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H. MOONS ETAL

3,261,239

METHOD AND ARRANGEMENT FOR BARING ELECTRIC RIBBON CABLES

Filed June 10, 1963

2 Sheets-Sheet 1

FIG.1

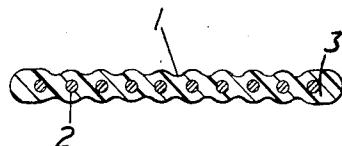


FIG.2

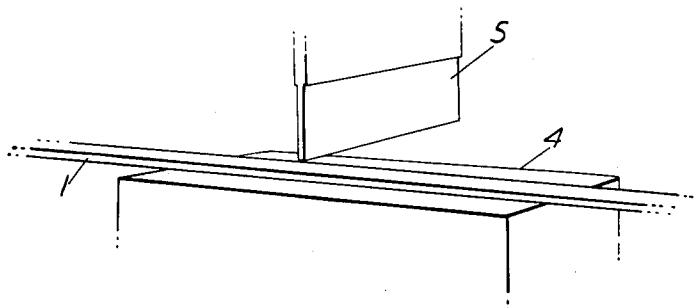
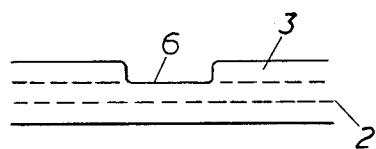


FIG.3



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FIG.4

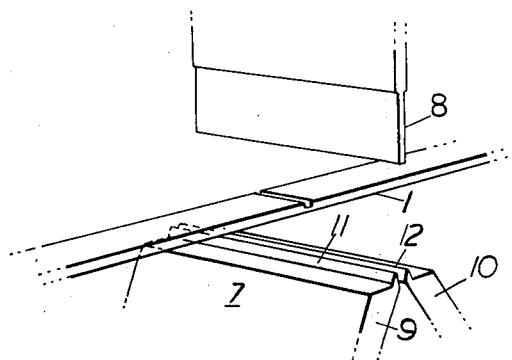


FIG.5

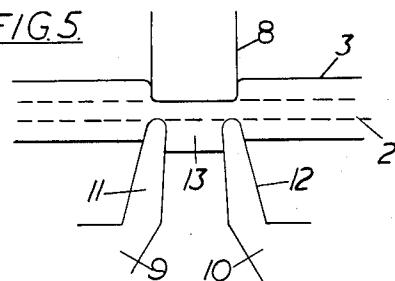
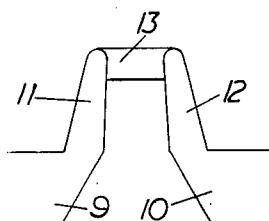
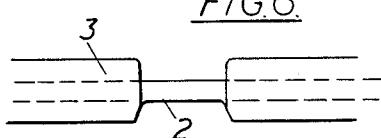


FIG.6



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3,261,239

### METHOD AND ARRANGEMENT FOR BARING ELECTRIC RIBBON CABLES

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280,312

11 Claims. (Cl. 81—9.51)

This invention relates to a method and arrangement for baring, at desired places, electric ribbon cables in which the conductors are embedded in thermoplastic insulating material in a single plane.

Such a method and arrangement is already known in the prior art. The insulating material conveying the conductors is softened and forced between the conductors which are thus bared; afterwards this insulating material is more fully disengaged from the conductors and cutting means are finally employed in order to eliminate the disengaged material. The cutting operation is, however, particularly delicate and time consuming.

An object of our invention is to provide an improved method and arrangement for removing the insulation of electric ribbon cables at predetermined places which does not require a delicate and time consuming cutting operation.

A feature of our invention is the provision of a pair of longitudinal knives which cooperate with each other and a resilient press to cut, pinch, and remove insulating material from electric ribbon cables at desired places along the cables.

The above mentioned and other objects and features of our invention will become more apparent and the invention itself will be best understood by referring to the following description of an embodiment taken in conjunction with the accompanying drawings, in which:

FIG. 1 shows a cross-sectional view of a ribbon cable comprising a plurality of coplanar conductors embedded in insulating material;

FIG. 2 is a perspective view of a press arrangement for effecting the first step of our manufacturing method according to our invention;

FIG. 3 is a side elevational view of the cable obtained after this first step;

FIG. 4 is a perspective view of a press arrangement for effecting the second step of our manufacturing method;

FIG. 5 is a side elevational view of a cable and parts of the press during this second step; and

FIG. 6 is a side elevation view of a cable and parts of the press after this second step.

Ribbon cable 1 upon which the method of the present invention is applied is shown in FIG. 1. Cable 1 comprises a plurality of conductors 2 arranged in spaced parallel relationship in one plane and which are enclosed in a homogeneous mass of thermoplastic material 3 such as plasticized polyvinyl chloride, hereinafter referred to as PVC.

Ribbon cable 1 is fed at a constant speed over table 4 (FIG. 2) and under the heated displaceable stamp 5 of a press. Cable 1 is stopped at regular intervals. At the moment the cable is stopped, heated stamp 5 (which is mounted in a vertical plane perpendicular to the longitudinal direction of cable 1) is moved towards table 4.

Cable 1 is thus pressed against table 4 and the PVC covering the upper face of the conductors is softened and introduced between the conductors. A cable is obtained having a groove 6 (FIG. 3) wherein the upper face of the conductors is bared. The temperature of stamp 5 should be such that it prevents the PVC from sticking to this stamp.

