ELECTRIC TERMINAL CLIP

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Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

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ELECTRIC TERMINAL CLIP

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1. The present invention relates to a clip-type electric terminal connector comprising a pair of toothed jaw members pivotally joined and spring biased about their pivot to press the jaw portions of the members together for gripping a wire or the like therebetween to effect an electrical connection therewith.

It is common practice to provide electric terminal clips comprising two co-extending, V-toothed jaw members, hinged together by pin means adjacent to one end of the jaws and being spring biased to cause the jaws to be normally engaged with the teeth thereof intermeshed. Heretofore, the jaw members have been pivoted on a pin extending through circular openings therein, the edges of which closely encircle the pin. In commercial production the jaw members are manufactured of strip metal cut and formed by combination stamping and forming dies and the wear of the dies, deviations in the gauge and temper of the strip metal stock sooner or later introduce variations in dimensions between the teeth and the pivot pin openings in the jaw members and as a result the teeth are not aligned so that the teeth on one jaw do not completely fill the voids between the teeth of the other jaw at all times. These gaps result in poor gripping action and an unworkmanlike appearance of the finished clip.

The principal object of the present invention is the provision of a novel and improved terminal clip of the type mentioned in which the hinge pin openings in one of the jaw members is slightly elongated in a direction longitudinally of the jaws whereby when the jaws are urged together by the spring, the jaws may shift longitudinally relative to one another as the teeth on the one jaw become centered between the respective teeth of the other jaw whereby the teeth always mesh with a continuous line of contact therebetween.

Other objects and advantages of the invention will be apparent from the following description of a preferred form thereof, reference being made to the accompanying drawings wherein:

FIGURE 1 is a longitudinal sectional view of a conventional form of an electric terminal clip;
FIGURE 2 is a sectional view of the clip taken along line 2—2 of FIGURE 1;
FIGURE 3 is a longitudinal sectional view of an electric terminal clip embodying the invention; FIG. 4 is a sectional view taken substantially along line 4—4 of FIGURE 3; and
FIGURE 5 is a fragmentary view of a portion of the clip shown in FIGURE 3 and on a larger scale.

Referring to FIGURE 1 of the drawings, a conventional, so-called, alligator-type terminal clip 5 is shown constructed in accordance with well-known practices. The clip comprises two jaw members 6, 7 formed of sheet metal stampings providing a tooth-like jaws 8, 9. U-shaped in transverse cross section and between which wires or other conductors, not shown, may be gripped to effect an electrical connection with another wire, not shown, secured inside a sleeve 10 formed on member 6. Members 6, 7 intermediate their ends, have pairs of side tabs 11, 12, respectively, formed so that tabs 12 nest between tabs 11 when the adjoining edges of jaws 8, 9 are in engagement for engagement with one another. This nesting of the tabs maintains the jaws in alignment by preventing lateral shifting of the jaws relative to one another. Tabs 11, 12 have aligned circular openings which closely receive a pivot pin or rivet 13 extending therethrough.

The inwardly turned edges of jaws 8, 9 have V-shaped teeth 14, 15 formed therealong, respectively, and which, ideally, mesh when the jaws are moved together so that the axes of the teeth 14 fit between adjacent teeth 15, and vice versa, and the edges of the teeth engage the opposite teeth edges throughout the length thereof. Jaws 8, 9 are normally urged together by a torsion spring 16 forced about pin 13 and having its ends reacting against the opposed jaw members, as shown, and the jaws may be separtated for receiving a wire or other object therebetween by depressing the end of jaw member which is opposite the end having the teeth 15 and on which a finger pad 18 is formed toward the jaw member 6.

In commercial production, the jaw members 6, 7 are each formed by a progressive die which blanks and forms the part from strip metal into its finished form. Due to the fact that the dies wear and are repaired from time to time and also because of slight production variations in the gauge and temper of the strip from which the members are made the dimensions between the teeth 14, 15 and the punched openings for receiving pivot pin 13 vary somewhat and as a result the teeth frequently fail to completely mesh, as is indicated in FIGURE 1, and the jaws consequently gaps, resulting in poor gripping action and an unworkmanlike appearance.

Referring to FIGURES 3 and 4, a novel and improved terminal clip 20 is shown embodying the present invention. Clip 20 is formed like clip 5 except as hereinafter pointed out, and corresponding parts are referred to by the same reference characters. For sake of clarity, spring 16 has been omitted from the drawings of clip 20, although it is to be understood that the spring is employed.

