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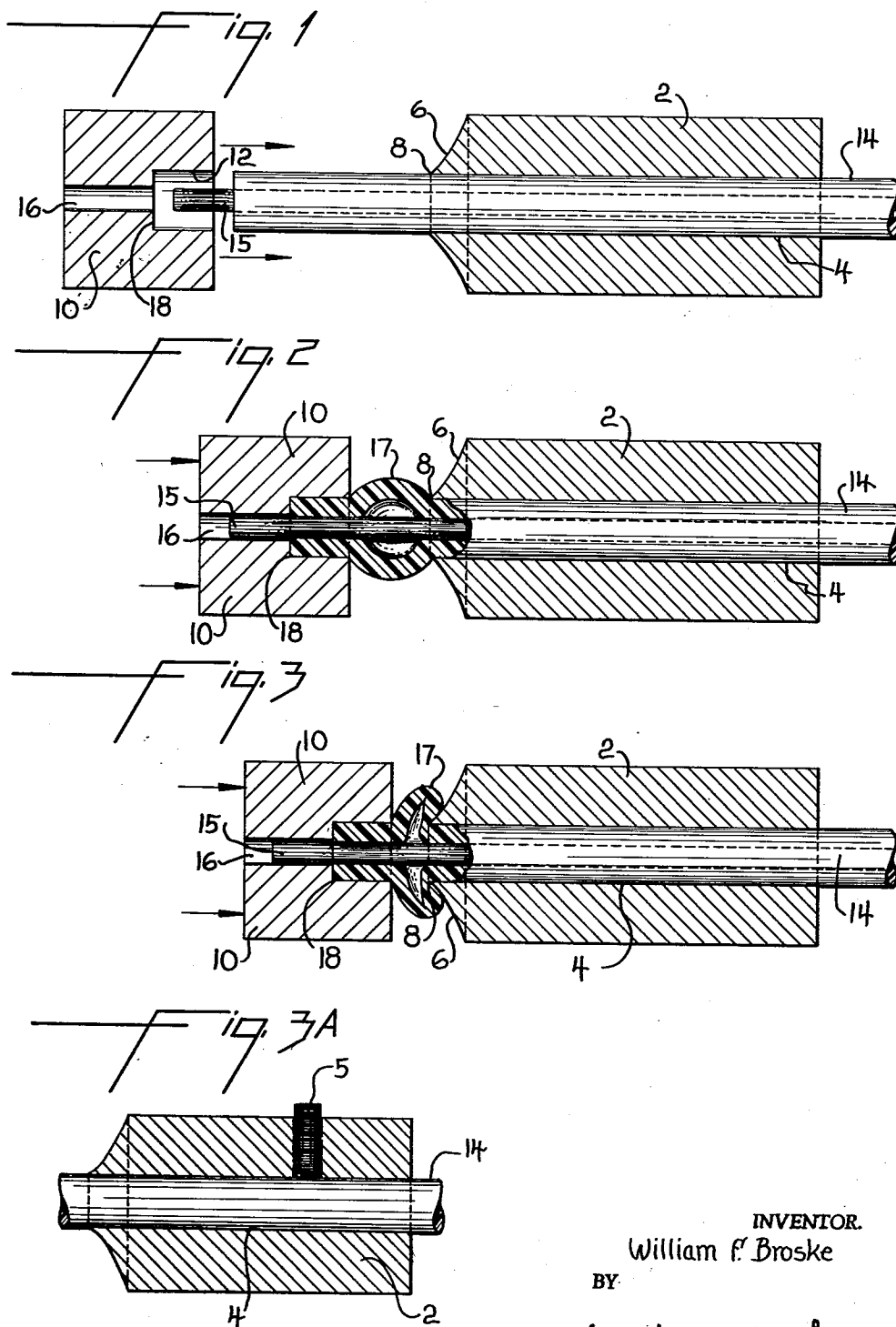
W. F. BROSKKE

3,044,333

INSULATION PUSH BACK STRIPPER

Filed Dec. 31, 1958

3 Sheets-Sheet 1



INVENTOR.

