March 26, 1968 R. LEMAIRE 3,374,810

MANUFACTURE OF TELEPHONE QUADS

Filed June 9, 1965

Fig.1

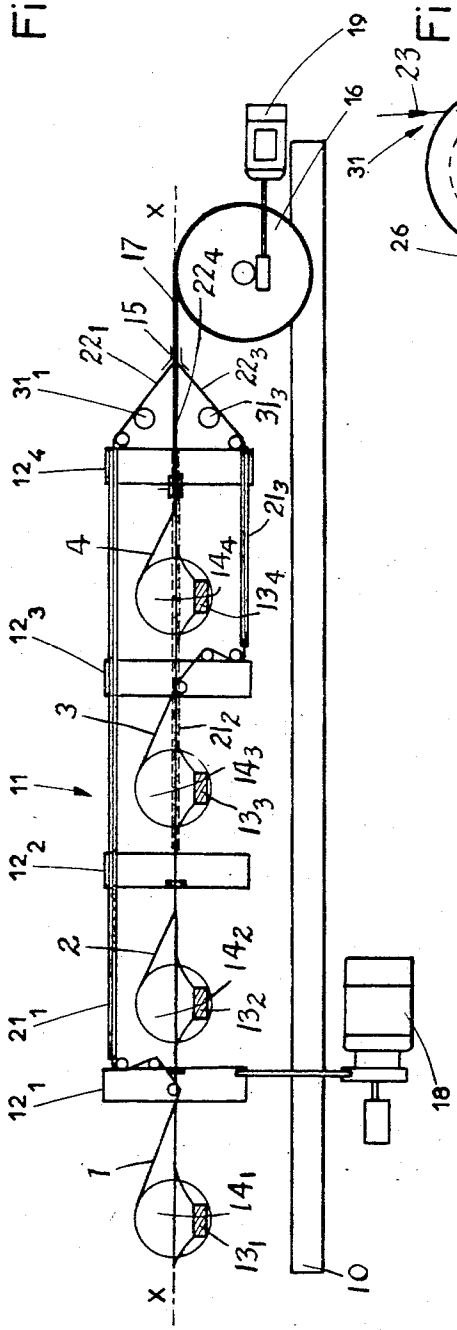


Fig.2

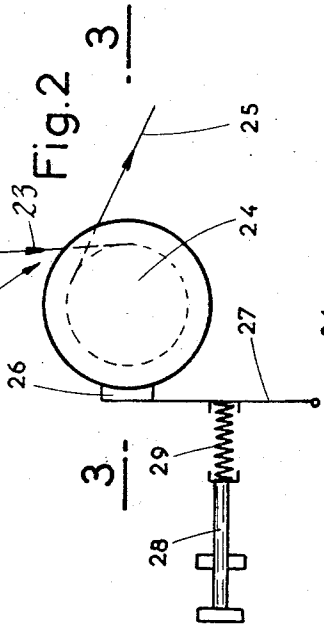


Fig.3

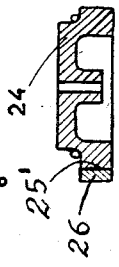
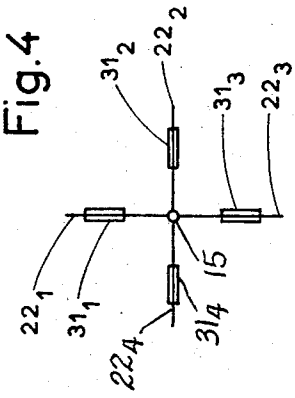


Fig.4



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MANUFACTURE OF TELEPHONE QUADS

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5 Claims. (Cl. 140—149)

ABSTRACT OF THE DISCLOSURE

A wire quad manufacturing machine comprising a framework which is rotatable about a horizontal axis and which supports cradle members in horizontally spaced relation, each of which in turn supports an associated reel of wire for free rotation about a horizontal axis and from which the wire is drawn, by a pulling means common to all of the wires, through a die plate means located beyond an endmost cradle member which is also common to all of the wires. Positioned between each reel and the die plate means is a pulley on which the wire passes for substantially a complete turn, the pulley being acted on by an adjustable brake-shoe for the application of an adjustable braking action on the pulley.

The present invention relates to an improved type of quadding machine, i.e., a machine for manufacturing telephone-wire quads for telephone cables.

Such a machine is adapted to assemble, in the form of a quad a number of four telephone wires, each derived from a separate reel and spirally twisted in reciprocating relationship. During the quadding operation, it is essential that the tension stress or resistance of the wires with respect to their forward motion be accurately controlled.

The invention is more particularly useful in connection with high-production quadding machines whose reel-supporting frame rotates at a comparatively high speed. In such a quadding machine, the reels are arranged one behind the other, along the axis of rotation, and the path of the wires between the reels from which they derive and the die plate in which they are assembled have different lengths.

According to the invention, the machine comprises separately adjustable braking means, effective to act on various wires so as to compensate for the differences in the resistance presented by the wires to the common traction effort exercised thereon and which are due to their different length of path.

Thus, an improved type of quadding machine according to this invention comprises means enabling, in spite of the differences in the path lengths, to render the feeding conditions at the die plate of the various wires rigorously identical.

The invention will be best understood from the following description and appended drawings, wherein:

FIGURE 1 is a diagrammatic view of one embodiment of the quadding machine according to the invention.

