

Feb. 2, 1971

H. H. STASCHEWSKI

3,559,390

APPARATUS FOR BONDING TWISTED PLASTIC INSULATED CONDUCTORS

Filed Oct. 22, 1968.

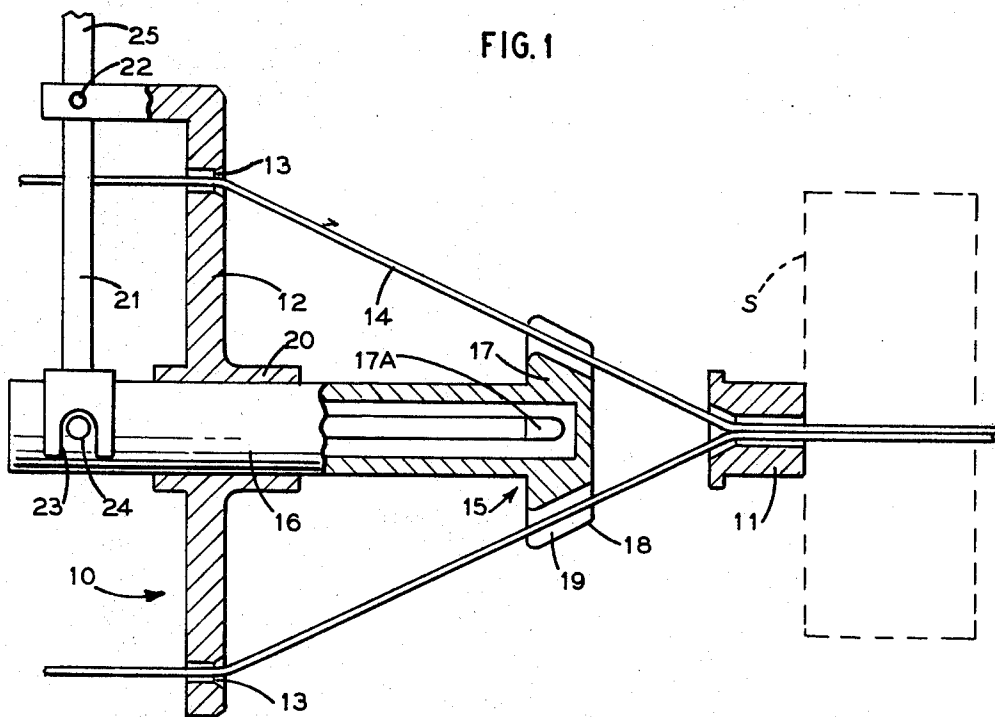
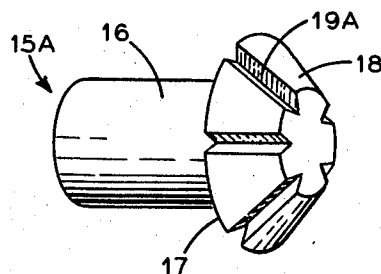


FIG. 2



INVENTOR.

HARRY H. Staschewski

BY

Philip S. Hilbert

ATTORNEY

1

3,559,390

APPARATUS FOR BONDING TWISTED PLASTIC INSULATED CONDUCTORS

Harry H. Staschewski, Langenhagen, Germany, assignor to Kabel- und Metallwerke Gutehoffnungshütte Aktiengesellschaft, Hannover, Germany, a corporation of Germany

Filed Oct. 22, 1968, Ser. No. 769,553

Claims priority, application Germany, Oct. 24, 1967,

P 17 04 154.2

Int. Cl. H01b 13/02

U.S. Cl. 57—6

6 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus associated with mechanism for twisting the elements of electric cable wherein the direction of twist is reversed at intervals; the apparatus being adapted to bond the elements of the cable together by way of their thermoplastic insulation, the bonding action taking place at intervals.

BACKGROUND OF THE INVENTION

In the twisting together of cable elements or the like, it is known to provide means for preventing untwisting of the twisted elements under conditions of tension or torsion. Such means is particularly necessary in the case of known mechanisms which not only twist the cable elements, but periodically reverse the direction of twist; the reversing points being sensitive to tension.

Thus, in such mechanisms, the elements to be twisted are drawn from suitable supply reels and are accumulated in a rotating storage means, whose direction of rotation may be reversed. When the storage means is filled, its direction of rotation is reversed whereby the stored material is removed therefrom and simultaneously, further material drawn from the supply reels is twisted in the opposite direction. It follows that the twist direction changes at intervals corresponding to the capacity of the storage means.

It has been proposed to bind the twisted elements together by means which is capable of spraying a hot-melt quick setting adhesive at appropriate intervals during the twisting operations, with suitable control means for making the spray means operative when necessary. Such known binding means has very limited usage and can not be applied to electric cables, particularly those having conductors concentrically disposed about a shaped core member.

In another known device, the binding means comprises a spinner or winder moving in the direction of the cable twisting operation and being adapted to apply adhesive coated tapes to the twisted elements at appropriate points. This entails the use of rails for carrying the spinner with a reversing motor to change the direction of movement of the spinner after applying tape to a twist reversing point. Obviously, such a device requires extensive control equipment adapted to operate the same at the speed of cable twist and has proven to be quite costly. Further such device is limited in use to instances where the reversal points of the twisted elements are fairly closely spaced.

