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STRAND TAKEUP DISTRIBUTOR

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2 Sheets-Sheet 1

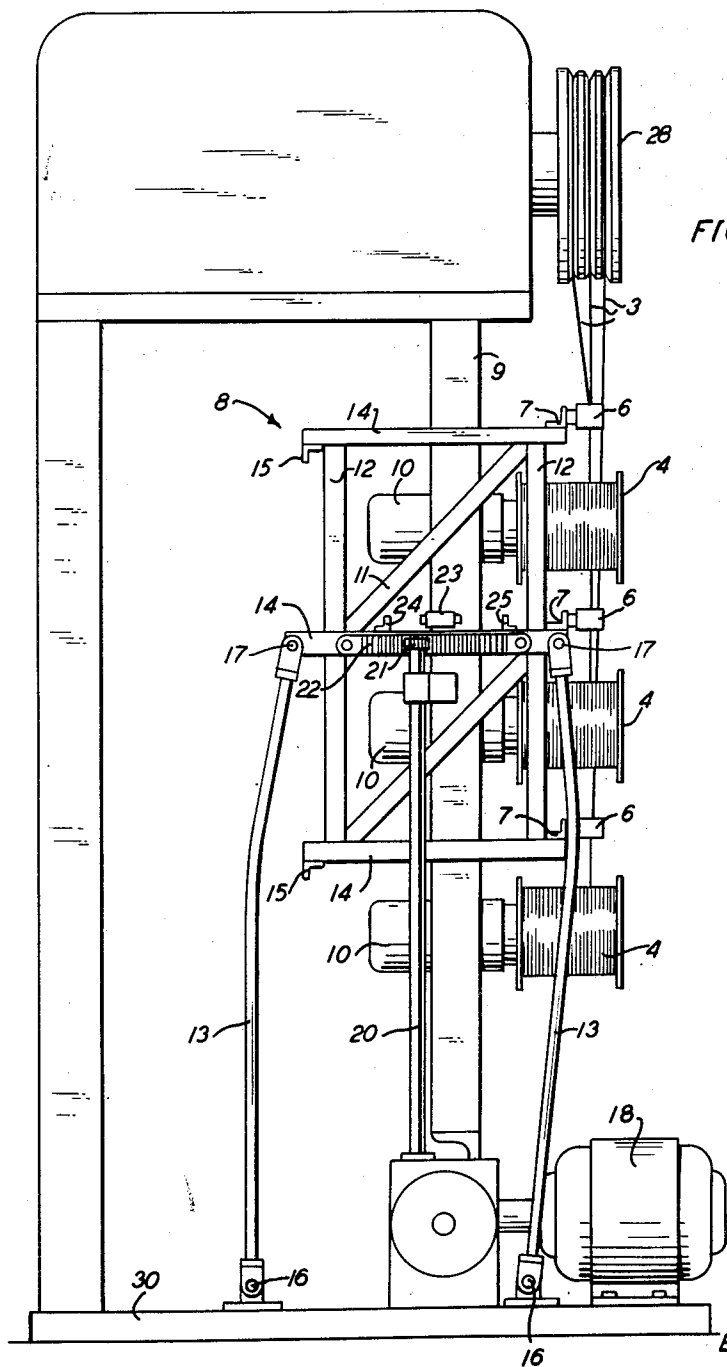


FIG. 1

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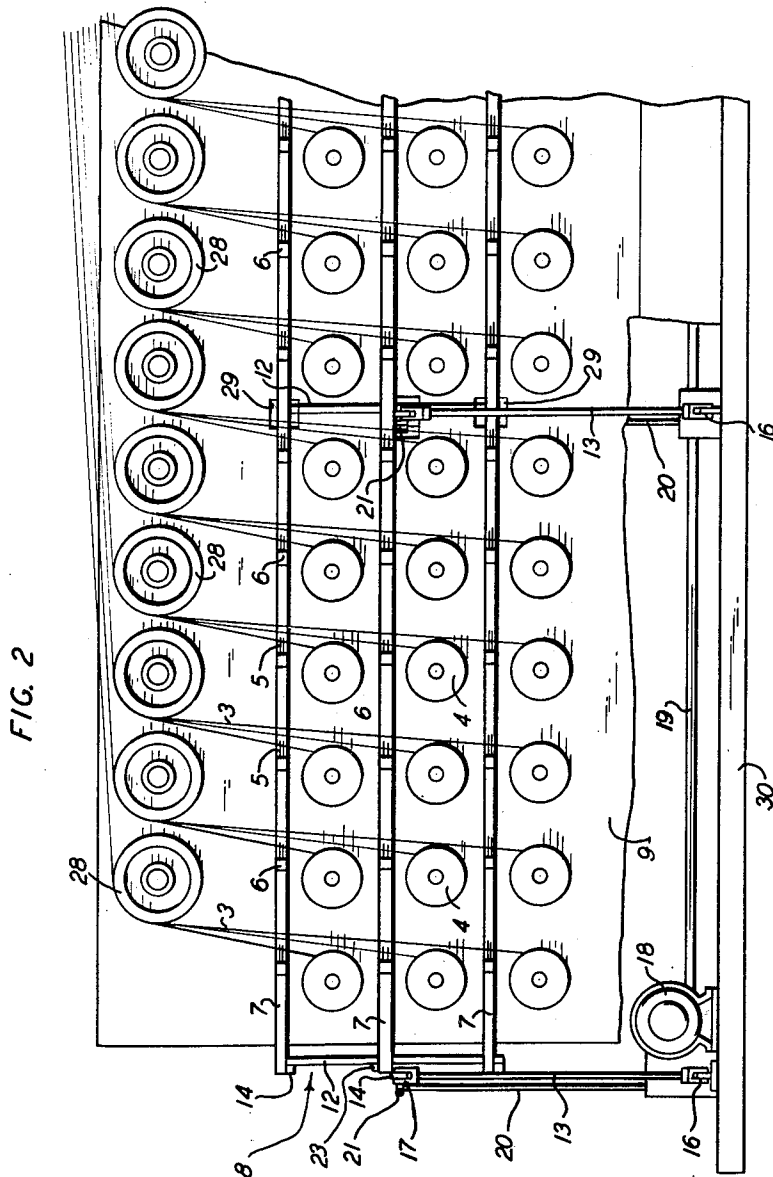
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STRAND TAKEUP DISTRIBUTOR

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7 Claims. (Cl. 242—25)

This invention relates to material distribution apparatus and particularly to apparatus for distributing strands uniformly on reels.

In the manufacture or processing of strands such as electrical conductors, the strands, upon leaving the processing machines, are generally distributed on take-up reels. In most instances, it is necessary to obtain uniform distribution of the strands over the full width of the reel. Heretofore, relatively complicated apparatus was required to obtain such uniform distribution, especially where the simultaneous take-up distribution of a plurality of strands was concerned. Such apparatus usually required complex cam and gearing systems.

It is the general object of this invention to provide a simple and reliable device for distributing strands uniformly on take-up reels.

According to the general features of the invention, applicant has provided strand distribution apparatus in which the strand guiding means are supported for distribution motion by pivot bearings thereby eliminating undesirable longitudinal bearing surfaces. More specifically, take-up reels are mounted on a panel and the associated strand guiding means are fixed to a rigid frame which is supported on pivoted upright members and oscillated to distribute the strands on the reels. The driver for the frame comprises a reversing motor driving a pinion which engages a rack on the frame. As the frame moves back and forth in a slight arc, there is a slight vertical displacement of the rack along the teeth of the pinion, but the horizontal component of the rate of motion of the strand guiding means remains uniform to effect proper distribution of the strands on the reels.

According to a feature of the invention, the effective distribution width of the strands may be changed simply by displacing the motor reversing means thereby making it possible to adapt the apparatus for take-up reels of different widths.

