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F. P. PULASKI

2,989,430

CORE WRAPPING APPARATUS

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Fig. 1

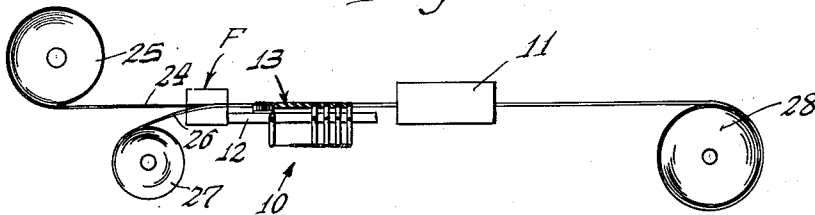


Fig. 2

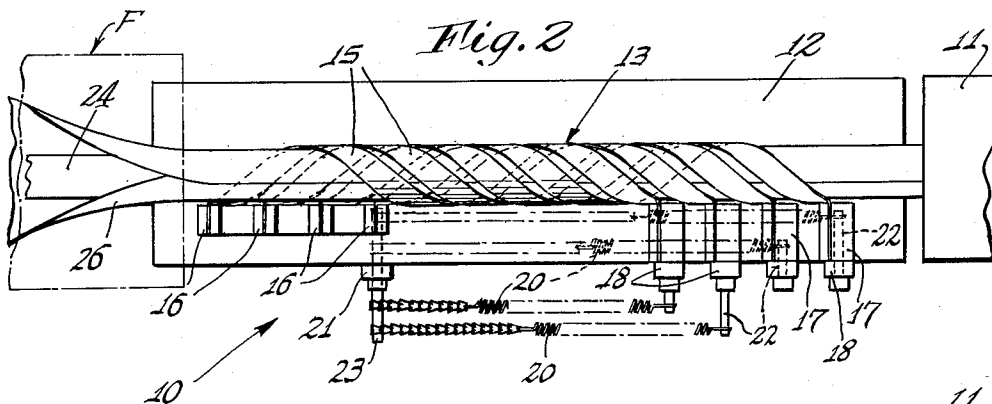
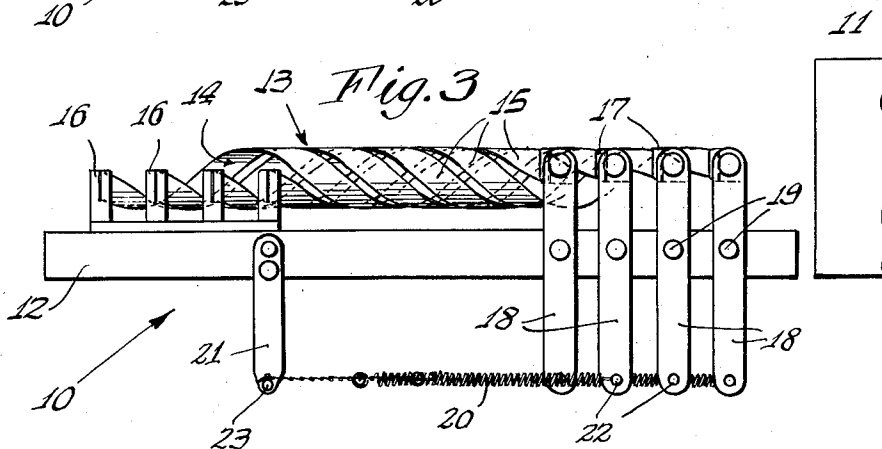


Fig. 3



INVENTOR.
Frank Paul Pulaski

BY
Johnson and Kline
ATTORNEYS

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CORE WRAPPING APPARATUS

Frank Paul Pulaski, Norwich, Conn., assignor to Plastic Wire & Cable Corporation, Jewett City, Conn., a corporation of Connecticut

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This invention relates to a device for forming a wrapper to a strand or core. More specifically, it pertains to an apparatus for folding and forming a tape wrapper or the like longitudinally of itself around an elongate continuous cable core.