William F. Broske

BY

Laurie, Morris & Lafford

July 17, 1962

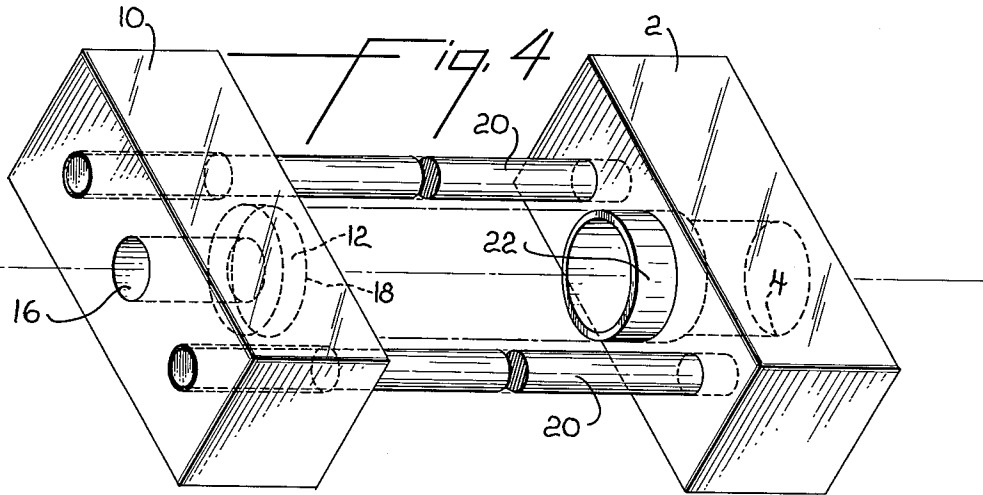
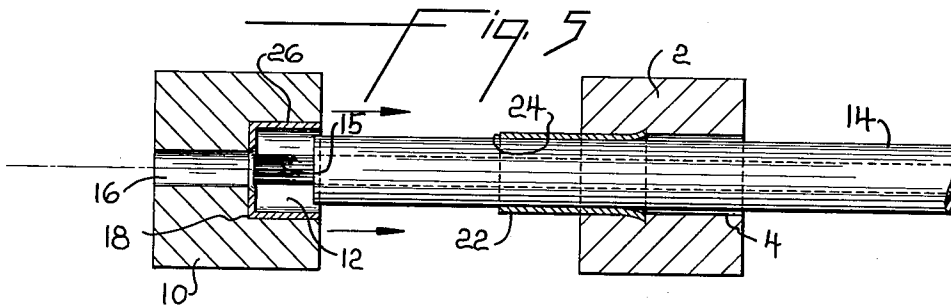
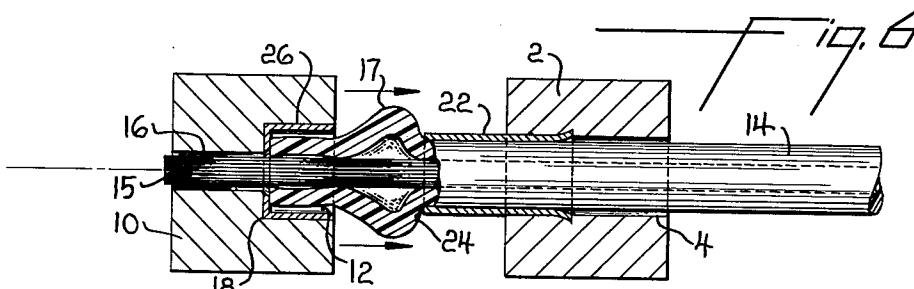
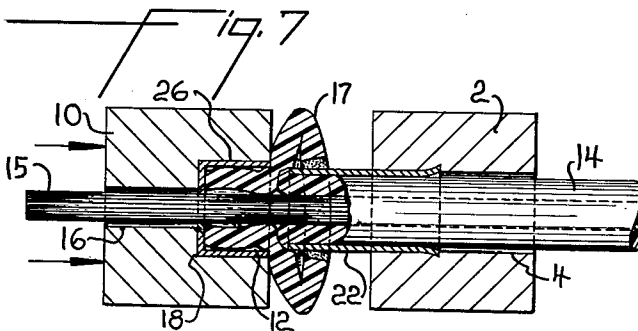
W. F. BROSKE