This and other features of the invention will be more fully understood from the following detailed description when considered in conjunction with the accompanying drawing in which:

Fig. 1 is a side elevational view of a strand take-up distributor according to the invention, and

Fig. 2 is a front elevational view of a portion of the distributor of Fig. 1 showing the takeup reel support panel partially broken away.

Referring now to the drawing showing the multiple strand take-up apparatus, take-up reels 4 are mounted on spindles provided therefor in rows on a vertical panel 9, together with their associated driving motors 10. Strands 3 are guided to each of the reels 4 from sheaves 28 by two guide fingers 5 of guide units 6 which are mounted on front longitudinal stringer members 7 of a rigid frame 8 having cross-members 14 extending through openings 29 in the panel 9, rear stringers 15, upright members 12 and diagonal reinforcing members 11. The rear stringers 15 are similar to the front stringers 7 except that they do not have guide units mounted thereon.

The frame is supported on a plurality of pivoted up-

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right legs 13, these legs being substantially equally spaced in pairs along the length of the take-up machine and are pivotally mounted to the ends of the middle cross-members 14. The number of legs and the reinforcement of the frame 8 is determined by the rigidity required and is, of course, different for distributors of different sizes. Only a portion of a distributor is shown in Fig. 2; a typical installation for 54 take-up reels would be just double the size of that shown in Fig. 2 and would utilize four pairs or legs 13 for its correspondingly longer frame 8. In addition such a distributor would have nine additional sheaves 28 and nine additional rows of reels 4. The legs 13 are of equal length and are pivoted in support bearings 16 on the base 30 of the machine. These base bearings 16 of each pair of legs 13 are the same distance apart as the front and rear pivots to the frame 17. Thus, any movement of the frame is pure translation and the guide units always remain in the same vertical relation to each other so that the wire is distributed exactly the same on the three tiers of reels while the legs pivot about their base bearings.

The distributor frame is driven back and forth by a constant speed, quick reversing motor 18, of conventional design, located at the base and end of the machine. Movement is transmitted from the motor by means of appropriate gearing through a line shaft 19 extending the length of the machine and vertical shafts 20 to each of the middle cross-members 14 to which the upright legs 13 are pivoted. The distributor frame is driven simultaneously at these places to avoid bending the stringers and to give a similar distribution motion along the length of the machine.

For correct, even distribution, it is necessary that the horizontal movement be uniform despite the slight arc of the frame movement at the ends of the pivoting legs 13. This is accomplished by driving the frame by a pinion gear 21 on each of the vertical shafts 20 engaging a rack 22 mounted to the side of each of the middle horizontal cross-members 14. The arc of the frame movement causes a small vertical displacement of the rack along the face of the gear teeth but does not affect the horizontal component of motion which remains uniform in accordance with the characteristics of the driving motor 18. The distribution of the strands is, therefore, controlled solely by the horizontal component of the guide units and thus is uniform across the width of the reels.

Reversal of the motor 18 is attained automatically by reversing the polarity of the excitation voltage thereto by switch 23, which is actuated by members 24 and 25 mounted on the frame. The length of the distribution path of the strands is controlled by the positions of the actuator members 24 and 25, which may be moved for different reel widths.

The position of the strand, relative to each reel, may be individually controlled by adjusting the position of the guide element 6 on the stringer member.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. In a strand take-up device, apparatus for distributing strands uniformly comprising a base member for the apparatus, a rigid frame having strand guiding means provided thereon, support members pivotally connected to the base and the frames for moving the frame in translation motion with respect to the base, and means for oscillating the frame between fixed limits to distribute the strands comprising a rack mounted to the frame, a pinion for the rack mounted on the base and reversible, driving means for the pinion, the face of the rack being of suffi-

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cient width to permit engagement with the pinion over the arcuate path of the frame.

2. Apparatus for distributing strands uniformly comprising a base member for the apparatus, a rigid frame having strand guiding means provided thereon, support members pivotally connected to the base and the frame for moving the frame in translation motion with respect to the base, and means for oscillating the frame to distribute the strands comprising a reversing motor mounted on the base, a rack mounted to the frame, and a pinion for the rack driven by the motor for driving the frame independent of curvilinear travel thereof, the face of the rack being of sufficient width to permit engagement with the pinion over the arcuate path of the frame.

