March 10, 1970 C. O. ARESKOUG 3,499,816

APPARATUS FOR ENCLOSING A RESISTANCE WIRE TAPE BETWEEN FLAT SECTIONS OF INSULATING CERAMIC PASTE COMPOUND

Filed June 3, 1965 2 Sheets-Sheet 1

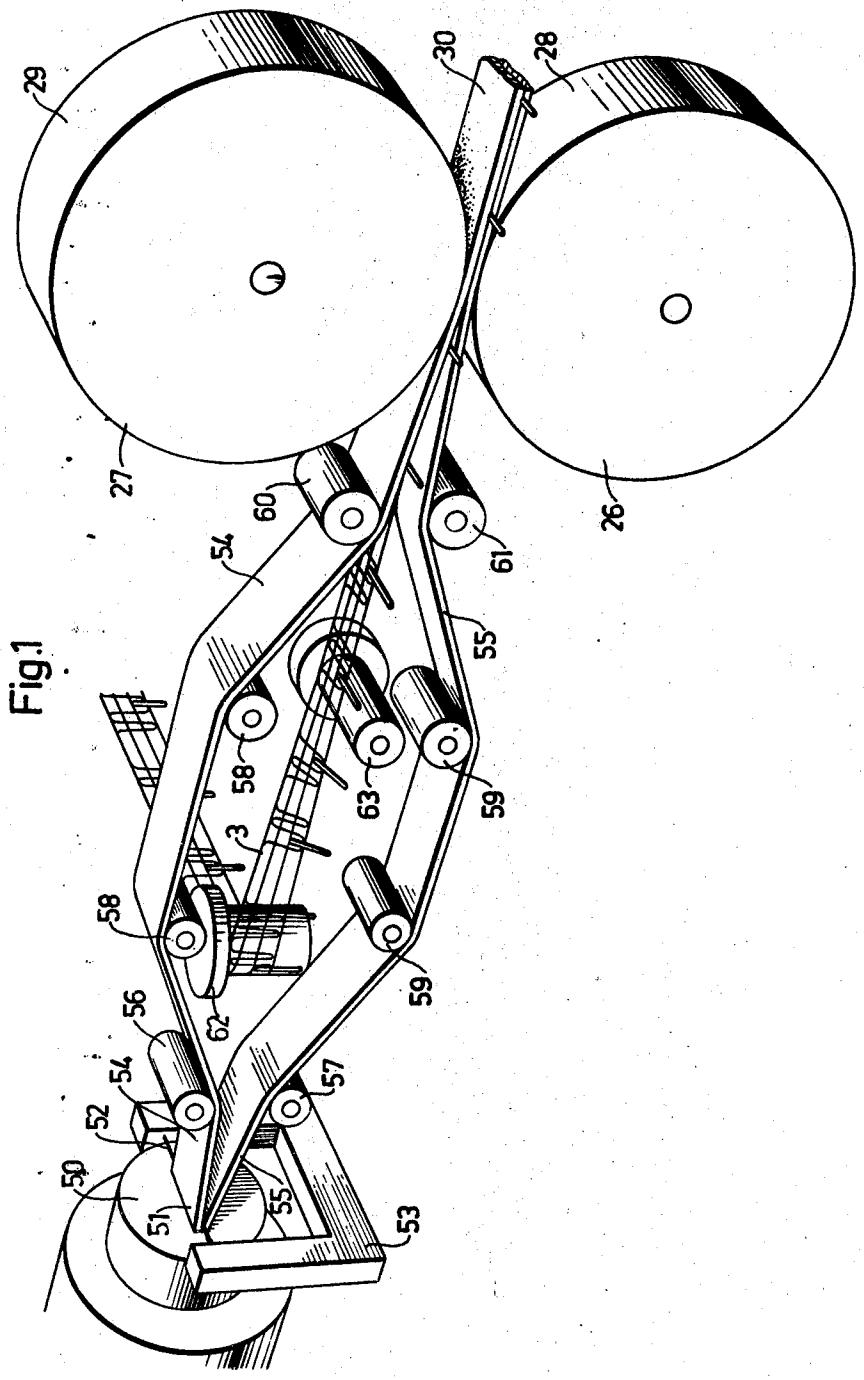

Fig.1

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Filed June 3, 1965 2 Sheets-Sheet 2

