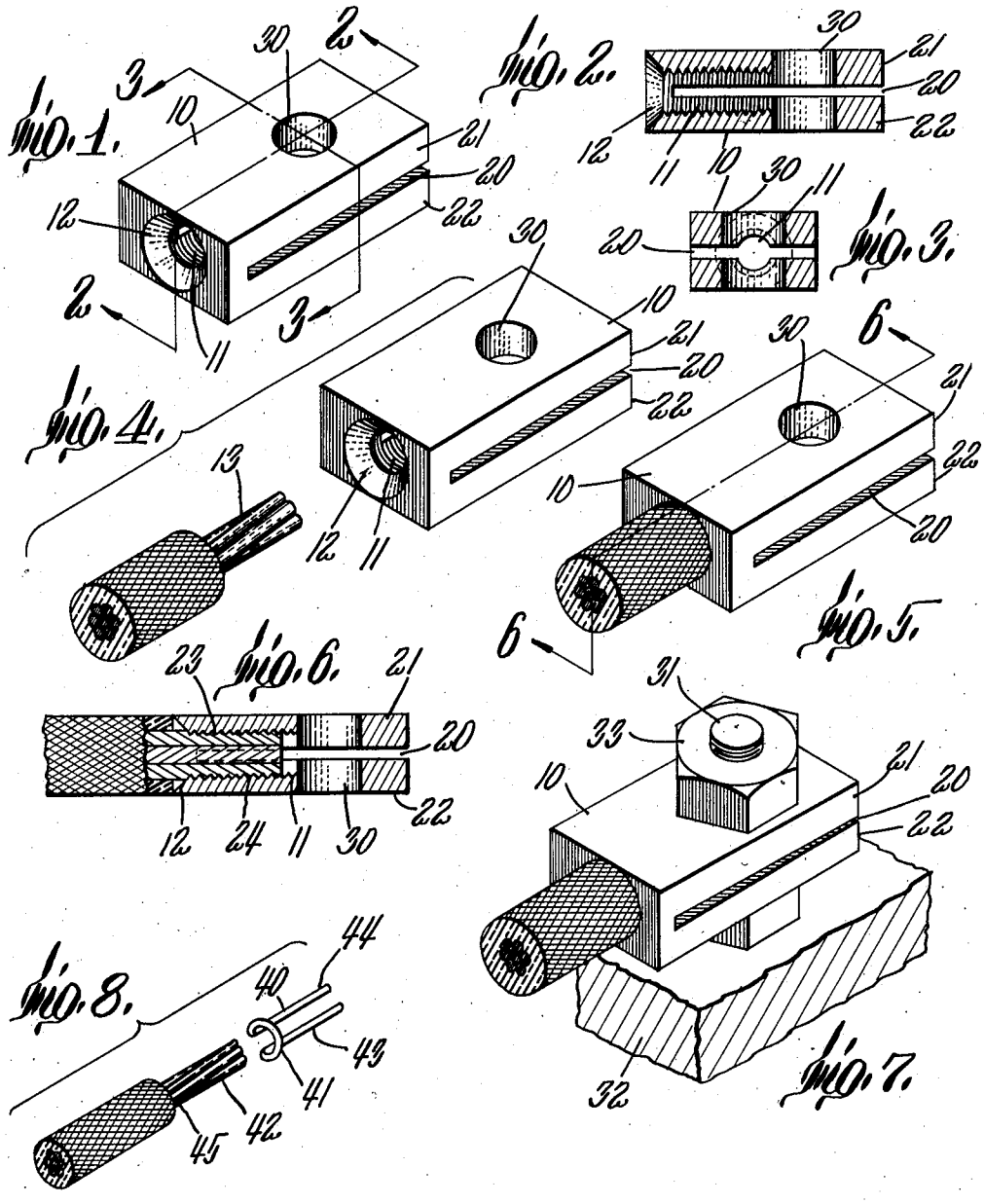
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SOLDERLESS CONNECTER LUG

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Inventor
Ernest G. Johansson
by Wright, Brown, Quinby & May
Attys

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SOLDERLESS CONNECTER LUG

Ernest G. Johansson, Watertown, Mass., assignor to The Palmer Electric & Manufacturing Co., Waltham, Mass., a corporation of Massachusetts

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This invention relates to a method of and means for making an efficient permanent electrical connection between an electrical conductor, particularly one of substantial diameter, and a binding post.

