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1

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APPARATUS FOR BIAS CUTTING AND SPLICING WIRE OVERHEAD STRIP MATERIAL

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ABSTRACT OF THE DISCLOSURE

A machine for fabricating a continuous web having angularly disposed wire strands relative to its longitudinal center line from narrow strips cut from a continuous wire coated narrow width tape having wire strands that are parallel relative to the longitudinal center line of the tape, wherein a wire tape feeding device moves tape in a longitudinal direction for a predetermined distance. The tape is clamped and then cut, after which the tape is unclamped and moved onto a splicing table which is subject to being magnetized and which cooperates with a splicing means to facilitate the splicing action.

This invention relates to a bias cutting apparatus and method; and, more particularly, to the apparatus and method for fabricating wire overhead strips for use in making bands for radial tires

Heretofore, in the manufacture of strips for wire overhead use in tires, it has been the practice to use a plurality of reels which feed the plural strands of wire into a calendering apparatus, which apparatus applies a thin coating of rubber between the longitudinally extending wires and coats such wires to form a sheet of calendered stock, after which such stock material is fed onto the conveyor table of a bias cutter. A bias cutter comprises a power-driven circular knife that traverses angularly across the conveyor table to cut the material at a bias angle. Such sheet of parallel strands of wire with rubber coating thereon as used herein is referred to as a wire strip material to differentiate such material from fabric or cord fabric for tires which is composed of rubberized cloth. Such material is fed past the circular knife by the conveyor and brought to rest after the requisite length of wire strip material stock has been conveyed past the knife. Since it is necessary to sever the stock to the exact length desired, it is necessary to slow down the stock preparatory to its positioning prior to the severing operation. Difficulty has been experienced in moving such wide stock quickly and in positioning such stock accurately for the cutting operation. Maintenance also was found to be quite high as a result of the rapid acceleration and deceleration of the mechanical equipment.

The bias cutter then traverses the calendered wire strip material and severs a section of such material after which such bias cut material is fed laterally into position with another piece of bias cut material and the respective lateral portions would be spliced by manual operation. The bias cutting would be continued followed by splicing the respective lateral portions together making a longitudinally extending strip of bias cut material referred to as a wire overhead material. Ordinarily, such wire strip material in the calendering process would be made in widths varying from 24 inches to 36 inches and even wider, and it was felt that it was more advantageous to calender as wide a strip of material as possible. Accurate prepositioning and advancing of the material is difficult and time consuming.

The present invention proposes to provide an apparatus and a method which continuously processes from a plu-

2

rality of reels which reels are considerably less than heretofore thought practical or desirable, reducing the total number of reels to 1/24 and process such wires through an extruder wherein such wires are coated and formed into a narrow width tape in the order of approximately one inch width. The tape is then indexed a predetermined amount, cut to length at a bias angle and then spliced into a strip of previously cut sections of wire overhead at a speed faster than the method heretofore used such as calendering. The cost of the apparatus employed in carrying out such process is materially less than heretofore used, making it feasible to construct and manufacture tires which employ wire overhead bands on a small economical scale. The maintenance problem is reduced and the necessity of maintaining a large coordinated movement of wire is eliminated, which consumed a large percentage of the shut-down time.

The present invention contemplates the use of an extruder cooperative with a supply of wire to fabricate a tape of narrow width rapidly, cutting such tape to length and stitching such tape to the previously bias cut tape to form a wire overhead strip economically.

An object of the present invention is to provide an inexpensive apparatus which efficiently and effectively fabricates a wire overhead strip of material.

A further object of this invention is to provide a novel apparatus which butt splices a wire overhead continuous strip from a narrow width extruded wire tape.

Another object of this invention is to provide a novel apparatus which coordinates the extrusion of a narrow width tape with the severing of such tape and splicing such tape to fabricate economically a wire overhead strip of material.

A further object of this invention is to provide a novel method of fabricating bias cut wire overhead strip stock.

An object of this invention is to provide a novel method for fabricating a multiple wire rubber covered strip of material wherein the wires are located at an angle relative to the longitudinally extending length of the strip material.

These and other objects and advantages will appear more fully in the following detailed description when considered in connection with the accompanying drawings in which:

FIGS. 1*a* and 1*b* are side elevational views of the entire wire overhead strip fabricating apparatus constructed in accordance with the principles of this invention which when longitudinally aligned show the entire wire overhead strip fabricating apparatus of this invention.

FIG. 2 is a plan view of the wire overhead strip fabricating apparatus showing the feeding, shearing and splicing means with the wire tape being conveyed left to right.

FIG. 3 is a side elevation view of the wire overhead apparatus as shown in FIG. 4 from the back side showing the tape being conveyed from right to left.

FIG. 4 is a cross sectional view of the feeding means taken along the line **4—4** of FIG. 3.

FIG. 5 is a cross sectional view of the clamping means taken along line **5—5** of FIG. 2.

FIG. 6 is a plan view of the splicing plate.

FIG. 7 is a side elevational view of the splicing plate.

FIG. 8 is a diagrammatic view of the pneumatic control system.

FIGS. 9*a* and 9*b* illustrate an electrical control circuit for the apparatus.

In the drawings, the reference numeral **10** generally designates a strand wire let-off device having a plurality of spools **11** which are mounted on a frame which is provided with suitable tension devices (not shown) normally used thereon. The strands of wire are withdrawn from the respective spools **11** and are directed downwardly toward a