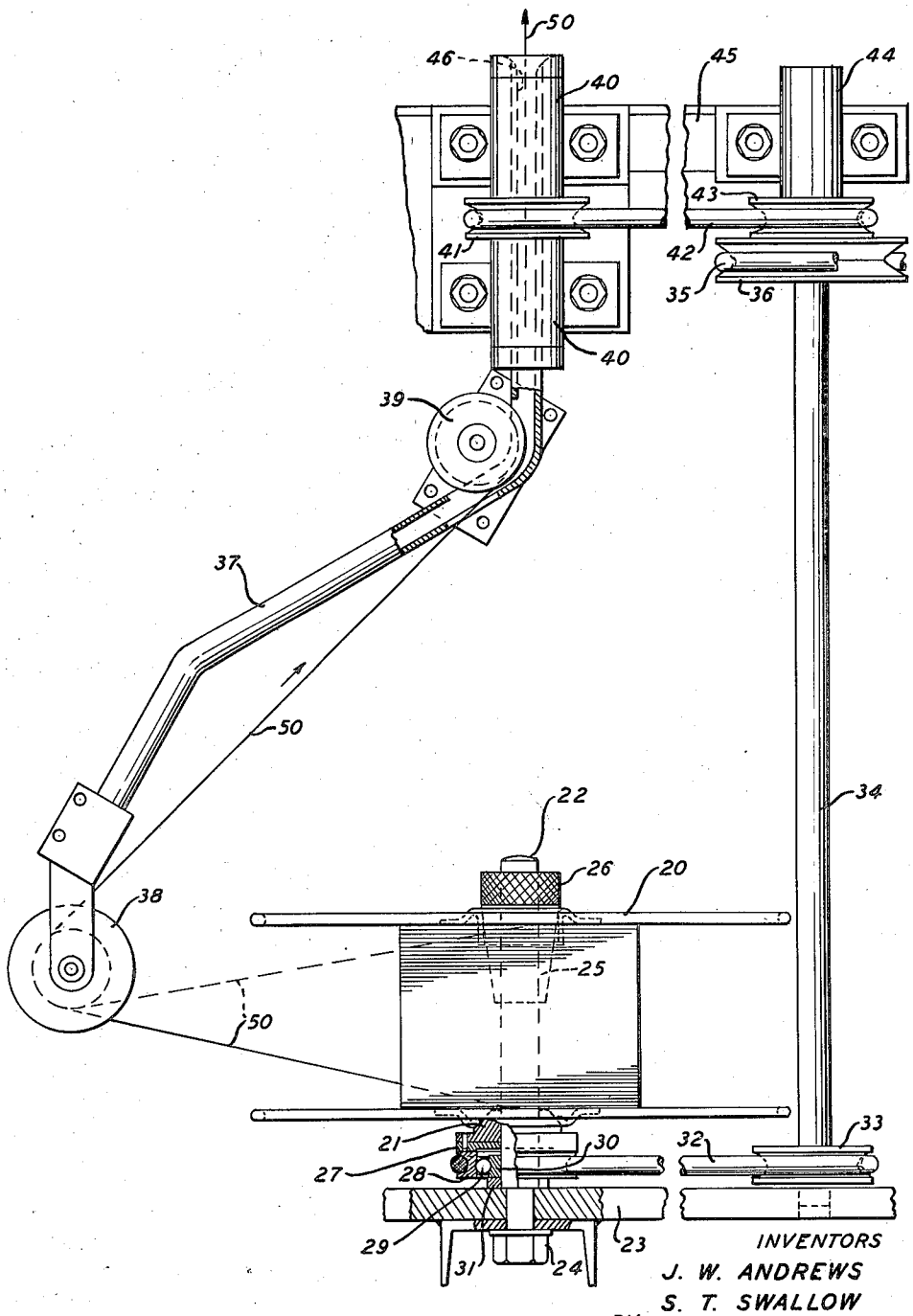
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STRAND HANDLING APPARATUS

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STRAND HANDLING APPARATUS

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5 Claims. (Cl. 117—23)

This invention relates to strand handling apparatus and more particularly to a device for taking off a strand from a supply reel.

In some instances in a large variety of machines for handling and/or treating strand materials, the supply of strand is wound on a supply reel and is withdrawn therefrom through a flier rotating about the supply. The action of the flier produces a twist in the strand for each revolution of the flier and as the diameter of the body of strand diminishes the pitch of this twist shortens.

It is one object of the present invention to provide a flier take-off device which will deliver strand from a supply reel with an unvarying and predetermined pitch of twist.

One embodiment of the invention contemplates a device in which strand is being drawn through a take-off flier from a supply reel at constant linear speed of the strand, the flier and the reel being driven at predetermined speeds so related to each other and to the linear speed of the strand as to impose a twist upon the strand of predetermined pitch and with means whereby the speed of the reel may vary to compensate for the diminishing diameter of the body of strand thereon.

The above and other objects of the invention will appear clearly from the following detailed description of one embodiment of the invention taken in connection with the accompanying drawing in which the single figure is a broken view in side elevation and partly in section of a strand take-off device constructed in accordance with the invention.

In the embodiment herein disclosed, a supply reel 20 rests at the lower rim of its central aperture on a cone support 21, which is rotatably mounted on a vertical stationary shaft 22, which in turn is rigidly secured to any suitable supporting member 23 as by a nut 24. A sleeve having a knurled handling portion 26 and a conical outer surface 25 is rotatable on the shaft 22 and fits down into the upper end of the central aperture of the reel to center and steady the reel.