FIGURE 2 is a diagrammatic view of a braking device.

FIGURE 3 is a cross-sectional view along line 3—3 of FIGURE 2.

FIGURE 4 is a schematic front view, at an enlarged scale.

On the stand **10** of the machine, as illustrated in FIGURE 1, there is a framework **11** comprised of four plate members mounted for rotation about a horizontal axis X—X; said plate members 12_1, 12_2, 12_3, 12_4 carry oscillating cradles 13_1, 13_2, 13_3, 13_4, respectively, on which are mounted for rotation about their axes, reels 14_1, 14_2 14_3, 14_4, respectively, from which issue the four wires **1**, **2**, **3** and **4**, which, after having passed through a die plate **15**

urged by the drawing device **16**, form the desired quad assembly **17**. The framework **11** is rotated by an electric motor **18**, the pull of the quad being effected by means of an electric motor **19** the speed of which may be adjusted relative to the speed of rotation of the framework **11**.

Guiding means are provided for each wire between the reel from which it is issued and the assembling die plate **15**. For the wire **4**, which is nearest to the die plate **15**, these guide means consist of a single or of a plurality of pulleys such as **20**, but which do not offer any appreciable resistance to the forward motion of the wire under the action of the drawing device. Wire **3** issued from reel 14_3 at a greater distance from the die plate **15** than reel 14_4, is guided, between plate 12_3 and plate 12_4, by means of a tube 21_3 the length of which corresponds to the spacing between the two plates. Wire **2** issued from reel 14_2 is, in turn, guided by a longitudinal tube 21_2, the length of which corresponds to the spacing between plates 12_2 and 12_4, which is substantially twice the spacing between plates 12_3 and 12_4. Wire **1** issued from reel 14_1 is guided by a tube 21_1 whose length corresponds to thet distance between plate 12_1 and plate 12_4 which is substantially three times as large as the spacing between plate 12_3 and plate 12_4. Said tubes emerge at the outer periphery of plate 12_4 in order for the wire strands 22_1–22_4 to form the required angle with the axial direction of draw.

During the operation of the machine, plates **12** rotate at a great speed with the guide tubes **21** integral therewith, the wire running through said tubes being applied by the centrifugal force against the wall of said tubes, the friction forces between a wire drawn by device **16** and the tube being substantially high, and in any case different for the different wires: these forces are twice as great for wire **2** than for wire **3**, and they are three times as great for wire **1** than for wire **3**.

According to the invention, each one of the strands 22_1, 22_2, 22_3, 22_4 is passed over a braking device adjusted so as to equalize the forces of resistance developed on the various wires relative to the common traction effort applied thereon by the drawing device **16**.

One embodiment of such a braking device is illustrated in FIGURES 2 and 3. A wire strand **23** issued from plate 12_4 passes over a pulley **24** over which it achieves a nearly complete turn, and leaves the latter along a strand **25** which enters the die plate **15**. Onto a ring member **25'** adjacent pulley **24**, there is applied the action of a brake-shoe **26** secured on the end portion of a lever **27** and whose application pressure may be adjusted by means of spring biased screw member **28**, the spring being shown at **29**. The various braking devices **31** are adjusted in such a manner that each one of the wires **1**, **2**, **3**, **4** offers, between the pulley **14** from which it is issued and die-plate **15**, the same resistance to the traction effort applied thereon. The braking device 31_4 is adjusted to a maximum value, since no resistance other than that exercized by said device is supported by wire **4** which traverses no guide-tube; the braking device 31_3 is adjusted in such a manner as to offer a resistance which is lower than that of the device 31_4; device 31_2 is adjusted to a still lower value, while device 31_1 is adjusted to the lowest value, which may even be null, the resistance introduced by device 31_4 being then equal to that introduced during the passage through tube 21_1, over its whole length, by wire **1** during the rotation of plates **12**.

Thus, a quad **17** is obtained whose spiral pitch of the constitutive wires follow precisely the same path.

What is claimed is:

1. A machine for manufacturing wire quads, comprising a framework, means for rotating said framework about an axis, cradle members supported on the framework in spaced relation along said axis, means for support-

ing a reel of wire on each cradle member for free rotation about an axis substantially parallel to the axis of rotation of said framework, die plate means common to said wires located beyond an endmost cradle member, pulling means common to said wires for pulling the wires from the reels and through the die plate means, pulley means between each reel and the die plate means for receiving the associated wire and passing the same for substantially a whole turn on said pulley means, and brake-shoe means adjacent each pulley means for application of an adjustable braking action thereon.

2. A machine as claimed in claim 1 comprising longitudinal guide-tube means supported from the framework for guiding the wires of a quad from the respective reels from which they are issued, to said common die plate means.

3. A machine as claimed in claim 1 wherein said pulley means comprises a pulley for each reel on which the wire thereof passes, and a ring adjacent said pulley on which the brake-shoe means is applied.

4. A machine as claimed in claim 3 wherein said brake-shoe means comprises a pivotal lever, a brake-shoe on said lever adapted for contact with the ring of an associated pulley means, and adjustable spring means acting on the lever for controlling the pressure of the brake-shoe on the ring.

5. A machine as claimed in claim 3 wherein said axis of rotation of the framework is horizontal.

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