March 4, 1930. L. O. REICHELT ET AL 1,748,995

SERVING APPARATUS

Filed June 4, 1927 2 Sheets-Sheet 1

Fig. 1.

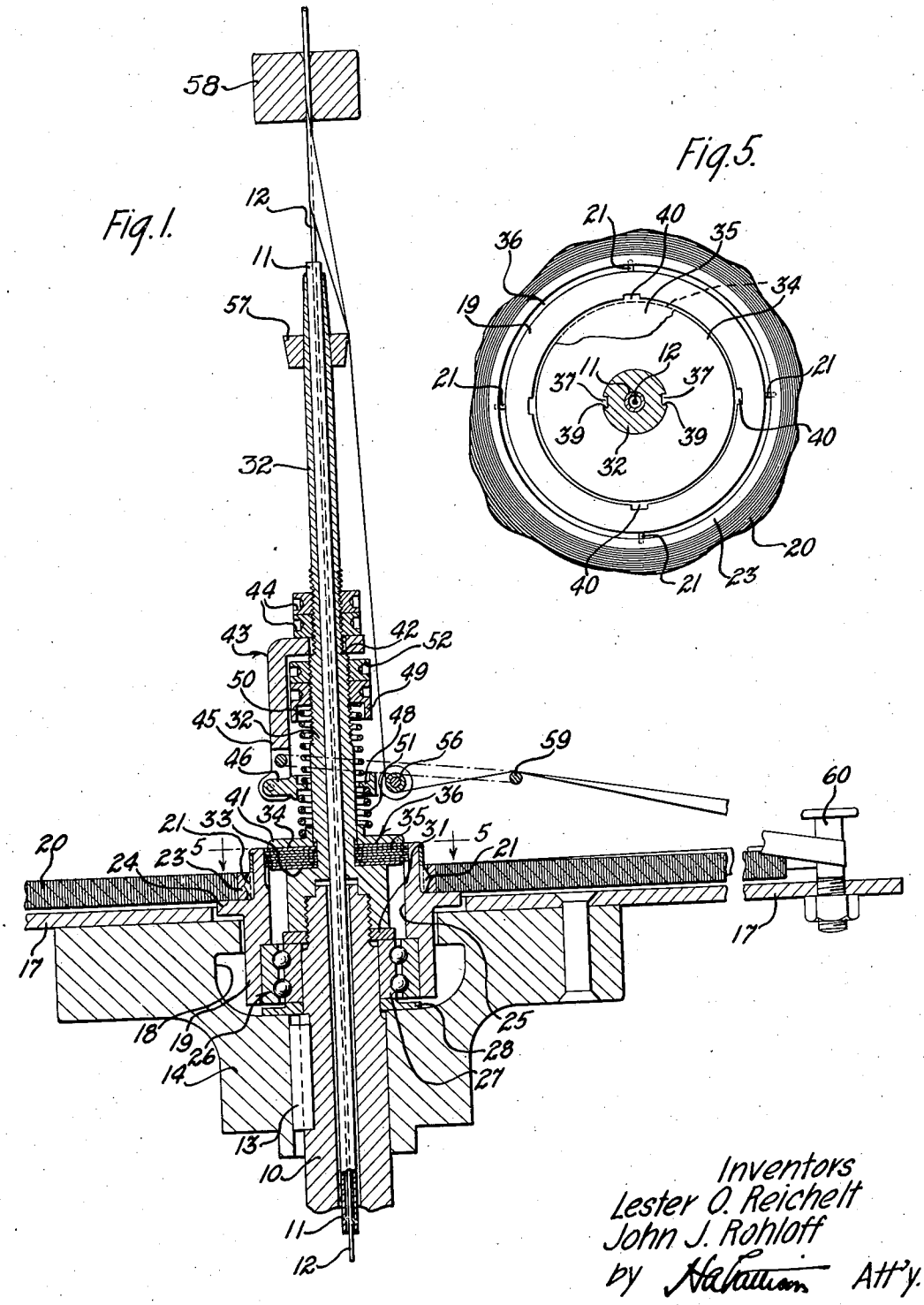


Fig. 5.

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Fig. 2.