A friction member 27 having a downwardly facing, plane, annular friction face is secured to the under side of the conical support 21. A complementary friction member 28 has a complementary upward facing friction surface, an external peripheral pulley groove and an internal ball race to receive anti-friction balls 29. The balls 29 also run in a raceway formed in a collar 30 secured around the shaft 22 and supported on a spacing block 31 resting on the support 23.

A driving belt 32 runs in the pulley groove of the member 28 and also on a pulley 33 secured to a drive shaft 34 which has a step bearing in the member 23, the shaft 34 being driven by a belt 35 and a pulley 36 from any convenient power source not shown. The shaft is also journalled at 44 in any convenient support 45.

A flier 37 having a take-off sheave 38 and a guide sheave 39 mounted thereon is rotatably journalled at 40, 40 to carry the sheave 38 around the reel 20. The flier is also provided with a drive pulley 41 driven by a belt 42 and a pulley 43.

In describing the operation of the device it will be assumed that a strand 50 is being drawn off upwardly from the reel 20, over the sheaves 38 and 39 and through the delivery channel 46 of the flier, at constant linear speed of the strand by some means not shown. It will further be assumed for the first mode of operation that the strand has been wound on the reel clockwise as seen from above, so that if the reel were stationary the flier would rotate counterclockwise to unwind the strand. All rotations will be described as seen from above.

In the device as disclosed and in one mode of operation, the flier is driven counterclockwise to unwind the strand from the reel. The reel is also driven counterclockwise and the difference of the rotational velocities of the flier and reel is determined by the linear speed with which the strand is being withdrawn and by the diameter of the body of strand remaining on the reel. The linear velocity of the strand is assumed to be constant. The rotational velocity of the reel changes as the diameter of the strand supply on the reel diminishes. The member 28 is driven at constant speed and a little more slowly than the necessary speed of the reel, and member 21, 27 slips on the member 28 under the pull of the strand on the reel.

The lever advantage of the strand on the reel will diminish as the reel empties, tending to increase the tension required on the strand, but the weight of the reel and strand supply body diminishes substantially likewise, diminishing the friction between the members 27 and 28 and so the tension required to drive the reel less and less ahead of the member 28 is held substantially constant.

Under these conditions the strand will be drawn from the reel at constant linear speed, under constant tension and with an imposed twist of constant pitch, and the reel will run ahead of the flier in rotation by a decreasing amount to com-

pensate for strand being taken off at constant linear speed from the diminishing supply.

In another mode of operation, the supply may be thought of as wound counterclockwise on the reel. Counterclockwise rotation of the flier will then tend to wind strand on the reel, but the reel in this case is driven faster than the flier and the office of the flier is in effect merely to take up the slack thus produced and to provide tension on the strand being drawn off. Here again the difference in speeds of the flier and reel is determined by the constant linear speed of the strand, the constant rotational speed of the flier, and the diminishing diameter of the strand supply.

In either mode of operation, the strand is withdrawn at constant linear speed and the flier is driven at constant rotational speed, so that the strand as delivered at the outlet of the flier has a twist of constant pitch, particularly an important factor in the manufacure of some kinds of cable for telephone and other communications uses. The supply reel is also driven by a friction slip drive or other variable means from a rotating member (28) whose speed is determined by the speed of the flier and by the speed of the strand in such a way as to impose the required tension on the strand and to permit the reel to lead the member by a varying amount.

The embodiment of the invention herein disclosed is illustrative only and may be widely modified and departed from in many ways without departing from the spirit and scope of the invention as pointed out in and limited only by the appended claims.

What is claimed is:

1. A strand take-off device having a supply reel supporting member rotatable about a vertical axis and free to move vertically, a driving member rotatable about the same axis and on which the supporting member rests with frictional engagement therewith only, and slippable friction means between the supporting member and the driving member, the parts being so constructed and arranged that the frictional coupling of the driving member to the supporting member will diminish as the weight of the contents of a reel supported on the supporting member diminishes by withdrawal of the contents.

2. A strand take-off device having a supply reel supporting member rotatable about a vertical axis and free to move vertically, a driving member rotatable about the same axis and on which the supporting member rests with frictional engagement therewith only, and slippable friction means between the supporting member and the driving member, the parts being so constructed and arranged that the frictional coupling of the driving member to the supporting member will diminish as the weight of the contents of a reel supported on the supporting member diminishes by withdrawal of the contents, all in combination with a rotatable flier positioned to revolve a strand guide coaxially about a reel positioned on the supporting member, and means to drive the flier at constant speed.

3. In a strand handling apparatus, a supply reel holder rotatable about a substantially vertical axis, and means to support and rotate the holder comprising a driven rotating member upon which the holder is supported and with which the holder has frictional engagement only, the parts being so constructed and arranged that the resistance of the holder to sliding on the member diminishes as the weight of the contents of a reel held in the holder diminishes by withdrawal of strand from the reel.

4. In a strand handling apparatus, a supply reel holder rotatable about a substantially vertical axis, a take off flier rotatable coaxially about the holder, and means to support and rotate the holder comprising a driven rotating member upon which the holder is supported and with which the holder has frictional engagement only, the parts being so constructed and arranged that the resistance of the holder to sliding on the member diminishes as the weight of the contents of a reel held in the holder diminishes by withdrawal of strand from the reel.

5. In a strand handling apparatus, a supply reel holder rotatable about a substantially vertical axis, a take off flier rotatable coaxially about the holder, means to drive the flier at constant speed, and means to support and rotate the holder comprising a driven rotating member upon which the holder is supported and with which the holder has frictional engagement only, the parts being so constructed and arranged that the resistance of the holder to sliding on the member diminishes as the weight of the contents of a reel held in the holder diminishes by withdrawal of strand from the reel.

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