In the manufacture of certain kinds of electrical conducting cable, a core comprising one or a plurality of insulated conductors is provided with a shield or wrapper in the form of a tape applied longitudinally thereover, over which is formed, by extrusion or in a similar manner, a jacket or outer sheath. The tape, which may be paper, metal foil or any other flexible foldable material having the desired characteristics, is preferably longitudinally folded over the core and formed therearound just prior to passing the shielded core through an extrusion chamber, wherein the jacket is applied.

In forming the tape shield or wrapper around the core, it is highly desirable to positively control the application and forming of the tape to the core, and the position of the tape, relative to the core, up to a point as near as is practical to where the extruded sheath or jacket is being formed on the tape shielded core; the necessity for binding the tape shield between its forming and the application of the outer sheath is thus eliminated and other difficulties that may arise from lack of complete control may be avoided.

It is an important object of the present invention to provide apparatus which will simultaneously form the wrapper and guide the core, while maintaining control of the wrapper, relative to the core, up to a point adjacent an extruder or like apparatus.

According to the invention, control and forming of the wrapper is achieved by passing the core and tape through a tubular member, positioned adjacent an extruder or the like, adapted to be longitudinally extended to reduce its internal diameter, whereby the tape is wiped smooth and firmly pressed into formed engagement with the core.

It is another object of the invention to provide an apparatus for forming and pressing a tape or the like to an elongate continuous core as the tape and the core are being simultaneously fed therethrough, which includes a tubular member formed of a plurality of spirally wound band members adapted to be longitudinally extended to reduce the internal diameter of the bore of the tube, whereby the tape is wiped into formed engagement with the core.

Yet, another object of the invention is to provide an apparatus for forming a longitudinally folded tape to an elongate continuous core which includes a plurality of spirally wound parallel bands forming a tubular member having one end thereof anchored to a base member and the other end movable relative thereto, whereby the tubular member is enabled to be longitudinally extended relative to the base member to decrease the internal diameter of its bore so that a tape folded around a core, being traveled therethrough, is wiped into formed engagement with the core.

It is further an object of the invention to provide an apparatus for forming and pressing a wrapper to an elongate continuous core which includes a longitudinally extensible tubular member fixedly mounted relative to a base member and adapted to be resiliently maintained in extended position, whereby the bore is of reduced diameter, so that a wrapper folded longitudinally over a core,

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being passed through the tube, is wiped by the inner surface of the bore into formed engagement with the core.

It is still further an object of the invention to provide an apparatus for forming a tape shield to an elongate continuous core which may be incorporated in a continuous production process, is simple in structure and operation and of such rugged character it will function for long periods of time with freedom from all difficulties.

Other objects and advantages will be apparent from the specification and claims when considered in connection with the attached sheet of drawings, illustrating one form of the invention, wherein like characters represent like parts, and in which:

FIGURE 1 is a diagrammatic illustration of one embodiment of the invention in combination with a cable forming apparatus;

FIG. 2 is a plan view of one form of the invention in operation; and

FIG. 3 is an elevational view of the form of the invention shown in FIG. 2.

Referring now to the drawings for a more detailed description of the invention, in FIG. 1 an apparatus for forming and pressing a tape to an elongate continuous core, generally indicated by the numeral 10, is shown. While the apparatus of the invention may be utilized in any operation requiring the application of tape or the like to an elongate continuous core or strand, it is here shown in combination with cable forming apparatus, including an extruder 11 for forming an outer jacket on a tape shielded core, to facilitate and clarify the description. The illustrated embodiment of the invention is not intended to be a limitation on the invention.

The tape forming and controlling apparatus 10, which in the illustrated embodiment of the invention is positioned adjacent the extruder 11 in alignment with the feed passage or extrusion chamber thereof (not shown), comprises a base member 12 mounting an extensible tubular member 13 having a bore 14 of variable diameter. The tubular member 13, which has its bore 14 preferably in axial alignment with the passage into the extruder has one end anchored against movement relative to the base member 12 and its other end longitudinally movable relative thereto so that the tubular member may be extended in length to decrease the internal diameter of the bore 14. As will be more fully explained hereinafter, the decrease in the internal diameter of the bore of the tubular member enables the tubular member to wipe a tape or similar wrapper into smooth, pressed engagement with a core or strand being fed therethrough.