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INSULATION PUSH BACK STRIPPER

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3 Sheets-Sheet 2



INVENTOR.

BY

Kurtis, Morris & Safford

July 17, 1962

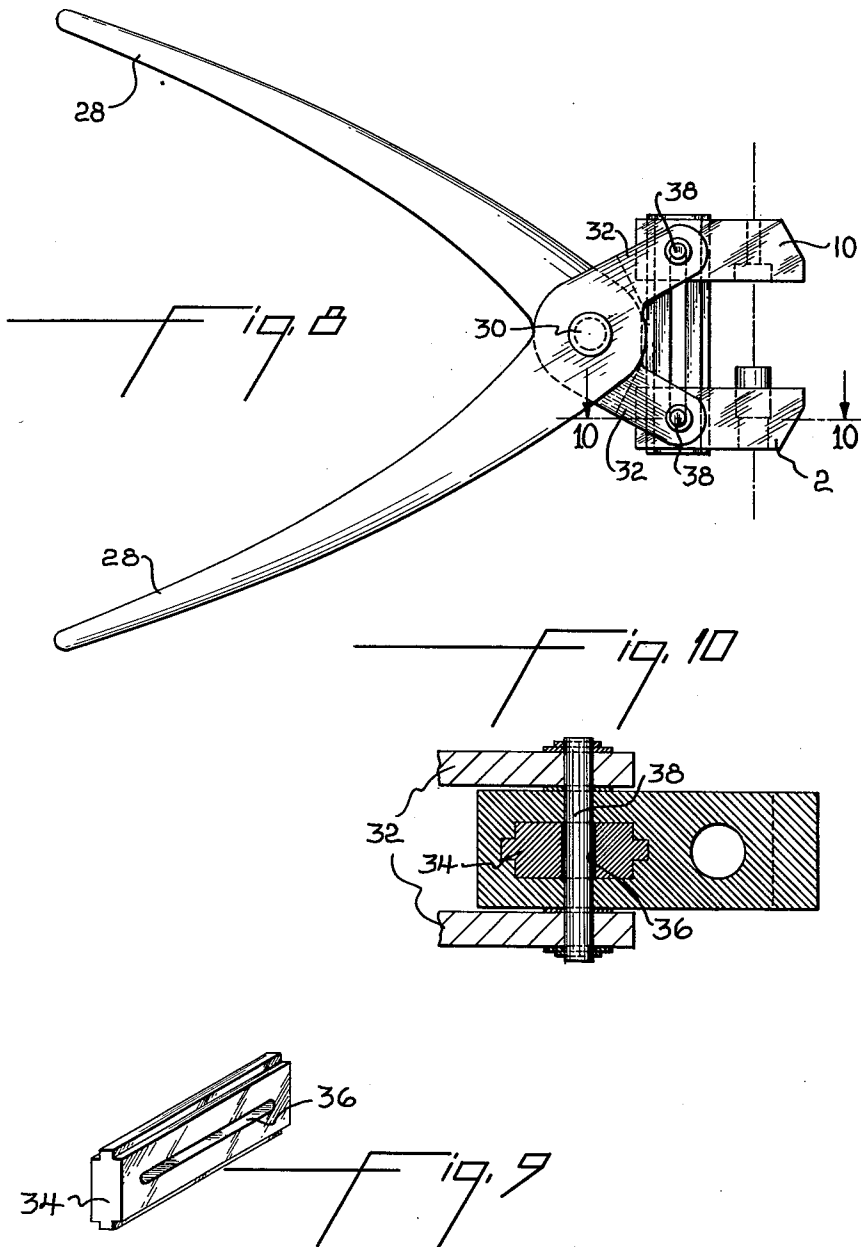
W. F. BROSKE

3,044,333

INSULATION PUSH BACK STRIPPER

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3 Sheets-Sheet 3



INVENTOR.