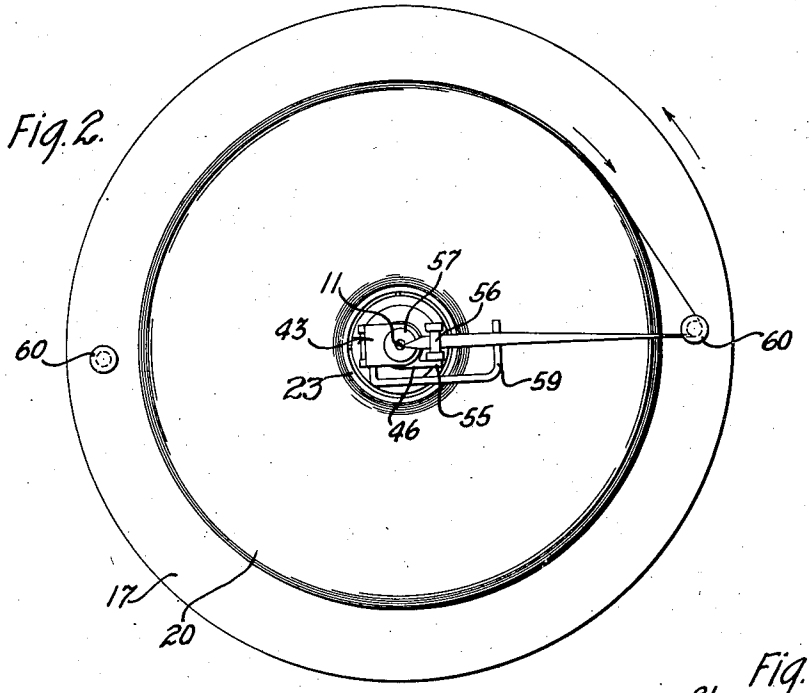


Fig. 3.

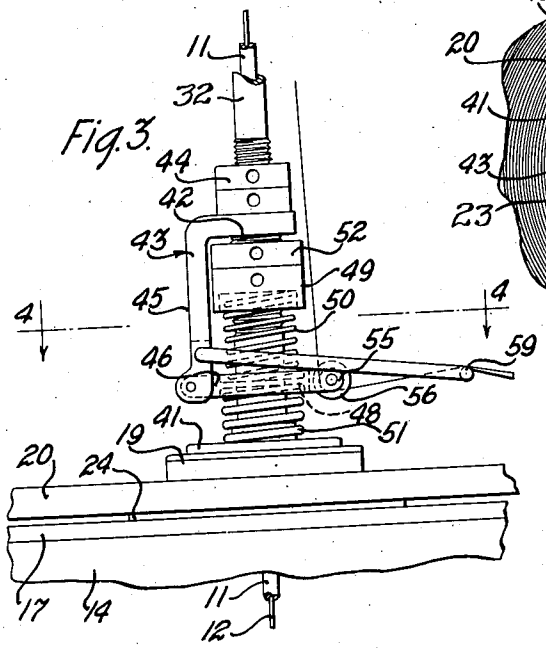
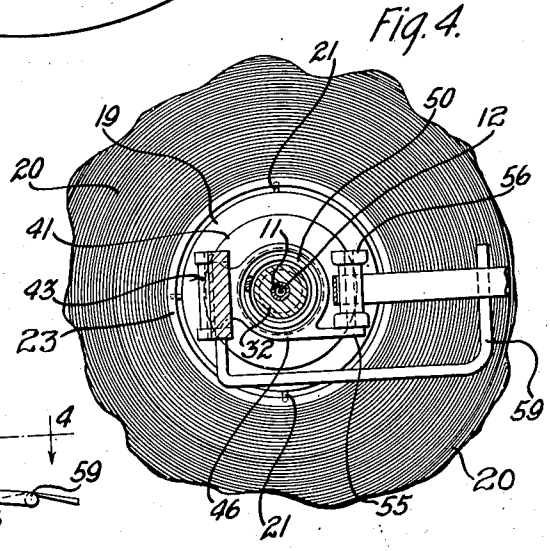


Fig. 4.



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UNITED STATES PATENT OFFICE

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SERVING APPARATUS

Application filed June 4, 1927. Serial No. 196,587.

This invention relates to serving apparatus, and more particularly to serving apparatus for applying covering material to wire or other types of cores.

The primary object of this invention is to provide an improved serving apparatus capable of applying covering material of widely varying quality and tensile strength to cores expeditiously and with a substantially uniform tension thereon at all times.