It is contemplated in accordance with the invention that the tubular member 13 will comprise one or a plurality of spirally wound parallel bands 15 of flexible material, preferably of metal, and that each of the bands will be individually anchored at one end to the base member against movement relative thereto and movably mounted at its opposite end for longitudinal movement. While the bands 15 may be removably clamped to the base member to anchor them or may be riveted, welded or similarly secured thereto, in the illustrated form of the invention they are shown to be gripped by anchor clamps 16 which are fixedly mounted on base member 12. It will, of course, be understood that the number of anchor clamps will be equal to the number of bands incorporated in the tubular member and that they will be positioned on the base member in such a manner as to cause the spirally wound bands to parallel one another. The opposite ends of the bands 15, which are movable relative to the base member to increase or decrease the length of tubular member 13 are retained in clamps 17, that are movably supported by base member 12. While clamps 17 may be slidably supported on base member 12 or mounted thereby in any other manner which would facil-

itate their movement toward and away from anchor clamps 16, in the herein illustrated form of the invention they are pivotally carried on arms 18 which in turn are pivotally connected to base member 12 as at 19.

In accordance with the invention, means are provided for automatically shifting clamp carrying arms 18 to longitudinally extend the bands 15 so that tubular member 13 is lengthened and the internal diameter of the bore is decreased. In the illustrated form of the invention the shifting means are shown as springs 20, each of which has one end operatively connected to an arm 18 and the other end anchored to a supporting post 21 which extends below base member 12 and is connected thereto. It will be understood that various mechanical devices may be utilized to shift the arms 18 and clamps 17, however, I have found it preferable to utilize resilient means so that the arms may be readily shifted against the shifting means to decrease the length of tubular member 13 to enlarge the bore and to facilitate the passage of cores or strands having unforeseen protrusions or abnormalities therethrough. The shifting means or resilient springs 20 are connected to their respective arms 18 through transversely extending carriers 22 to maintain the springs in spaced and separated relationship. While the spacing of the springs may be accomplished by utilizing arms 18 of different lengths it is here achieved by utilizing carriers 22 of different lengths extending from opposed sides of their respective arms. The anchored ends of springs 20 are secured to supporting post 21 through a carrier arm 23 to likewise maintain the spaced relationship therebetween.

Referring now to FIGS. 1 and 2 for an explanation of the operation of apparatus 10, for forming and pressing a tape into smooth engagement with a core, reference is made to its use in combination with a cable forming device having an extruder 11. In accordance with this embodiment of the invention a cable core 24, comprising one or a plurality of conductors, is fed from a supply roll 25 or the like through tubular member 13 while simultaneously a tape 26 of any material having the desired characteristics is fed from a supply roll 27 into engagement with the core. A folder shown at F in FIGS. 1 and 2, in the form of a conventional trumpet device or the like of the type disclosed in the United States patent to Barmack, No. 2,372,645, longitudinally folds the tape and disposes it around the core just prior to the simultaneous passage of the two through tubular member 13. It should here be noted that the initial insertion of the core, with the tape disposed therearound, into the bore 14 of the tubular member is facilitated by pivoting arms 18 counterclockwise, against springs 20, and shifting clamps 17 to the left, as seen in FIG. 2, to shorten the tubular member and enlarge the internal diameter of the bore. After the core and tape wrapper have been inserted through the bore of tubular member 13 and the tubular member has been longitudinally extended, to decrease the diameter of the bore, by the arm shifting action of springs 20, continued travel of the core and tape through the tubular member causes the tape to be wiped into smooth, pressed engagement with the surface of the core by the inner surface of bore 13. As is conventional in the cable forming art, the tape shielded or wrapped core is thereafter traveled through the extruder 11 where the outer jacket or sheath is formed thereover. It has been found desirable to position the tape applying apparatus as close to the entrance of the extrusion chamber in the extruder as possible in order to avoid the necessity of having to bind the wrapper 26 in position around the core to prevent its displacement relative thereto before the extruded jacket is formed.