In making electrical connections with conductors of considerable diameter such as solid or stranded copper wires commonly used for carrying currents of considerable amperage, it is essential that good electrical connections of ample contact area be made at the terminals. Otherwise, there is danger of objectionable voltage drop at the connection, together with heat losses arising from excessive resistance at the point of poor contact, such heat losses involving potential danger to the conductor itself and to any combustible material in the vicinity. In order to obtain an adequate and satisfactory electrical connection, it has been customary in the past to employ connecter lugs having an open hollow at one end to receive the end of the conductor to be connected, the opposite end portion of the lug being flat and transversely bored to receive a binding post. In using a lug of this type, it is customary to strip a short portion of an insulated conductor, then to solder the stripped end portion of the conductor securely into the open hollow. The lug, thus adequately connected to the conductor, was then ready to be mounted on a binding post and to be clamped thereon as by a suitable nut. In actual practice, there are many occasions when it is highly inconvenient, if not impossible, to solder a lug on the end of an electric conductor. For example, a lineman working at the top of a pole may not have or be able to use facilities for soldering a lug onto the end of a conductor. Various attempts have been made to provide a lug which would furnish a satisfactory connection without the use of solder. Such attempts have heretofore resulted in clumsy and expensive structures.

The present invention represents a successful solution of the problem of furnishing a practical and efficient lug which is adapted to be connected to an electrical conductor efficiently and permanently without the use of solder. The invention may be embodied in a device which is a combination of a screw-thread cutter and clamp, the clamping being effected by a binding post and nut thereon. The thread-cutting member is adapted to cut a screw thread on the end portion of the electrical conductor to be connected, this screw thread not only enlarging the interfacial area of contact between the conductor and the connecting element, but also ensuring clean, bright surfaces for such contact. The thread-cutting elements are thereupon clamped tightly on the cut threads by the clamping action of the nut on the binding post to which the connecting element is attached. This results in an adequate permanent electrical connection which can easily be made without special tools.

For a more complete understanding of the invention, reference may be had to the description of an embodiment thereof which follows, and to the drawing, of which

Figure 1 is a perspective view of a device embodying the invention.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 1.

Figure 4 is a perspective view of a device similar to that shown in Figure 1 together with an end portion of an electric conductor in position to enter the device.

Figure 5 is a perspective view of the device and conductor after the end portion of the latter has entered the device.

Figure 6 is a section on the line 6—6 of Figure 5.

Figure 7 is a perspective view of the members shown in Figure 5 when mounted on and secured to a binding post.

Figure 8 is a perspective view of an end portion of an electric conductor, together with a device for increasing the size of such end portion.

Briefly, the invention consists in cutting a screw thread on the bared end portion of an electrical conductor, then clamping the threaded end portion between complementary threaded elements to ensure tight interfacial contact between the threaded surfaces of the conductor and elements, and to prevent the conductor from working loose by reverse rotation.

Figures 1, 4 and 5 illustrate in perspective an embodiment of the invention consisting of a metal block 10 which may be conveniently of general rectangular shape. A screw threaded bore 11 extends into this block from one end thereof, this bore being countersunk as at 12 to provide a conical guiding surface to guide into the bore the end of an electrical conductor such as a stranded wire 13, illustrated in Figure 4. The diameter of the bore 11 is such as to cause the threads therein to cut a screw thread on the electrical conductor 13, the latter being of metal which is considerably softer than that of the block 10. The block 10 is preferably made of brass or other rustless metal of sufficient hard-

