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CATERPILLAR FEEDER FOR STRANDS

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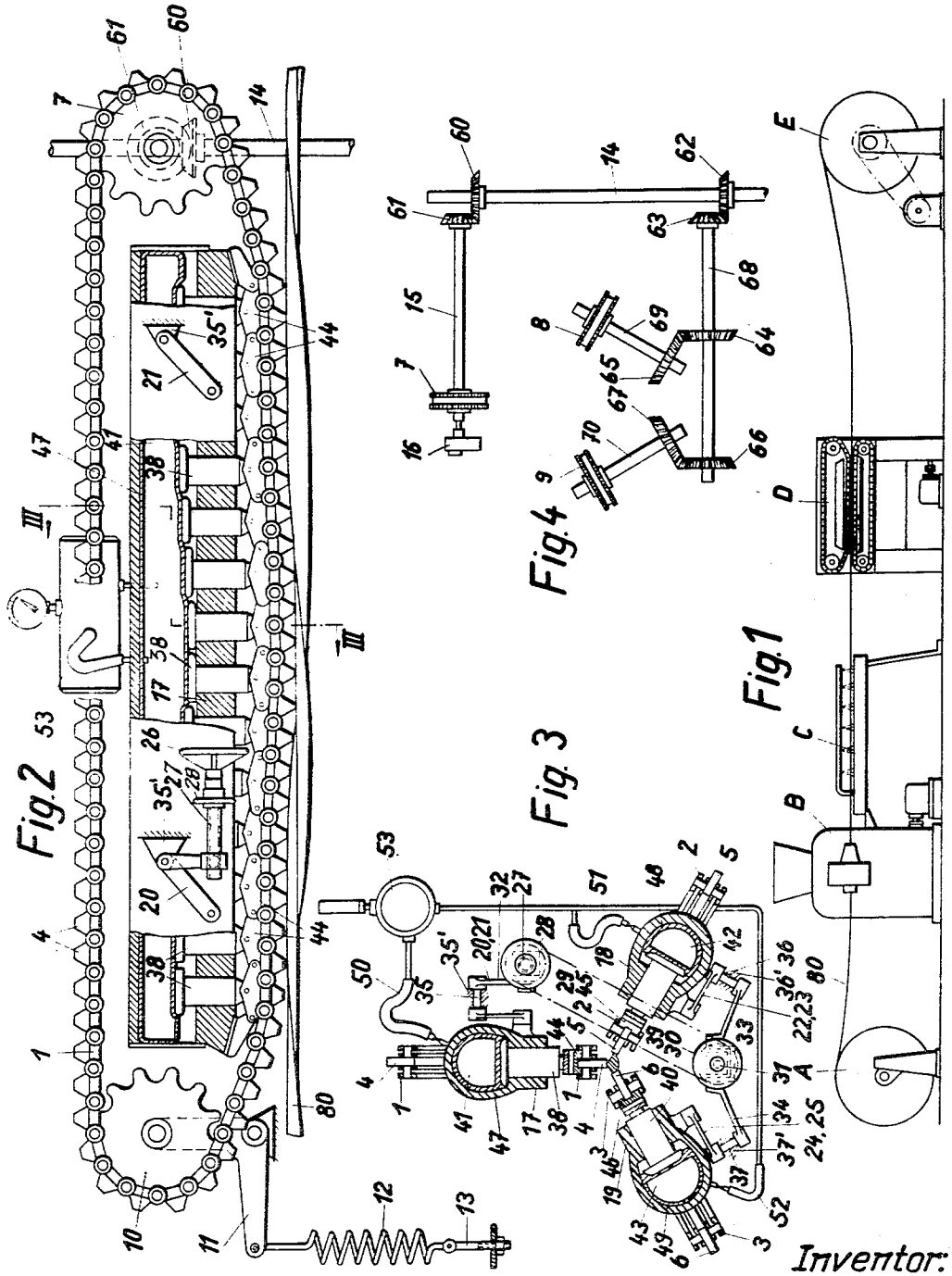

Fig. 2

Fig. 4

Fig. 3

Fig. 1

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CATERPILLAR FEEDER FOR STRANDS

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The present invention relates to caterpillar feeding mechanisms for cables, ropes and strands as they are used to pull such cables, ropes or strands through cable stranding or insulating machines. Wherever in this specification and claims the broad term "strand" is used, it is to be understood to include any longitudinally extending elements of indefinite length, such as cables, ropes, wires, relatively slender strips, ribbons, or tubes, made of any material.