An important feature of the wrapper forming apparatus is its ability to accommodate unexpected minor distortions such as wrinkles, bulges or protrusions, in the wrapper or the core during the tape applying operation. The resilient tensioning of tubular member 13, in ex-

tended position, enables such unexpected, yet common minor distortions to pass through the bore of the member without causing interruption of the cable forming operation. It will, of course, be understood that unusually large distortions will be prevented from entering the tubular member as a result of the limitations imposed by the maximum diameter of the bore 14. After the core, with the wrapper disposed therearound, has been passed through extruder 11 to receive the outer jacket or sheath, the completed cable is collected on a take-up roll 28 or the like. It is contemplated that the take-up roll will be power driven to pull the core 24 and tape 26 through tape forming apparatus 10 and thereafter through extruder 11.

The above described apparatus, while being particularly adapted to the forming of a tape wrapper or the like to an elongate continuous core, is of use in guiding elongate strands or cores in substantially all feeding operations requiring the material being fed to enter a stage of the operation in an uncurved condition and is also useful in straightening soft malleable core materials of lead or the like.

Thus, among others, the several objects of the invention as aforementioned are achieved. Obviously, numerous changes in the structure may be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. An apparatus for forming an applied wrapper to an elongate continuous core comprising a base member, a longitudinally extensible tubular member having a bore of variable diameter mounted on said base member, said tubular member having one end thereof anchored relative to said base member and the other end movably mounted relative thereto, means for feeding an elongate core with a wrapper therearound through said tubular member and means for longitudinally extending said tubular member, whereby said bore is reduced in diameter to engage said wrapper and wipe the same into engagement with said core.

2. An apparatus for forming an applied wrapper to an elongate continuous core comprising a base member, a longitudinally extensible tubular member having a bore of variable diameter mounted on said base member, said tubular member having one end thereof anchored against movement relative to said base member and the other end movably mounted relative thereto, means for feeding an elongate core with a wrapper therearound through said tubular member and resilient means for longitudinally extending said tubular member, whereby said bore is reduced in diameter to engage said wrapper and wipe the same into engagement with said core.

3. An apparatus for forming an applied wrapper longitudinally to an elongate continuous core comprising a base member, a longitudinally extensible tubular member having a bore of variable diameter mounted on said base member, said tubular member comprising a plurality of resilient spirally wound bands, each of said bands having one end thereof anchored relative to said base member and the other end movably mounted relative thereto, means for feeding an elongate core with a wrapper therearound through said tubular member and means for longitudinally extending said tubular member, whereby said bore is reduced in diameter to engage said wrapper and wipe the same into engagement with said core.

4. An apparatus for forming an applied wrapper to an elongate continuous core comprising a base member, a longitudinally extensible tubular member having a bore of variable diameter mounted on said base member, said tubular member comprising a plurality of resilient spirally wound bands, each of said bands having one end thereof anchored relative to said base member and the other end movably mounted relative thereto, means for feeding an elongate core with a wrapper therearound through

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said tubular member and means for longitudinally extending each of said bands to elongate said tubular member, whereby said bore is reduced in diameter to engage said wrapper and wipe the same into engagement with said core.

5. An apparatus for forming an applied wrapper to an elongate continuous core comprising a base member, a longitudinally extensible tubular member having a bore of variable diameter mounted on said base member, said tubular member comprising a plurality of spirally wound parallel bands, each of said bands having one end thereof anchored relative to said base member and the other end movably mounted relative thereto, means for feeding an elongate core with a wrapper therearound through said tubular member and resilient means operably connected to the movable ends of said bands for longitudinally extending said tubular member, whereby said bore is reduced in diameter to engage said wrapper and wipe the same into engagement with said core.