ness to cut threads in the comparatively soft copper which is customarily used for electrical conductors. The block 10 is also provided with a longitudinal slot 20 which extends into the block from the end opposite the countersink 12. As shown, the slot 20 extends for nearly the entire length of the block. For the purpose of the invention, it is necessary that the slot 20 intersect the bore 11 for a considerable portion of the length of the latter from its inner end. The slot 20 is also of lesser width than the diameter of the bore 11 so that the intersection of a portion of the bore 11 by the slot 20 results in the formation of a pair of jaws 21 and 22 having on their inner surfaces threaded portions 23 and 24, these threaded portions being wall portions of the bore 11. In order to employ the block 10 to make an electrical connection, the block is screwed onto the end portion of a conductor 13. The guiding countersink 12 tends to crowd the ends of the strands of the conductor 13 into the threaded bore 11, so that, by rotation of the block 10, a screw thread is cut on the outer surface of the conductor 13 as the conductor advances longitudinally into the bore 11. This screw thread, by reason of its valleys, offers an increased surface area on the conductor 13 for interfacial contact with the interior of the bore 11. Since these faces are freshly formed as a screw thread is cut, a bright clean contact is thus obtained. As the end portion of the conductor comes opposite the slot 20, it turns easily in the bore 11 since the threaded surfaces 23 and 24 can yield from each other slightly by reason of the slot and therefore do not bind the conductor. When the conductor 13 has penetrated a sufficient distance into the bore 11 for adequate interfacial contact with the surfaces 23 and 24, the jaws 21 and 22 are pressed toward each other by suitable means with the result that the threaded surfaces 23 and 24 are pressed securely against the contacting portions of the conductor 13 so that the ridges of each thread are wedged into the valleys of its complementary thread and a tight connection is made. The conductor 13 is firmly gripped and reverse rotation thereof is prevented.

The invention is not limited to any particular means for pressing the jaws 21 and 22 toward each other for the purpose of clamping the conductor tightly within the bore 11. It is convenient, however, to employ for this purpose a binding post to which the block 10 is to be attached. To this end, the block may be provided with a transverse bore 30 extending therethrough from top to bottom and transversely intersecting the slot 20. The bore 30 is of sufficient size to receive easily a binding post 31, which, as is customary, may be mounted on a suitable base 32. The binding post is provided with a nut 33 or its equivalent. By screwing the nut 33 tightly against the block 10 after the latter has been placed upon the binding post 31, the jaws 21 and 22 are thus pressed toward each other. Thus, the operation of setting up on the nut 33 serves the double purpose of clamping the end portion of the conductor 13 tightly between the jaws 21 and 22, and of making a secure electrical connection between the block 10 and the binding post 31. It is obvious that, when the nut 33 is backed off to permit the disconnection of the block 10 from the binding post 31, the block 10 is thus released so as to be readily removed from the end portion of the conductor 13 by reverse rotation. It is further evident that each time the block 10 is removed from or replaced on the end of the conductor 13, the contact faces of both the conductor and the block are cleaned and brightened.

Blocks 10 may be provided with bores 11 of various sizes to receive the standard sizes of electrical conductors. In some cases, it may be desired to connect a conductor to a block having an over-size bore 11. This may be done by increasing the size of the end portion of the conductor 13 by the addition of extra strands sufficient for the purpose. For example, the addition of two extra strands to a No. 6 stranded wire will increase its size to the equivalent of a No. 4 wire. To facilitate the addition of a pair of extra strands, I may provide a bent piece of single-strand wire 40, as illustrated in Figure 8. As shown, this auxiliary piece may consist of an intermediate portion 41 adapted to pass around somewhat more than half the circumference of the conductor 42. The member 40 has, in addition to the intermediate portion 41, straight end portions 43 and 44, these portions being preferably of approximately the same length as the stripped end portion 42 of the conductor. Thus, when the intermediate portion 41 is seated against the end of the insulation 45 of the conductor, the ends of the straight portions 43 and 44 are substantially flush with the end of the conductor 42. Thus the ends of all of the strands including 43 and 44 penetrate substantially equal distances into the bore 11 when the block 10 is screwed thereunto. By the use of such devices, a standard sized block 10 can be employed for conductors of various sizes.

It is evident that various modifications and changes may be made in the embodiments herein shown and described without departing from the spirit or scope of the invention as defined in the following claims.

I claim:

1. An electrical connection, comprising a block having a screw-threaded bore extending inwardly from an end thereof, said block being split from the opposite end so that the bore is longitudinally intersected for a substantial portion of the length thereof from its inner end, an electrical conductor having a screw-threaded end engaged in said threaded bore, a binding post extending loosely through both split end portions of said block, and means on said binding post for pressing said split end portions of the block toward each other whereby the end portion of the conductor is tightly clamped in said threaded bore.

2. An electrical connecter comprising a fixed binding post, a block of metal having a longitudinal threaded bore extending in from one end of said block, a transverse slot extending in from the other end of the block to bisect said bore transversely for most of the length thereof and a second bore perpendicularly intersecting said slot and threaded bore, said binding post extending loosely through and projecting beyond said second bore, and a nut threaded on the projecting portion of said binding post and adjustable to press against said block.

ERNEST G. JOHANSSON.