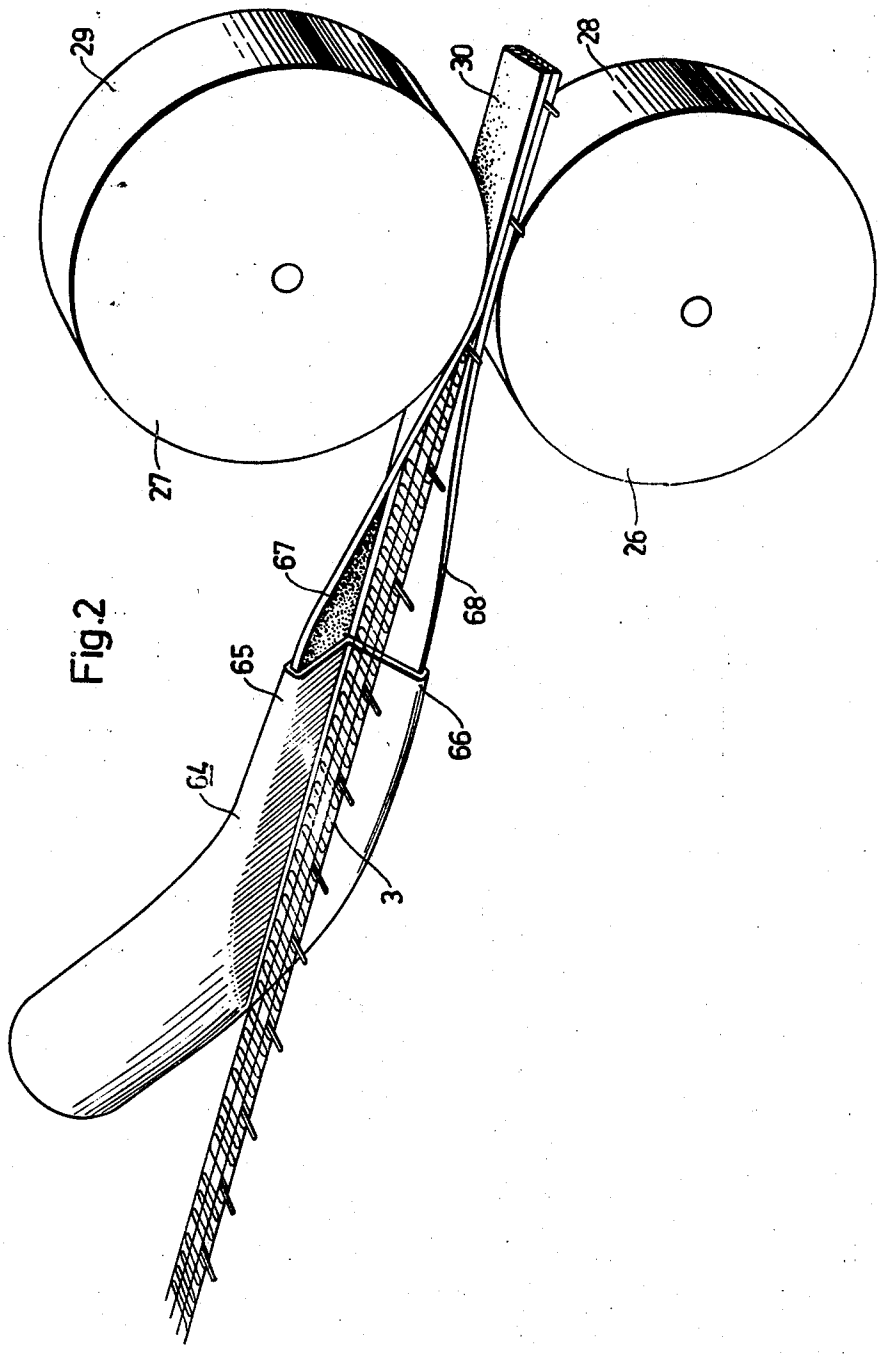

Fig. 2

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APPARATUS FOR ENCLOSING A RESISTANCE WIRE TAPE BETWEEN FLAT SECTIONS OF INSULATING CERAMIC PASTE COMPOUND

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U.S. Cl. 156—436
4 Claims

ABSTRACT OF THE DISCLOSURE

A ceramic insulation paste material is continuously split into two moving flat parallel sections while emerging from a nozzle, a tape of resistance wire is inserted between, and moved along with, the insulation sections. The sections are then squeezed together enclosing the resistance wire.

The present invention relates to arrangements for applying, for example, a ceramic compound about a flat structure. It is known in prior art when manufacturing ceramic resistors to embed a tape in between two strands of a ceramic compound on which tape the resistance filament units of the resistor to be made are arranged. As a rule, the two strands are provided to be extruded, each from a separate nozzle on either side of the flat tape planar structure. However, this entails a number of drawbacks with respect to the extrusion through the nozzles of the ceramic compound, since it is extremely difficult to achieve any uniform extrusion owing, for example, to varying viscosity of the ceramic compounds. The present invention has for its object to avoid the said drawbacks.

