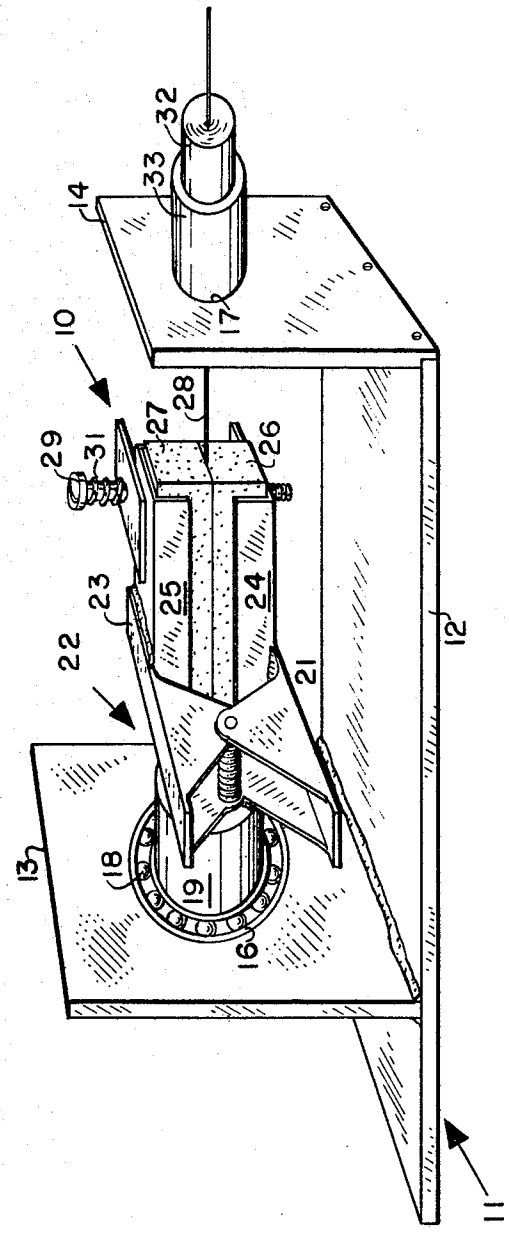
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WIRE TENSIONING APPARATUS

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WIRE TENSIONING APPARATUS

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ABSTRACT OF THE DISCLOSURE

A friction grip for applying tension to strands of magnet wire being paid from a stationary coil is rotatably mounted so that it will turn freely to follow the twisting of the wire.

Background of the invention

In the handling of wires and other strands it is commonly required to pay a wire endwise from a stationary coil even though the wire may have some degree of torsional stiffness. The coil from which the wire is being paid may or may not be wound on a flanged reel. Paying the wire thus, instead of unwinding it from a rotating reel, introduces a 360° twist into the wire for each convolution that is paid off. In coil winding machines and other applications this twist may, in itself, be unobjectionable, but it is usually necessary to tension, or brake a wire as it pays from a coil and for this purpose it is passed through some device that applies friction to the wire surface. In some cases the friction is applied by passing the wire between opposing soft surfaces such as felt and in other cases the surfaces may be hard and highly polished such as tungsten carbide. Whatever the nature of the friction surface, however, tensioning devices of this type have been a universal source of trouble in the form of wire damage and defective coil forming and no completely satisfactory wire tensioner has been available.

Summary

We have now discovered that the basis of the poor performance of prior art wire tensioners for strand being paid from stationary coils resides in the fact that the twist in the wire is "pushed back" as it passes through the friction member. Thus twists are accumulated until the wire breaks or enough torsional stress develops to spurt a tight group of twists through the tensioner. In the case of insulated magnet wire the torsion may crack or weaken the insulation and in all cases the uneven torsional distribution may produce an erratic movement in the wire leaving the tensioner. We have now overcome this problem by mounting the friction applying member so that it can rotate very freely around the wire axis. For this purpose we have invented an apparatus for tensioning an advancing wire comprising a stationary frame with means for guiding the wire through the apparatus. Our frame may conveniently comprise a base plate and two apertured plate members extending normally from it. Bearing means are supported on the frame such as by being mounted in one of the plate members. Our apparatus comprises friction means, such as opposing elongated pads, engaging the strand. The friction means is freely rotatable around the axis of advance of the strand, and may be mounted

on a hollow shaft that is rotatably supported in the bearing means.

Brief description of the drawing

The figure shows a pictorial view of an embodiment of our invention.

Description of the preferred embodiment

In the drawing our tensioning apparatus, indicated generally by the numeral **10** comprises a frame **11** built to include a horizontal base plate **12** from which extend vertical plates **13** and **14** with respective apertures **16, 17.** Within the aperture **16** there is mounted a ball bearing **18** within the inner race of which there is fitted a hollow stub shaft **19.** Brazed to the arms **21, 23** respectively are channels **24, 25** into which are inserted felt pads **26, 27** through which tension is to be applied. Adjustable pressure is applied to the pads **25, 26** by means of a threaded pin **29** and compression spring **31.** A wire guide consisting of a perforated plastic cylinder **32** fitted into a sleeve **33** is mounted in the aperture **17.** As the wire **28** passes between the pads **26, 27** the entire assembly mounted on the stub shaft **19** rotates in the bearing **18** as may be required to follow the turning of the wire with each convolution that pays from a coil, not shown. It will be understood that, although we have illustrated a friction device with felt pads which have particular application for enamelled magnet wire other friction devices may be used, particularly where there is no danger of damaging the wire surface. Pads of materials such as leather, foam rubber, nylon, fluorocarbons, polished carbides, and the like may also find application in the practice of our invention. It is important however that the friction applying member shall be free to rotate, and to rotate continuously in one direction, so as to accommodate the twisting of wire being pulled from a coil.

Although our invention has particular application to solid wires because they are usually stiffer in torsion than stranded wires, it is by no means limited thereto, provided that a stranded wire presents the problem hereinabove discussed, and wires of materials other than metal, such as plastic, and glass may also be tensioned with apparatus made to our invention.

We have invented a new and useful apparatus of which the foregoing description has been exemplary rather than definitive and for which we desire an award of Letters Patent as defined in the following caims.

We claim:

1. Apparatus for tensioning an advancing wire being paid from a stationary coil comprising:
   - (A) a stationary frame,
   - (B) means guiding said wire through said apparatus,
   - (C) bearing means supported on said frame, and
   - (D) friction means engaging said strand,
     - (a) said friction means being mounted in said bearing means, and
     - (b) said friction means being freely rotatable around the axis of advance of said wire.

2. The apparatus of claim 1 wherein said friction means comprises opposing elongated pads, said wire advancing between said pads and said apparatus comprising means urging said pads against said wire.

3. The apparatus of claim 2 wherein said frame comprises a base plate, and two apertured plate members extending normally from said base plate, said wire advancing through apertures in said members, said bearing means being mounted in one of said apertures and guiding means for said wire being mounted in the other of said apertures, said apparatus comprising a hollow shaft, said shaft being rotatably supported in said bearing means, and said pads being fastened to said shaft.

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