To attain the aforementioned object, the present invention contemplates a serving mechanism for insulating conductors for use in the transmission of human intelligence electrically, provided with a carrier for the material to be served to the core which is driven by power communicated thereto through a plurality of interleaved friction disks. These disks are operatively associated with the driving and driven elements and are adapted to bear against each other with a predetermined pressure, depending upon the character of the material being served to the core and upon the tension of such material in its travel from the carrier to its point of application to the core, which is effected through the adjustment of oppositely disposed elastic elements of different strength coaxially arranged relative to each other and the longitudinal axis of the core being served. Due to this particular arrangement of the elastic elements marked improvements result in the ability to serve material at considerably higher speeds and also material having widely different characteristics, as the power communicated to the driven element may be very closely regulated to compensate for very slight variations in the tension of the material. According to another embodiment the invention also contemplates in cooperation with the foregoing embodiment to make possible serving of material at higher speeds, a stationary center tube through which the wire to be served travels and which functions to eliminate all tendency of the wire to rotate or deviate from a straight line.

Other objects and advantages of this invention will more fully appear from the following detailed description taken in connection with the accompanying drawings, which illustrate one embodiment of this invention, in which

Fig. 1 is a fragmentary side view, partly in section, of a serving head embodying the features of this invention;

Fig. 2 is a plan view on a reduced scale, the polisher being omitted, of the complete serving head showing the path of the insulating material from the supply coil to the wire to be served;

Fig. 3 is a view in elevation of a portion of Fig. 1;

Fig. 4 is a plan section on the line 4—4 of Fig. 3 looking in the direction indicated by the arrows; and

Fig. 5 is an enlarged fragmentary plan section on the line 5—5 of Fig. 1 looking in the direction indicated by the arrows.

Referring to the drawings wherein like numerals refer to similar parts throughout the various figures, a rotary driving spindle 10 is provided with a longitudinal aperture throughout its length within which is a stationary tube 11, the spindle and tube being suitably journaled and fixed respectively upon a base (not shown). A wire 12 to be insulated is threaded through the aperture in the tube 11, the wire being led from a suitable supply (not shown). Adjacent the upper end of the spindle 10 is attached, by means of a key 13, a collar 14, to the upper surface of which is fixed a plate or serving head 17. Mounted in an axially disposed annular recess 18 formed in the upper surface of the collar 14 and surrounding the spindle 10 projecting therethrough is a material supply carrier 19, the material in the present instance being a coil of paper 20. The carrier 19 upon an outer peripheral surface has a plurality of equally spaced radially extending fins 21, around which a cardboard core 23 of the coil of paper 20 is pressed, the lower inner surface of the coil of paper 20 resting on the upper surface of a flange 24 of the carrier 19, which surface is on a slightly higher plane than the upper surface of the head 17 so that the lower surface of the coil of paper 20 does not drag thereon in the operation of the apparatus. The carrier 19 is provided with an axial opening 25 and is supported on an anti-

friction ball bearing 26, an inner race member 27 of which fits a shouldered portion of the spindle 10, the lower surface of the race member resting on a washer 28 in turn supported on a horizontal surface of the collar 14 at the bottom of the recess 18. The inner annular wall of the recess 18 of the collar 14 and the peripheral surfaces of the carrier 19 are suitably spaced from each other at all points and with the carrier and the coil of paper 20 supported thereon, carried by the anti-friction ball bearing 26, it will be apparent that the carrier will rotate with a minimum of friction. Threaded onto the upper end of the spindle 10 is a lock nut 31 which serves to clamp the inner race member 27 and the washer 28 against the horizontal surface of the recess 18 formed in the collar 14.

Secured to rotate with the spindle 10 by a threaded connection at the upper end thereof is a shouldered rotary tip member 32 which abuts the lock nut 31, the tip member forming an extension of the spindle. Resting on a shoulder 33 of the member 32 on a plane below the upper surface of the carrier 19 are a plurality of disks 34 and 35 forming a friction clutch 36. Alternate disks 34 and 35 of the clutch 36 are connected to the rotary member 32 and the carrier 19, respectively, as clearly shown in Figs. 1 and 5, in the following manner: The peripheral wall of each of the axial openings of the disks 34 is provided with a pair of oppositely disposed tongues 37 (Fig. 5) which are entered within a pair of key-ways 39 formed in the member 32, thus rotatably locking the disk 34 and the member 32 together, while the disks 35 are provided upon their peripheries with a plurality of tongues 40 which project into corresponding notches formed in the peripheral wall of the opening 25 of the carrier 19, thus rotatably securing them together. It will thus be apparent that rotary motion will be transmitted from the member 32 to the carrier 19 upon suitable pressure being exerted between the disks 34 and 35. Abutting the upper face of the top disk 34 is a brake washer 41 which is free to rotate and to move longitudinally upon the member 32. Mounted upon the member 32 and resting against a shoulder 42 formed thereon is an L-shaped member 43 which is clamped in position thereagainst by a pair of lock nuts 44 threaded onto a threaded portion of the member 32, as clearly shown in Fig. 1. A depending arm 45 of the member 43 is bifurcated at its lower end and has pivotally supported between the furcations thereof a tension lever 46, the lever surrounding the member 32 but spaced therefrom.