An arrangement according to the present invention is substantially characterized in that a nozzle is provided to form a strand of a ceramic compound, the compound strand close to the outlet end of the nozzle being arranged to be split into two strand halves, which are to pass on either side of the tape structure and then rolled together while enclosing the tape structure.

A further arrangement according to the invention is characterized substantially in that a nozzle is of such a shape as to form a compound strand which is substantially V-shaped, the legs of the compound strand being arranged to be compressed while enclosing a tape structure in between the said legs.

The present invention will be explained more in detail hereinafter with reference to the accompanying drawings, in which

FIG. 1 is a perspective view of an embodiment according to the invention, and

FIG. 2 illustrates another embodiment in a perspective view.

The arrangement shown in FIG. 1 comprises a nozzle **50** shaping and delivering a strand of a ceramic compound. Adjacent to the orifice of the nozzle a steel wire **52** is provided, which is clamped in a U-shaped fitting **53**. The said steel wire splits the compound strand **51** into two strand halves **54, 55**, which are separately made to run over a first couple of rollers **56, 57**, respectively. Thence the strand halves **54** and **55** each run over a couple of rollers **58, 59**, respectively. A tape **3** of resistance units, as mentioned in the preamble, passes over two idlers **62, 63**. From the idler **63** the tape is fed in between the two rollers **60** and **61**, the tape thus lying between the two strand halves **54, 55**.

The strand halves and the resistance tape will then

pass in between the rolls **26, 27** to be compressed into a unitary strand **30**.

By the arrangement described hereinbefore it is warranted that the two strand halves **54** and **55** become uniform, i.e. there will arise no tendency to creasing of the one or the other strand half owing to any too rapid extrusion. Another advantage of the arrangement consists in the fact that the steel wire **52** causing the splitting up of the compound strand **51** will also bring about a roughened surface structure of the partings of the strand halves **54, 55**. Such a surface structure is of advantage when rejoining the strand halves between the rolls **26, 27**, since effective binding between the strand halves is thus readily achieved.

Naturally, it is possible to carry out the arrangement as described hereinbefore by applying sliding paths for the strand halves **54, 55** instead of the rollers **56** to **61** as illustrated. It is also possible to replace the steel wire **52** by a knife member, in which case the side faces of the knife member may be connected to the said sliding paths.

The embodiment shown in FIG. 2 comprises a nozzle **64** of V-shape having two legs **65, 66**. The nozzle delivers a strand of a ceramic compound formed in a corresponding way with two legs **67, 68**. A tape **3** of resistance units **3**, as shown in FIG. 1, is by means of the legs **65, 66** of the nozzle **64** fed in between the said legs and preferably in parallel with the horizontal leg **66**. The resistance tape will then rest on the leg **68** of the compound leg while being fed towards the rolls **26, 27**. However, it is not necessary, that the tape rests on the leg **68**, but it should, however, be parallel to the same just before entering between the rolls **26, 27**. The leg **67** of the compound strand will then come into touch with the cylindrical face **29** of the roll **27** and be rolled down towards the leg **68** and compressed between the said rolls into a common material strand **30**. As will be apparent, two uniform strand halves of a ceramic compound are achieved in a very simple manner, it being easy to roll together the same, while they do not require any directed guiding means to make them land one right on top of the other to be rolled together, as the legs **67, 68** are all the time interconnected at their base portion.

What is claimed is:

1. An apparatus for enclosing a plurality of planar resistance wire convolutions with an insulating ceramic paste compound jacket comprising: extruding means including a container for the compound having a single nozzle opening; means located near and in the path of the nozzle for uniformity dividing the compound into two continuous flat portions having rough opposing surfaces and diverging from one another in a V-shaped configuration; means located downstream of the dividing means for guiding the two portions along spaced apart longitudinally and laterally parallel paths; means for continuously conveying the planar wire convolutions along a path both longitudinally and laterally parallel to, and in between of, the compound portions; rejoining means located downstream of the guiding and conveying means for applying pressure perpendicular to both the longitudinal and lateral directions of the compound portions and the planar wire convolutions; whereby the compound will be extruded, divided at a uniform rate without creasing the two portions, then rejoined together completely around the wire convolutions.

2. An apparatus as in claim **1** wherein the guiding means comprise rollers.

3. An apparatus as in claim **1** wherein the dividing means comprises a wire.

4. A device as in any of the claims **1, 2** or **3** wherein the conveying means comprises first and second cylindrical rollers located between said portions with said first

roller nearer said dividing means and said second roller nearer said rejoining means, each of said rollers having its axis of rotation perpendicular to each other and to the longitudinal direction, with a tangential direction of the cylindrical surface of said second roller that is perpendicular to its axis is parallel to the longitudinal direction; whereby said planar tape is fed between converging and diverging portions of said insulator from a direction lateral thereto.

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18—5; 29—203; 156—500, 517, 244; 264—146