Caterpillars heretofore known generally grip the cable by means of two chains lined with profiled rubber treads, said chains being mechanically, hydraulically, or pneumatically pressed on the cable by means of a bar. In spite of the provision of such profiled rubber treads, the cables are sometimes unduly compressed under the action of pressure from opposite sides, so that the shape of the cable is distorted and/or its insulation is damaged.

In order to obviate this drawback, or to at least considerably lessen it, caterpillar pulling mechanisms with more than two tracks have been recently used. As a result of this, the unit surface pressure is reduced and, at the same total pressure and with the same tension, the caterpillar mechanism can be designed shorter. Since the profiles of the treads engage the cable around a smaller circumferential surface than in two-track caterpillar mechanisms, the cable will not be readily damaged.

It is an object of the present invention to provide in a caterpillar pulling mechanism having three tracks displaced 120° with respect to one another one unobstructed side for the unhindered insertion or threading of the cable and to operatively connect these three tracks to a common drive shaft disposed at one side with regard to the caterpillar mechanism.

In order to feed pre-shaped sector cores or conductors and flat strands, the device for applying pressure to the tracks is suitably designed in such a way, that the latter become adapted to the shape of these cores, conductors or strands. This is accomplished, according to another object of the invention, by providing a pressure bladder to engage the heads of a larger number of plungers arranged one behind the other, the ends of said plungers being equipped with shoes serving to guide the tracks. The bladder is provided in a displaceable, preferably rockably suspended beam or bar. By varying the air pressure in this bladder, the pressure applied by the tracks may be adjusted as desired. In place of compressed air, liquid under pressure may be applied to the bladder. The three pressure bladders are suitably connected to a common pressure-equalizing device. In order to obtain an uninterrupted guide way for the tracks, the ends of the guide shoes interengage one another, i.e. they are hingedly connected to each other, forming links from plunger to plunger.

Still further objects and the entire scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

In the drawings,

Figure 1 illustrates schematically a side view of a caterpillar mechanism feeding a cable or the like through a cable insulating machine;

Figure 2 is a side view, partially in section, of a caterpillar mechanism for pre-shaped sector conductors or cores;

Figure 3 is a cross section through the caterpillar mechanism along the line II—II of Figure 2; and

Figure 4 is a schematic showing of the drive means for the tracks.

Referring now in more detail to the drawings, in Figure 1, A is the winding up cable drum, B is a plastic extrusion machine, C is a cooling trough, D is a caterpillar pulling or feeding mechanism and E is a winding reel. A cable, conductor or strand **80**, fed from the cable drum A, is to be provided with insulation in the extrusion machine B and cooled in the trough C, whereby the pulling force exerted by the caterpillar mechanism D will not damage the insulation just formed. During the pulling of pre-shaped sector conductors, i.e., conductors which have already obtained a shape other than circular corresponding to their position in the sector cable, care has to be taken that these conductors are not distorted when passing through the pulling mechanism D.

The caterpillar mechanism, as shown in Figures 2 and 3, is provided with three endless chains **1**, **2**, **3**, which are displaced 120° towards each other. These chains are equipped with rubber treads **4**, **5**, **6**, respectively, and are passed over sprocket wheels of which the sprocket wheels **7**, **8**, **9** are the drive wheels (see Figure 4). The associated second sprocket wheels of each sprocket wheel pair (**10** in Figure 2) is hingedly mounted on an elbow lever **11**, so that the chain can be stretched or tensioned. The tension is obtained from a spring **12**, the force of which is adjustable by means of a threaded bolt **13**. The drive sprocket wheels **7**, **8**, **9** are driven by a drive shaft **14**, disposed at one side of the caterpillar mechanism, via bevel gears **60** to **67** and intermediate shafts **15**, **68**, **69** and **70**, in such a way, that all of these sprocket wheels, **7**, **8** and **9** operate at the same circumferential velocity and in the same direction. The drive shaft **14** is connected to the driving gears of the cable insulating machine by means of a velocity-regulating arrangement. The pulling speed of the tracks can be read on a tachometer **16** coupled with the sprocket wheel shaft **15**.

