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GUIDING DEVICE FOR CABLE-JACKETING METAL STRIPS

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Fig. 1

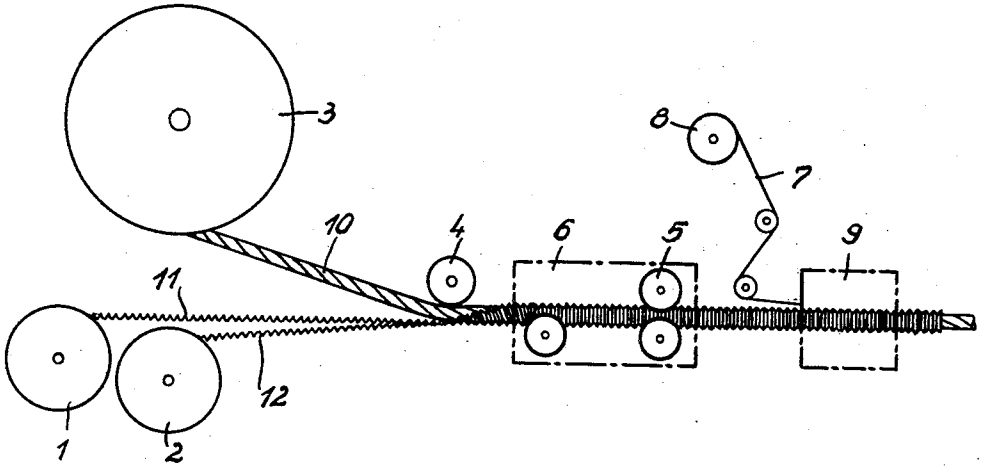
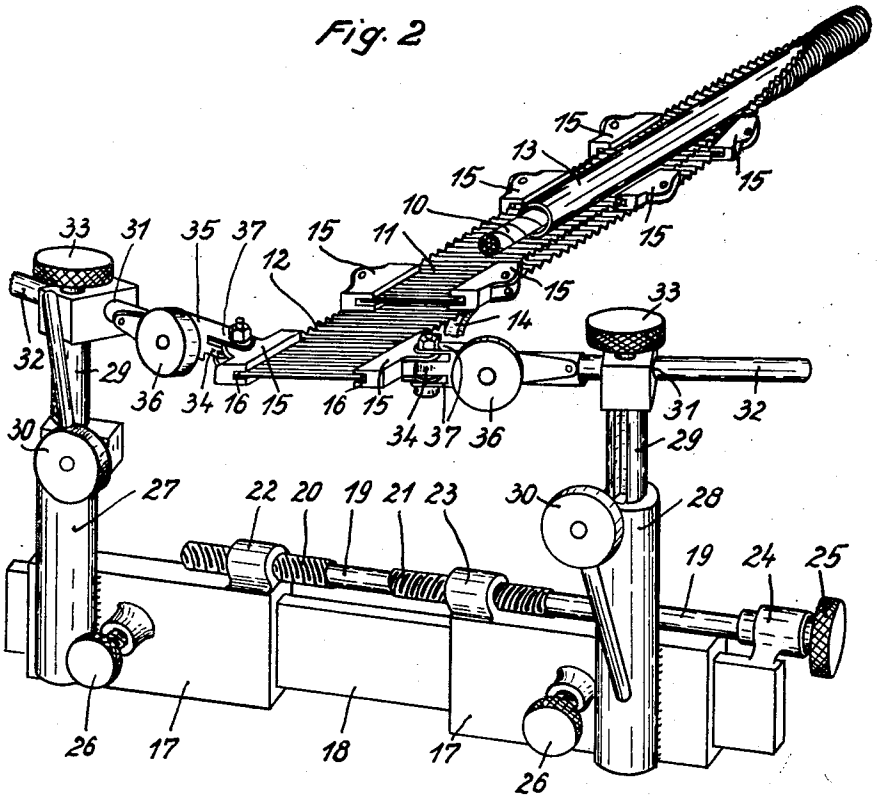


Fig. 2



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GUIDING DEVICE FOR CABLE-JACKETING METAL STRIPS

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7 Claims. (Cl. 153—1)

My invention relates to the production of cable jackets from metal tape and, in a more particular aspect, to cable-jacketing devices of the type illustrated and described in my copending application Serial No. 91,672, filed February 27, 1961.

In such devices a cable jacket is produced from a metal strip that extends longitudinally of the electric cable core to be jacketed and is preferably corrugated in the transverse direction for securing sufficient bendability. The metal strip passes through a jacket bending machine where it is bent by rollers, endless belts or the like forcing means so as to assume a tubular shape around the cable core with the edges of the tubular jacket overlapping each other. Thereafter, in the same course of operations the overlapping edges of the strip are soldered to each other. The known jacket-forming devices of this type involve difficulties with respect to securing an accurate straight-line guidance of the strip edges and of the overlapping seam.