BY

Austin, Morris & Safford

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3,044,333

INSULATION PUSH BACK STRIPPER

William F. Broske, Camp Hill, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

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2 Claims. (Cl. 81-9.5)

This invention relates to methods and apparatus for removing a sheath, such as an insulating sheath, from a core, such as a conducting core of a wire.

The most widely used method of removing insulation from a wire is to cut the insulation circumferentially and slide the severed section from the metallic core of the wire. A serious drawback of this method is that unless a high degree of care is exercised in making the cut, there is a danger of nicking the metallic core and, in the case of stranded wires, severing one or more of the strands. If this happens, the conducting core is physically weakened and/or its ability to conduct an electrical current is impaired. Various hand-tools and machines are available for stripping wire insulation by this method and if the cutting blades or dies are manufactured to a high degree of precision the possibility of nicking and/or cutting the conducting core is minimized, however, the possibility is nonetheless always present and the manufacture of precisely machined cutting blades or knives for tools of this type is a time consuming and expensive operation.

An object of the present invention is to provide an improved method and apparatus for removing a portion of a sheath, such as an insulating sheath from a core, such as a wire. A more specific object is to provide a wire stripper which obviates the danger of damaging the conducting core of the wire when the insulation is stripped therefrom. A still further object is to provide an improved wire insulation stripper which is substantially fool-proof and which can be manufactured at a relatively low cost and which does not require precise machining operations during manufacture.

These and other objects are achieved in one preferred embodiment comprising a support member for the wire and an insulation pushing device having an aperture therein which is of a size sufficient to permit passage of the conducting core of the wire therethrough but which will not permit passage of the insulation. The support member may take the form of a block having an aperture therein of a size slightly larger than the diameter of the unstripped wire so that the wire with the insulation thereon can be inserted through the block and brought to bear against the insulation pusher. Also provided in this preferred embodiment is a severing or cutting device which is effective between the support member and the wire pushing device. In use, the wire is positioned in the support member with its cut face against the pushing device, and the pushing device and the support are moved relatively towards each other whereby the insulating sheath of the wire is bunched and gathered to form a collar in the zone between the support and the pushing device. Thereafter, the severing device severs this collar of sheath material around its entire periphery to separate the end section of insulation from the body thereof, and the end section can then be removed by sliding it off of the wire. Advantageously, the severing device is effective in a locus extending around the axis of the wire and spaced from the metallic core thereof so that the severing

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edge or surface does not engage the metallic core of the wire but performs the severing operation in a location spaced from this core. By virtue of this fact, the possibility of damaging the conducting core is substantially eliminated.

In the drawing:

FIGURE 1 is a cross sectional view of one form of apparatus for practicing the invention;

FIGURES 2 and 3 are views similar to FIGURE 1 but showing the parts in their relative positions during the successive stages of a wire stripping operation;

FIGURE 3A is a sectional view of an alternative embodiment having a wire clamp;

FIGURE 4 is an alternative form of apparatus for practicing the invention;

FIGURES 5, 6 and 7 are cross sectional views of the embodiment of FIGURE 4 showing the parts in their relative positions during two successive stages of an insulation stripping operation;

FIGURE 8 is a plan view of a hand tool incorporating the invention;

FIGURE 9 is a perspective view of a guide bar which forms part of the hand tool at FIGURE 8; and

FIGURE 10 is a view taken along the lines 10-10 of FIGURE 8.