Accordingly, an object of this invention is to provide improved means for bonding twisted, plastic coated elements at selected intervals related particularly to instances where the direction of twist may be reversed at given intervals; the means being of relatively simple construction, economical to fabricate and capable of operating under widely varying twist conditions.

2

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a side elevational view, with parts in section, showing a bonding apparatus embodying the invention; and

FIG. 2 is a perspective view showing an alternative form of bonding head.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

10

As shown in FIG. 1, 10 designates an apparatus for bonding elements which are to be twisted together, so as to resist untwisting under conditions of tension or torsion. The apparatus 10 is associated with a twisting mechanism which may be of the known storage type, indicated at S and having a nipple 11 for receiving the elements 14 which are to be twisted together.

15

Thus, elements 14 may be electric conductors covered with thermoplastic insulation, which are drawn from suitable supply reels, not shown and pass through a guide disc 12 coaxially related to nipple 11, and having circumferentially spaced openings 13 to pass said elements 14.

20

Means is provided for preheating the insulating covering on elements 14 to bring the same to a pasty, adhering condition, immediately in advance of nipple 11. Such means comprises a head 15 having a tubular portion 16 with a frusto-conical head portion 17 at the forward end thereof. The surface 18 thereof is formed with grooves 19 through which elements 14 may pass.

25

The head 15 is brought to a temperature related to the plastic insulation on elements 14 which will render the outer surface portions of such insulation pasty, whereby the contacting surface portions of said elements when said elements are twisted together in mechanism S, will bond to each other. To this end, a heater element 17A is located in head portion 17, which may be energized by a suitable electric current supply, not shown.

30

The head 15 is mounted for advanced and retracted movement in an axial hub portion 20 of guide disc 12, to bring the same into operative engagement with elements 14 at periodic intervals, as desired. The tubular portion 16 is thus reciprocated by an arm 21 pivotally mounted as at 22 on a bracket portion extending from a peripheral portion of guide disc 12. The lower end of arm 21 is bifurcated as at 23 to receive therein a stud 24 projecting radially from tubular portion 16.

35

The outer end 25 of arm 21 is suitably rocked, by controlled means, not shown, to advance and retract the head 15 so as to activate the insulation on elements 14 to an adhering condition. Thus, this may take place at long intervals, or at short intervals, as when the elements 14 are to be bound before and after a reversal in twist of elements 14 within mechanism S.

40

The grooves 19 on head 15 may be of semicircular cross section so as to limit the fusion of the thermoplastic covering on elements 14 to those surface portions which will come in contact tangentially with each other. Alternatively, the head 15A, as shown in FIG. 2, has grooves 19A which are of V shaped cross section to accommodate elements 14 of varying diameters; the heat again being applied to limited surface portions of the thermoplastic covering on elements 14.

45

It will be apparent, that with suitable control of the bonding head 15, both as to its operative temperature and its reciprocatory movements, related to the operation of mechanism S and the drawoff speed of the twisted elements 14; the elements 14 may be quickly bonded within nipple 11 of mechanism S or immediately thereafter.

50

It is understood that the guide disc 12 will have as many openings 13 as there are elements 14 to be twisted;

55

60

65

70

3

and interchangeable discs of different element capacities may be provided.

Head 15 may be modified to provide an axial passage therethrough, to pass a core element, not shown, about which elements 14 may be twisted and adhered, as above described.

What is claimed is:

1. Apparatus for bonding twisted linear elements having fusible thermoplastic coverings, comprising in combination with an element twisting mechanism having a constricted inlet means, guide means for directing a plurality of moving elements in converging paths toward said inlet means, said guide means being coaxially related to said inlet means, and fusing means located between said guide means and said inlet means, said fusing means being operable to fuse limited, opposed surface areas of the thermoplastic coverings of said linear elements at spaced points along the length thereof, whereby contact of the fused surface portions of said converging elements will bond said elements together at said spaced points.

2. Apparatus as in claim 1, wherein said fusing means is arranged for reciprocatory axial movement between operative and inoperative positions thereof.

3. Apparatus as in claim 2 wherein said guide means comprises a disc having a plurality of circumferentially spaced guide openings therein located adjacent the periphery thereof and an axially disposed hub portion, said fusing means including an elongated portion slidably mounted in said hub portion, an arm member pivotally mounted on a peripheral portion of said disc, and inter-

4

engageable means on said arm member and said elongated portion of the fusing means to impart reciprocatory movement to said fusing member upon oscillating movement of said arm member.

4. Apparatus as in claim 1 wherein said fusing means comprises a frustoconical head portion having radially directed grooves formed on the tapered surface portion thereof for passing said moving elements.

5. Apparatus as in claim 4 wherein said grooves are of semicircular cross section.

6. Apparatus as in claim 4 wherein said grooves are of V-shaped cross section.

References Cited

UNITED STATES PATENTS

2,048,450	7/1936	Horn	156—47
2,425,294	8/1947	Morgan	156—47X
2,434,073	1/1948	Isenberg	57—6X
2,518,454	8/1950	Elliott	156—47X
2,749,261	6/1956	Hardison	156—47
2,828,234	3/1958	Hengel et al.	156—47

FOREIGN PATENTS

656,008	1/1938	Germany	57—9
---------	--------	---------	------

JOHN PETRAKES, Primary Examiner

U.S. Cl. X.R.

57—34, 59, 66; 156—47