For coping with such difficulties it has become known from U.S. Patent 2,845,989 and German Patent 1,027,750 to prevent the jacket seam from becoming twisted out of the straight-line path by sensing the location of the seam prior to the soldering operation, and controlling a rotatably mounted aligning device, in dependence of any sensed departures of the seam, in such a manner that the jacket seam always extends parallel to the longitudinal axis of the cable during the soldering operation. Such a machine, however, requires the addition of complicated auxiliary devices.

According to U.S. Patent 2,774,594 and German Patent 1,060,946, an automatic straight-line guidance of a flat metal strip, prior to entering into the jacket-forming device, is obtained by means of a roller which has electric contacts disposed on both sides of the strip. The contacts act upon control devices which, upon departure of the strip from the straight path, operate to re-align the tape. Such guidance of the tape at the entering point is not sufficient to reliably secure an automatic straight-line travel because inaccuracies may also occur in the jacket-forming device itself.

Referring to cable-jacketing devices generally of the above-mentioned type, it is an object of my invention to provide for accurate straight-line guidance of the thin jacketing strip, preferably a transversely corrugated strip, in parallel relation to the cable-core axis and prior to bending the strip to a tubular jacket about the core, while requiring only simple and reliably operating guide structures capable of securing the desired high accuracy of straight-line travel.

To this end, and in accordance with a feature of my invention, I provide a plurality of glide shoes which are spaced from each other on both sides of the jacket strip and which are adjustable positionally in a horizontal plane individually as well as conjointly, and which are also adjustable individually in a vertical plane.

According to another feature of my invention, the device is so designed that it affords a coarse as well as a fine adjustment of the glide shoes. According to still another feature, the glide shoes are pivotally mounted for rotary adjustment in the horizontal and vertical planes

to permit adapting the glide shoes to the particular position of the strip edges at the glide-shoe location.

The invention will be further described with reference to the embodiment of a jacket strip-guiding device according to the invention illustrated by way of example on the accompanying drawing in which:

FIG. 1 is a schematic diagram of a cable-jacketing apparatus, and

FIG. 2 is a perspective view of the jacketing device according to the invention that forms part of the apparatus but is omitted in FIG. 1.

In the illustrated embodiment, the core 10 of an electric cable is to be sheathed in an inner jacket formed of a longitudinal, transversely corrugated strip 11 of good conducting metal, for example aluminum, and also in an outer jacket formed of a somewhat wider metal strip 12, for example of iron.

The two strips 11, 12 are supplied from respective reels 1, 2. The cable core is supplied from a reel 3. Suitable guide means are provided such as the rollers shown at 4 and 5. The two corrugated metal strips are bent about the cable core in a bending device 6 which comprises a tube 13 (FIG. 2) traversed by the cable core 10. The two strips 11, 12 are bent in known manner to tubular shape by means of two endless belts 14 travelling beneath the two respective edges of the strips. As a result, the transverse corrugations of the two strips become nested in each other. The wider metal strip 12 is bent to such an extent that the strip edges overlap each other. In the same operating process the strip edges are soldered together with each other in the overlapping range. To this end, a strip 7 of solder is supplied from a reel 8 between the overlapping edges of the strip 12 shortly before the assembly passes through a soldering oven schematically shown at 9 in FIG. 1.

The method requires that the strips be accurately guided in parallel relation to each other, and that the overlapping seam of the outer strip 12 accurately extend parallel to the cable core. For this purpose the metal strips 11 and 12 in the illustrated device are guided according to the invention in machined grooves 16 of a number of glide shoes 15. The glide shoes are adjustable in the horizontal plane and in the vertical plane, and they are also angularly displaceable about respective pivot axes.

The adjustable mounting is illustrated only for the two glide shoes 15 facing the observer of the illustration, the mountings for the other glide shoes being identical with those shown and described presently.

The mutual spacing of the glide shoes in dependence upon the width of the strips is effected by sliders 17 which are displaceable on a rail 18 in a horizontal plane transverse to the longitudinal direction of the strips. The displacement of the sliders 17 is effected by means of a spindle 19 which has two threaded portions 20 and 21 of mutually opposed screw pitch in threaded engagement with respective projections 22 and 23 of the two sliders. The spindle 19 is journalled in a fixed bearing 24 and is operable by means of a knurled knob 25. By turning the knob toward the right or left, the sliders 17 and hence the glide shoes 15 can be placed closer to, or farther away from, each other. The adjusted slider position is fixed by respective set screws 26. Rigidly mounted on the two sliders 17 are respective vertical tubes 27 and 28. Guided in each tube is a shaft 29 which is vertically displaceable as well as rotatable relative to the guiding tube and which can be fixed in a selected position by means of a clamping screw member 30.

Mounted on the upper end of each shaft 29 in a bore 31 is a holder rod 32 for the glide shoe. The holder rod 32 is horizontally displaceable in the bore 31 and can be fixed in the adjusted position by means of a set screw

with a knurled knob 33. By vertically displacing the respective shafts 29, the desired height of the glide shoes can be adjusted. The displaceability of the holder rod 32 affords an additional adjustment of the glide shoes in the horizontal plane. That is, the two glide shoes can thus be adjusted individually, aside from the conjoint horizontal adjustment afforded by operation of the spindle 19.