Referring now to FIGURES 1-3, a simplified embodiment of a tool for practicing the invention comprises a wire support member 2 having an axial passageway 4 extending therethrough which is of a diameter slightly larger than the wire 14 so that the wire can be inserted through the passageway. Advantageously, this bore or passageway 4 should not be grossly oversized but should be of a diameter such that its cross sectional area is substantially filled by the wire. A nose portion 6 is provided on one end of support 2 and is externally tapered towards the bore to form a cutting edge 8 which surrounds the axis of the bore and the wire when it is positioned therein. A wire pushing device generally indicated at 10 has an axial bore 16 which is of a diameter sufficiently large to receive the insulating core 15 of the wire but which is not sufficiently large to permit passage of the insulation therethrough. A counterbore 12 in this wire pusher member had a diameter sufficiently large to receive the insulated wire, i.e. approximately the same diameter as passageway 4, and a shoulder 13 is defined between bore 16 and counterbore 12.

In use, the support and wire pusher are normally disposed in spaced apart relationship as shown in FIGURE 1 and the wire is threaded through passageway 4 and into counterbore 12 until its face bears against shoulder 18. Thereafter, pusher 10 and support 2 are moved relatively towards each other so that a pushing or compressing force is brought to bear against the cut face of the insulation of the conductor although this force is not brought to bear against the conducting core of the conductor. The insulation is, as a result, gathered and bulged in the zone extending between cutting edge 8 and the face of pusher 10. It will be understood that the conductor 14 must be lightly held in the passageway in support 2 so that it is not displaced rightwardly as viewed in the drawing during this movement of the pusher and support. Such light clamping of the conductor may be accomplished manually by holding the wire to the right of support 2. Alternatively, a separate

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clamp such as a set screw 5, as shown in FIGURE 3A can be provided for clamping the wire.

After the insulation extending between the cutting edge and the wire pusher has been gathered as shown in FIGURE 2, and the conducting core of the wire extends into bore 16, cutting edge 8 begins to cut into the bulged section of insulation 17 and in doing so severs this section from the running length of the wire. Thereafter the pusher member and support are moved relatively apart and the severed section of insulation can be removed by merely sliding it over the end portion of the conducting core of the wire.

A salient advantage of the invention is that the cutting edge 8 is effective along a locus extending around the wire and spaced from the conducting core thereof. The actual cut is then made in a direction extending parallel to, and spaced from, the core of the wire rather than towards the conducting core as with prior art stripping devices. Since the cutting edge 8 can not engage the conducting core there is virtually no possibility that the strands of this core will be nicked or severed during the cutting operation.

The invention is applicable to insulation coverings of many of the commonly available types, for example, the commonly used plastic insulation coverings of vinyl or the like can be gathered and bulged as shown in FIGURE 3 and since these materials are highly notch sensitive (i.e. amenable to cutting) wires insulated with these materials can readily be stripped by means of the invention. Many of the commonly employed fabric or fiber insulating materials can also be removed by the invention although these latter materials are not so highly notch sensitive as a general rule as are organic plastics. Where a fabric insulation is involved, it might be necessary to compress and gather the insulating sheath to a greater extent in order to cut cleanly therethrough than is the case with the organic plastic insulating materials.

FIGURE 4 shows an alternative form of the invention in which the support member 2 and the insulation pushing member 10 are guided for relative motion towards and away from each other by means of rods 20 extending from the support freely through guide holes in the pushing member 10. It will also be noted that in this embodiment the severing means take the form of a hard metal sleeve 22 which is press fitted within axial bore 4. Advantageously, this sleeve is relatively thin walled and its face 24 may be flat as shown at 24 so that it shears rather than cuts the sheath as explained below. Also, the counterbore 12 may be provided with a similar hard metal insert 26.