The caterpillar mechanism has three beams, **17**, **18**, **19** which are hingedly or rockably mounted on lever pairs **20/21**, **22/23**, and **24/25**, respectively. Figure 2 shows the beam **17** hanging on a pair of levers **20** and **21**. The three lever pairs are connected to one another in such a manner that their rocking movements take always simultaneously and uniformly, so that all of the beams are moved towards the center of the caterpillar mechanism or are retracted from the same in unison. This is obtained, as shown in the embodiment of Figures 2 and 3, by means of a threaded shaft **27** manually rotatable with the aid of a handwheel **26** and by means of a sprocket **28** mounted on this shaft **27**, said sprocket **28** being connected to a sprocket **30** via a chain **29**. The sprocket **30** is mounted on a threaded shaft **31**. The threaded shafts **27** and **31** transmit the rotating movements imparted to them via arms **32**, **33**, **34** and pins **35**, **36**, **37** to the lever pairs **20/21**, **22/23**, **24/25** mounted on these pins which are journalled in stationary bearings indicated at **35'**, **36'**, and **37'**, respectively. Thus,

the beams **17, 18, 19** can be radially adjusted in a simple manner to readily comply with any particular operating condition. The beams or frames **17, 18, 19** are provided with rails upon which the chains of the tracks slide, in order to feed smooth cables. Sensitive cables or sector-shaped conductors, particularly, those which are preshaped, require close adaptation of the chains to the shape of the cables, because, otherwise, there may not be enough points of engagement on the cable surface and damage to the insulation may result. In accordance with the invention, the three beams **17, 18, 19** support plungers **38, 39, 40**, distributed over the length of these beams, these plungers being radially displaceable with respect to the cable and extend with their heads in chambers **41, 42, 43**, formed in the beams **38, 39, 40**, respectively. The ends of these plungers **38, 39, 40** protruding from the beams are equipped with guide shoes **44, 45, 46**, respectively, for the tracks. Bladders **47, 48, 49** are inserted in the chambers **41, 42, 43**, respectively, said bladders being connected to a compressor **53** for air or liquid. If pressure is applied to these bladders, the plungers **38, 39, 40** move towards the center of the caterpillar mechanism, whereby the guide shoes **44, 45** and **46** are pressed on the tracks. These guide shoes are hingedly mounted on the plungers and engage one another at their ends, i.e., they flexibly interconnect adjacent plungers. The pressure force of the tracks acting on the cable can be controlled in a simple manner by varying the pressure in the bladders.

I claim:

1. A caterpillar feeding mechanism for strands, comprising three endless caterpillar tracks displaced 120° with respect to one another and adapted and arranged to circumferentially grip and feed said strands inserted between said tracks, a common drive shaft for said caterpillar tracks at one side of said mechanism, means to operatively connect said drive shaft to said caterpillar tracks, three frames, each of said frames supporting one of said caterpillar tracks, adjustable means to displace said frames in radial direction with respect to said strands, a pressure chamber in each of said frames, a pressure medium within said chambers, a plurality of plungers displaceably mounted in said frames and extending with one of their ends to said chambers to be acted upon by said pressure medium, and guide shoes hingedly mounted on the other ends of said plungers to slidingly engage and guide said tracks opposite the strand-engaging sides thereof.

2. A caterpillar feeding mechanism according to claim 1, wherein the ends of adjacent guide shoes on each of said plungers are interengaging one another.

3. A caterpillar feeding mechanism according to claim 2, wherein said ends of said guide shoes are hingedly connected to one another to form an articulated uninterrupted guide way for said track riding theron.

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