According to the invention, the openings 21 through side tabs 12 of jaw member 7 for receiving pivot pin 13 are elongated in the direction lengthwise of the jaw member, as seen in FIGURE 5 in which the opening 21 shown is exaggerated in length for sake of clarity. The extension or elongation of the openings 21 is in the same direction that the jaws 8, 9 extend from the pivot pin 13 and allows the member 7 to shift longitudinally relative to the pin 13 and member 6. To permit longitudinal shifting of jaw member 7 toward the teeth carrying end of jaw member 6, the edges 22 of tabs 12 are cut back to provide clearance between the tabs and the adjacent ends of the jaws 9 formed by turned in portions 24 of the jaw members. By this arrangement, when spring 16 urges the jaws together, any misalignment between the series of teeth 14 and 15 results in member 7 being shifted lengthwise by the camming action occurring between the engaged teeth until the teeth center in full meshing engagement with the teeth of the opposed teeth 15 and vice versa so that substantially line contact is effected between the meshed teeth. Although variations in dimensions may occur in the two jaw members during fabrication thereof, the elongated openings 21 permit shifting of one member relative to the other to accommodate such changes and provide complete meshing and closing of the teeth, as is seen in FIGURE 3, which assures good gripping action and a neat workmanlike appearance of the finished product.

The elongation of the openings 21 through which the pivot pin 13 extends need not be great, preferably about 0.02" to 0.04" depending upon the size of the clip and the fineness of the teeth. Under no circumstances need the elongation be greater than one-half the thickness of the thickest tooth.
Although but one form of the invention has been described, it will be apparent that other forms, modifications, and adaptations can be made, all falling within the scope of the claims which follow.

1. An electric terminal clip comprising two members each having an elongated gripping jaw generally U-shaped in transverse cross-section with longitudinal free edges of each jaw adjacent one another, means pivoting said members together adjacent one end of said jaws to provide for movement of said jaws into and out of engagement with one another, said jaws each having V-shaped teeth formed along said longitudinal free edges thereof adapted to mesh with the teeth of the other of said jaws when said jaws are moved to engage one another, and a spring urging said members about said pivot means to close said jaws with the teeth thereof in meshing engagement, said pivot means comprising an opening in one of said members, said opening being elongated in the direction that said jaws extend from said pivot means, and a pivot pin extending through said opening whereby said one member has sufficient movement longitudinally of its length on said pin relative to the other of said members to permit the teeth on one jaw to become centered between the respective teeth of the other jaw so that the teeth mesh with a continuous line of contact therebetween.

2. An electric terminal clip comprising two members each having an elongated gripping jaw generally U-shaped in transverse cross-section with longitudinal free edges of each jaw adjacent one another, means pivoting said members together adjacent one end of said jaws to provide for movement of said jaws into and out of engagement with one another, said jaws each having V-shaped teeth formed along said longitudinal free edges thereof adapted to mesh with the teeth of the other of said jaws when said jaws are moved to engage one another, a spring urging said members about said pivot means to close said jaws with the teeth thereof in meshing engagement, said pivot means comprising an opening in one of said members elongated in the direction that said jaws extend from said pivot means, a pivot pin extending through said opening whereby said one member has sufficient movement longitudinally of its length relative to the other of said members to permit the teeth on one jaw to become centered between the respective teeth of the other jaw so that the teeth mesh with a continuous line of contact therebetween, and a finger pad on said one member adjacent said pivot means.

3. An electric terminal clip comprising two members each having an elongated gripping jaw generally U-shaped in transverse cross-section with longitudinal free edges of each jaw adjacent one another, means pivoting said members together adjacent one end of said jaws to provide for movement of said jaws into and out of engagement with one another, said pivot means comprising side portions of one of said members nested inside corresponding side portions of the other of said members, said side portions both having aligned openings thereby said members each having V-shaped teeth formed along said longitudinal free edges thereof adapted to mesh with the teeth of the other of said jaws when said jaws are moved to engage one another, and a spring urging said members about said pivot to close said jaws with the teeth thereof in meshing engagement whereby said one member has sufficient movement longitudinally of its length relative to the other of said members to permit the teeth on one jaw to become centered between the respective teeth of the other jaw so that the teeth mesh with a continuous line of contact therebetween.

4. An electric terminal clip comprising two members each having an elongated gripping jaw U-shape in transverse cross-section with longitudinal free edges of each jaw adjacent one another and having V-shaped teeth formed along the longitudinal free edges thereof, said members being disposed with the toothed edges forming said jaws in registration with one another to mesh the teeth of one jaw with the teeth of the other jaw, said members each having a pivot section adjacent one end of said jaws U-shape in transverse cross-section, the sides of one of said pivot sections of one of said members nesting between the sides of said pivot section of the other of said members, the nesting sides of said pivot sections having aligned openings therethrough, said means extending through said aligned openings for pivotally supporting said members, the openings through the sides of said pivot section of one of said members being elongated in the direction said jaws extend from said pivot means sufficient shifting of said one member longitudinally thereof to allow the teeth on one jaw to become centered between the respective teeth of the other jaw so that the teeth mesh with a continuous line of contact therebetween, and spring means urging said members about said pivot to close said jaws together in meshing engagement.

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