In use, upon movement of the parts relatively towards each other, the sheath is gathered and the gathered section is severed as shown in FIGURE 7. Where a plastic insulation is being removed as illustrated in FIGURES 5-7, the collar of insulation may be sheared before sleeve 22 enters the counterbore in pushing device 10. Where the insulation is relatively thinner walled than the insulation shown in the drawing, however, the support and the pushing device will approach each other more closely than in FIGURE 7 and the sleeve may enter the counterbore before severance is effected. It should be mentioned that the embodiment of FIGURE 4 is particularly adapted to the removal of the braided metallic shielding provided on some types of insulated wires. Where such shielding is being removed by the practice of the invention, it is generally preferable to shear the gathered collar of shielding material rather than to cut it and such shearing can be effected if sleeve 22 is caused to pass beyond the face of insert 26. It will be realized that where shielding is being removed, the bore 16 of the pushing member must be of a diameter adequate to permit passage of the insulated wire and the shoulder 18 will be relatively narrow so that it will engage the shielding and gather it to form the collar.

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As previously mentioned, the wire support member may take the form shown in FIGURE 1 or it may comprise a clamp adapted to tightly clamp the conductor. It has been found that if the wire is held manually close to the support, clamping is not always necessary particularly with some types of insulated wire. However, if it is not convenient to hold the wire manually adjacent support 2, this support member may be made in two parts which are separable to permit positioning of the wire therebetween but which can be locked together to clamp the wire tightly.

It may prove feasible under some circumstances to form the nose portions 6 of FIGURE 1 or the sleeve 22 of FIGURE 4 as an element separately movable from the wire support so as to permit rotation of this element during the severing operation. Such rotation of this severing edge will of course facilitate the cutting action of the edge. It may also be desirable to supply heat to this element for some types of insulation, particularly thermoplastics and heat sensitive materials.

The wire support and the pushing device can be provided with any convenient form of moving means for effecting their relative motion towards and away from each other. For example, the invention can be provided in the form of a bench tool having a pneumatic piston-cylinder or a lever system for effecting the relative motion of the parts. FIGURE 8 shows a convenient plier-type hand tool, described in the United States patent to Olsen, Number 1,315,235, on which the support member and the pushing device are mounted. This embodiment has a pair of crossed handles 28, which are pivotally connected together at 30 and bifurcated at their ends 32 receive the sides of the support and pushing device. In this embodiment, the support 2 and pushing device are slidably mounted on a guide bar 34 having an elongated slot 36. Pins 38 extend between the ears of the handle ends through this slot and through drilled holes in the support and pushing device. In use, when the handles are closed the pushing device and support move relatively towards each other along a rectilinear path to accomplish the stripping operation. It will be obvious that the pushing device and support will move rightwardly, as viewed in the drawing, as they move together, however, both members move at the same speed and this rightward movement does not, therefore, interfere with the wire stripping operation.

Changes in construction will occur to those skilled in the art and various apparently different modifications and embodiments may be made without departing from the scope of the invention. The matter set forth in the foregoing description and accompanying drawings is offered by way of illustration only. The actual scope of the invention is intended to be defined in the following claims when viewed in their proper perspective against the prior art.

I claim:

1. Apparatus for stripping an insulating sheath from the end of a wire comprising, a support for supporting said wire adjacent its end while leaving said end unsupported, sheath engaging means normally disposed spaced from said support, said sheath engaging means having portions thereof engageable with the cut face of said sheath and having an opening therein to permit passage of the insulating core of said wire, and severing means disposed between said sheath engaging means and said support, said severing means having severing edges movable to sever along a locus surrounding a wire extending between said support and said sheath engaging means, means for moving said sheath engaging means and said severing means relatively towards each other thereby to gather and bunch said insulating sheath and to form a radially extending collar thereof, whereby upon relative movement of said severing edges into said gathered insulation, said insulation is severed along said locus.

2. A device as set forth in claim 1 wherein said support comprises a clamp for clamping said wire.

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