6. An apparatus for forming an applied wrapper longitudinally to an elongate continuous core comprising a base member, a plurality of anchor clamps fixedly mounted on said base member, a longitudinally extensible tubular member having a bore of variable diameter mounted on said base member, said tubular member comprising a plurality of resilient spirally wound parallel bands, each of said bands having one end thereof retained in one of said anchor clamps and the other end movably supported adjacent said base member, means for feeding an elongate core with a wrapper therearound through said tubular member and means for resiliently longitudinally extending said bands to elongate said tubular member, whereby said bore is reduced in diameter to engage said wrapper and wipe the same into engagement with said core.

7. An apparatus for forming an applied wrapper to an elongate continuous core comprising a base member, a spirally wound resilient band forming a longitudinally extensible tubular member having a bore of variable diameter mounted on said base member, said band having one end thereof anchored against movement relative to said base member and the other end movably mounted relative thereto, means for feeding an elongate core with a wrapper therearound through said tubular member and means for longitudinally extending said band, whereby said bore of said tubular member is reduced in diameter to engage said wrapper and wipe the same into engagement with said core.

8. In an apparatus for making cable including an extruder having a passage through which a wrapped core is fed; a device for applying and forming a wrapper to an elongate continuous core comprising a base member adjacent said extruder, a longitudinally extensible tubular member mounted on said base member and having a bore of variable diameter in alignment with said passage, said tubular member having an end thereof anchored against movement relative to said base member and the other end movably mounted relative thereto for movement toward and away from said extruder, means for simultaneously feeding an elongate continuous core and a wrapper through said tubular member, means for disposing the wrapper around the core and means for longitudinally extending said tubular member to decrease the diameter of the bore thereof, whereby the surface of

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the bore engages said wrapper and the latter is wiped into engagement with said core.

9. In an apparatus for making cable including an extruder having a passage through which a wrapped core is fed; a device for applying and forming a wrapper to an elongate continuous core comprising a base member adjacent said extruder, a longitudinally extensible tubular member mounted on said base member and having a bore of variable diameter in alignment with said passage, said tubular member comprising a plurality of spirally wound resilient bands, each of said bands having an end thereof anchored against movement relative to said base member and the other end movably mounted relative thereto for movement toward and away from said extruder, means for simultaneously feeding an elongate continuous core and a wrapper through said tubular member, means for disposing the wrapper longitudinally around the core and means for longitudinally extending said bands to decrease the diameter of the bore of said tubular member, whereby the surface of the bore engages said wrapper and the latter is wiped into engagement with said core.

10. In an apparatus for making cable including an extruder having a passage through which a wrapped core is fed; a device for applying and forming a wrapper to an elongate continuous core comprising a base member adjacent said extruder, a spirally wound resilient band forming a longitudinally extensible tubular member having a bore of variable diameter in alignment with said passage, said band having an end thereof anchored against movement relative to said base member and the other end movably mounted relative thereto for movement toward and away from said extruder, means for simultaneously feeding an elongate continuous core and a wrapper through said tubular member, means for disposing the wrapper around the core and means for longitudinally extending said band so that said tubular member is elongated to decrease the diameter of the bore thereof, whereby the surface of the bore engages said wrapper and the latter is wiped into engagement with said core.

11. In an apparatus for making cable including an extruder having a passage through which a wrapped core is fed; a device for applying and forming a wrapper to an elongate continuous core comprising a base member adjacent said extruder, a longitudinally extensible tubular member mounted on said base member and having a bore of variable diameter in alignment with said passage, said tubular member comprising a plurality of spirally wound parallel bands, each of said bands having an end thereof anchored against movement relative to said base member and the other end movably mounted relative thereto for movement toward and away from said extruder, means for simultaneously feeding an elongate continuous core and a wrapper through said tubular member, means for disposing the wrapper longitudinally around the core and means for resiliently longitudinally extending said bands so that said tubular member is elongated to decrease the diameter of the bore thereof, whereby the surface of the bore engages said wrapper and the latter is wiped into engagement with said core.

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