The glide shoes 15 are joined by an arm 34 and a pivot member 35 with the holder rods 32 so as to be pivotally displaceable in the vertical plane. The properly adjusted angular position can be fixed by a set screw with a knurled knob 36. Furthermore, the glide shoes 15 are pivotally mounted on the arms 34 by means of vertical pivot 37 so that the shoes are also angularly displaceable in the horizontal plane in order to permit a fine adjustment of the shoes relative to the strip edges.

As mentioned, only the most forward device for adjusting the glide shoes relative to the edges of the outer metal strip 12 are illustrated, all other glide shoes having corresponding adjusting devices. In the illustrated embodiment the first, fourth and sixth pairs of glide shoes serve for guiding the edges of the outer metal strip 12, whereas the second, third and fifth pairs of glide shoes serve for guiding the edges of the inner metal strip 11.

In accordance with the gradual bending of the two strips by the endless belts 14, the respective glide-shoe pairs are given respectively different adjustments corresponding to the particular orientation of the strip edges at the glide-shoe location. That is, the glide shoe of the first two adjusting devices must occupy a horizontal position, but the next following glide-shoe pairs are given an inclined position in accordance with the gradual bending of the strips to a tubular shape. The angle of inclination increases from one glide-shoe pair to the next one. It has been found that three glide-shoe pairs are sufficient for each strip in order to reliably secure an accurate position of the strip and an accurate parallel relation to the cable axis of the seams in the two strips.

The invention is analogously applicable in cases where only a single strip is to be bent tubularly around a cable core while passing lengthwise along the core. If desired, the number of sequential glide-shoe pairs can be chosen different from the illustrated example. The individual components, of course, may also have a design different from the one illustrated as long as the desired adjustability is secured. Thus, the link 35 may consist of a cardanic (universal-type) joint.

It will be obvious, therefore, to those skilled in the art, upon a study of this disclosure, that devices according to my invention can be given embodiments other than particularly illustrated and described herein, without departing from the essential features of my invention and within the scope of the claims annexed hereto.

I claim:

1. In apparatus for jacketing an electric cable equipped with feeding means for supplying a cable core and with strip supply means for passing a metal strip alongside the cable core, a strip guiding device for guiding the travelling strip in fixed and straight alignment longitudinally of the core, means for causing progressive deformation of the strip into tubular shape about the core, said strip guiding device comprising normally stationary glide shoes disposed in a plurality of pairs, the shoes of each pair having respective guide means engageable with the respective edges of the strip for guiding the travel path of said strip over the entire range of said deformation into mutually overlapping and parallel position of said edges, supporting structure on which the two guide shoes of each pair are mounted, said two shoes being jointly displaceable horizontally on said structure and being also individually displaceable horizontally relative to said structure, and adjusting means on said structure for individually adjusting said two glide shoes in the vertical direction for guiding the strip during said deformation into said tubular shape about the core.

2. A jacket-strip guiding device according to claim 1, said glide shoes being pivotally joined with said support structure so as to be additionally adjustable angularly in the horizontal and vertical planes.

3. In apparatus for jacketing an electric cable equipped with feeding means for supplying a cable core and with strip supply means for passing a metal strip alongside the cable core, a strip guiding device for guiding the travelling strip in fixed and straight alignment longitudinally of the core belt means for causing, progressively, deformation of the strip into tubular shape about the core, said strip guiding device comprising normally stationary glide shoes disposed in pairs, successive shoe pairs being spacedly arranged and positionable into increasingly inclined positions relative to the core for guiding the edges of the strip into mutual overlapping and parallel positions during said deformation, the shoes of each pair having respective grooves engageable by the respective edges of the strip, two supporting members on which the respective glide shoes of each pair are mounted, a horizontal rail member on which said supporting members are horizontally displaceable, a revolvable spindle having two screw portions of mutually opposed pitch in threaded engagement with said respective support members for simultaneously displacing said two glide shoes horizontally by turning said spindle, said two shoes being individually displaceable horizontally relative to said respective supports, and respective adjusting means on said structures for individually adjusting said two glide shoes in the vertical direction for guiding the strip into said tubular shape about the core.

4. A jacket-strip guiding device according to claim 3, said adjusting means comprising two shaft members, said support members being tubular, said shaft members being telescopically engaged by said respective tubular members and being vertically adjustable relative thereto, and two horizontal holders rods mounted on said respective shaft members, said two shoes being secured to said respective rods.

5. A jacket-strip guiding device according to claim 4, said shaft members having guide means in which said respective rods are horizontally displaceable.

6. A jacket-strip guiding device according to claim 4, said shaft members having guide means in which said respective rods are horizontally displaceable, and a pivot junction connecting each glide shoe with one of said respective rods and having a horizontal pivot axis to permit angular adjustment of said glide shoe in the vertical plane.

7. A jacket-strip guiding device according to claim 6, further comprising another pivot junction between each glide shoe and the appertaining one of said rods, said latter junction having a vertical pivot axis to permit angular adjustment of said glide shoe in the horizontal plane.

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