3. Apparatus for distributing strands uniformly on reels comprising means for rotatably mounting the reels, driving means for the reels, a rigid frame having individual strand guiding means for each of the reels provided thereon, support members pivotally connected to the frame and the base for moving the frame in translation motion with respect to the reels, and means for oscillating the frame to distribute the strands on the reels comprising a motor, at least one pinion driven by the motor, a rack for the pinion mounted to the frame, the face of the rack being of sufficient width to permit engagement with the pinion over the arcuate path of the frame and switching means controlled by the travel of the frame for reversing the direction of rotation of the motor.

4. Apparatus for simultaneously distributing a plurality of strands uniformly on take-up reels comprising a base member, a vertical panel mounted on the base member, means for mounting the reels in rows on the panel, driving means for the reels, a rigid frame having transverse cross-members extending through openings in the panel, strand guiding means on the frame for each reel, a plurality of pairs of pivotally mounted upright support members connected between the base and the frame so that the frame is movable in translation motion with respect to the base, and means for oscillating the frame to distribute the strands uniformly on the reels comprising a reversible motor, a plurality of pinions driven by the motor, a plurality of racks for the pinions mounted to the transverse cross-members on the frame, the faces of the racks being of sufficient width to permit engagement with the pinions over the arcuate path of the frame and switching means controlled by the travel of the rack for reversing the polarity of the motor excitation to reverse the direction of rotation thereof.

5. Apparatus for distributing strands uniformly on reels comprising a base member, a panel mounted to the base member, means for mounting the reels on the panel, driving means for the reels, a rigid frame, strand guiding means for each reel mounted on the frame, pivotally mounted frame support members connected between the base and the frame so that the frame is movable in translation motion with respect to the reels, and means for oscillating the frame to distribute the strands uniformly on the reels comprising a substantially constant speed, reversible motor, a pinion driven by the motor, a rack for the pinion mounted to the frame, the face of the rack being of sufficient width to permit engagement with the

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pinion over the arcuate path of the frame and switching means controlled by the travel of the rack for reversing the direction of rotation of the motor.

6. Apparatus for simultaneously distributing a plurality of strands uniformly on take-up reels comprising a base member, a vertical panel mounted on the base member, means for mounting the reels in rows on the panel, driving means for the reels, a rigid frame having transverse cross-members extending through openings in the panel, strand guiding means for each reel mounted on the frame, a plurality of pairs of pivotally mounted upright support members connected between the base and the frame so that the frame is movable in translation motion with respect to the reels and means for oscillating the frame to distribute the strands uniformly on the reels comprising a substantially constant speed, reversible motor, racks mounted to the transverse cross-members on the frame, pinions driven by the motor for driving the racks at substantial constant linear velocities independent of curvilinear travel thereof, the faces of the racks being of sufficient width to permit engagement with the pinion over the arcuate path of the frame and switching means controlled by the travel of the rack for reversing the polarity of the motor excitation to reverse the direction of rotation thereof.

7. Apparatus for simultaneously distributing a plurality of strands uniformly on take-up reels comprising a base member, a vertical panel mounted on the base member, spindles for the reels mounted in rows on the panel, driving means for the spindles, a rigid frame having longitudinal members corresponding to each of the rows of the spindles, transverse cross-members extending through openings in the panel, strand guiding means for each reel mounted on the longitudinal members, a plurality of pairs of pivotally mounted upright support members connected between the base and the frame so that the frame is movable in translation motion with respect to the base and means for oscillating the frame to distribute the strands uniformly on reels mounted on the spindles comprising a substantially constant speed, reversible motor, a plurality of pinions driven by the motor, racks for the pinions mounted to the transverse cross-members on the frame, the faces of said racks being of sufficient width to permit engagement with the pinion over the arcuate path of the frame and switching means controlled by the travel of the rack for reversing the polarity of the motor excitation to reverse the direction of rotation thereof.

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