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Cable 1 is then conveyed to table 7 and displaceable stamp 8 which is mounted above the table 7. Table 7 consists of parts 9 and 10 which are provided at their upper surface with longitudinal knives 11 and 12 respectively, the distance between these knives being substantially equal to the thickness of displaceable stamp 5. Knives 11 and 12 are heated in a not shown but obvious manner. The longitudinal blades are perpendicular to the path of travel of cable 1. Displaceable stamp 8 is made of a relatively soft resilient material, i.e., silicone rubber, and has a thickness which is substantially equal to that of stamp 5.

Table 7 (if a movable table is used) and the stamp 8 are then moved towards each other so that the cable 15 shown in FIG. 3 is gripped between them. Stamp 8 enters groove 6, while simultaneously the edges of the knives 11 and 12 enter the PVC 13 located below the conductors of this groove 6 along lines which are substantially coplanar with the edges of groove 6. The PVC 13 is cut along these lines due to the simultaneous 20 effect of the heating and cutting action of the knives. Stamp 8, being made of a relatively soft material, is able to push the PVC 13 down between knives 11 and 12. In this manner the cable shown in FIG. 6 is obtained when 25 stamp 8 is removed and the cable springs away from the knives which retain the gripped insulating material.

While the principles of our invention have been described above in connection with specific apparatus, it is to be clearly understood that this description is made only by way of example and not as a limitation on the scope of our invention.

We claim:

1. An arrangement for baring a portion of electric ribbon cables having a plurality of conductors disposed in a plane in insulating material, comprising:

movable means for displacing the insulating material from one side of the cable to the opposite side of the cable within the confines of the cable to bare the conductors on said one side;

resilient means for applying a force to the displaced insulating material to move said insulation material to said opposite side; and

means cooperating with said resilient means for removing all the insulating material from said portion whereby said conductors in said portion are exposed free of insulation.

2. An arrangement for baring electric ribbon cables having a plurality of conductors disposed in a plane in insulating material comprising:

movable means for forcing the insulating material away from one side of the cable between the conductors whereby the conductors are bared along a first plane;

resilient means for forcing the insulating material forced between said conductors to the side of said conductors opposite to said first plane; and

means cooperating with said resilient means for removing the insulating material which is moved by said resilient means to said opposite side and the material which was present on said opposite side from said ribbon cable; said removing means comprising two knives and means for movably mounting said knives so that the longitudinal cutting edges are disposed parallel to each other and can be moved towards and away from each other while constantly maintaining said parallel relationship.

3. An arrangement according to claim 2 wherein said resilient means comprises a first stamp made of resilient material which has a longitudinal face and means for movably mounting said first stamp so that said face is parallel with said knives for movement between said parallel knives and away from said knives.

4. An arrangement according to claim 3 further comprising means for conveying said cable between said blades and said resilient means so the path of said cable is perpendicular to said parallel knives and said longitudinal face.

5. An arrangement according to claim 4 wherein said movable means comprises a second stamp having a longitudinal face with approximately the same width of the longitudinal face on said first stamp, a table disposed beneath said second stamp, means for mounting said second stamp for movement towards and away from said table, and said conveying means further comprises means for conveying said cable along a path perpendicular to the longitudinal face of said second stamp between said stamp and table.

6. A method for baring electric ribbon cables having a plurality of conductors disposed in a plane within insulating material comprising the steps of:

applying heat to one side of the cable;  
forcing the insulating material away from one side of the cable to the opposite side within the confines of the cable to bare a portion of the conductors on said one side;  
applying heat to the opposite side of said cable;  
forcing the insulating material from around the conductors to said opposite side; and  
removing all the insulating material from said opposite side.

7. A method as claimed in claim 6 wherein the step of removing the material comprises the steps of simultaneously cutting the insulating material along two parallel lines perpendicular to the longitudinal axis of the cable and gripping the cut-away material between the cutting blades.

8. A method as claimed in claim 6 wherein the step of forcing the material from one side of the conductors comprises the steps of retaining the cable in a fixed position and stamping the cable to force the material away from the stamped side.

9. A method according to claim 6 wherein the step of forcing the material to the other side of the conductors comprises the steps of placing the cable on supports which restrain the cable from vertical movement and do not block the insulation which is to be removed and stamp-

ing the bare side of the cable, so that the cable is forcibly held against the supports, with a resilient stamp which protrudes between the conductors and forces the insulating material away from the conductors.

5. 10. A method as claimed in claim 6 wherein the step of removing the material from the other side of the conductors comprises the steps of cutting the material by forcing the cable against two parallel blades disposed perpendicular to the path of the cable.

10. 11. A method for baring electric ribbon cables having a plurality of conductors disposed in a plane within insulating material comprising the steps of:

forcing the insulating material away from one side of the conductors between the conductors;

15. forcing the material between the conductors to the other side of the conductors by placing the cable on supports consisting of two parallel cutting surfaces disposed perpendicular to the path of the cable which cannot cut through the conductors which restrain the cable from vertical movement and do not block the insulation which is to be removed and stamping the bare side of the cable, so that the cable is forcibly held against the supports, with a resilient stamp which protrudes between the conductors and forces the insulating material away from the conductors; and

removing the material from the other side of the conductors by moving said supports toward one another after the insulating material has been cut along parallel planes so that it is completely free of the insulating material remaining on the cable and moving the insulating material and cable apart.

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