Surrounding the sleeve 32 between upper and lower surfaces of an annular depressed web 48 formed upon the tension lever 46 and opposed surfaces of an adjustable cup-shaped collar 49 and the washer 41, respectively, are coiled compression springs 50 and 51, which as clearly shown in the drawings are coaxially or concentrically arranged relative to each other, as well as the longitudinal axis of the wire 12, the spring 50 being weaker than the spring 51, the latter spring serving as a cushion during the varying of the driving pressure between the disks. The tension of the spring 50 may be adjusted by moving the collar 49, which is threaded onto the member 32, upwardly or downwardly the desired distance and thereafter locking it in position by a nut 52. Mounted upon an arm 55 formed upon one side of the tension lever 46 by means of a roller bearing (not shown) is a roller pin 56 around which the paper travels in the operation of the apparatus. Secured upon a tapered upper end of the member 32 is a collar 57, over an upper peripheral edge of which the paper travels after leaving the roller pin 56 during its passage to the wire 12 to be served. Suitably mounted above the collar 57 is a forming die or polisher 58 through which the served wire passes. Pivotally supported upon the member 43 at a point above the pivot of the lever 46 is a guide 59 for guiding the paper from a roller pin 60 carried upon the upper surface of the serving head plate 17 and also as a support for the paper from wind pressure, due to the speed of the serving head. Two of the roller pins 60 are provided upon the plate 17 at diametrically opposite points to properly balance the latter.

It is desirable that the centers of the roller pins 56 and 60 and the axis of the serving head 17 always be in line with each other and to facilitate and insure such alignment the supporting member 43 carrying the tension lever 46 is adjustably mounted upon the member 32. It will be apparent that by loosening the lock nuts 44 upon the member 32 the desired alignment may be readily had without the removal of any part of the serving apparatus and as readily clamped in such position.

The operation of the hereinbefore described serving apparatus is as follows:

The coil of paper tape 20, as hereinbefore mentioned, is mounted upon the carrier 19 with its free end uncoiling in a direction reverse to the direction of rotation of the head 17. The wire 12 is threaded through the stationary tube 11 from its supply, through the polisher 58, around a suitable capstan and thence to a suitable take-up mechanism (both not shown). The operation of this serving apparatus, it is believed, will be clearly understood without illustrating the capstan and the take-up mechanism, they being generally well understood in the art. Referring to Figs. 1 and 2 the free end of the paper coil 20 is led around the roller pin 60 over the upper surface of the guiding arm of the guide 59, around the inside surface of the roller pin 56,

during which movement it is turned 90° from its original position on the coil. From the pin 56 the paper is led upwardly to the polisher 58, the paper being spaced from the member 32 by the upper peripheral edge of the collar 57. The free end of the paper is manually wrapped around the wire 12 in a clockwise direction and held thereon, the apparatus started and the capstan draws the wrapped wire upwardly and feeds it to the take-up mechanism. It will be apparent from the description hereinbefore given that through the frictional driving pressure between the disks 34 and 35 of the clutch 36, which disks are alternately secured to the extension 32 of the driving spindle 10 and the carrier 19 mounting the coil of paper 20, respectively, the latter will be revolved in the same direction as the head 17, but at a different speed, due to the drawing of the paper from the coil as it is wrapped on the advancing wire 12 by the revolving head. This difference in speed is indicated by the arrow (Fig. 2) adjacent the paper between the coil 20 and the roller pin 60. Any tendency of the paper to vary from the initial predetermined amount as determined by the delicately balanced spring tensioned lever 46 is mainly caused by the decreasing diameter of the coil of paper 20. As the coil of paper becomes smaller the leverage becomes less and the tendency is to increase the tension on the paper, but this is immediately offset by a very slight movement of the lever 46, against the compression of the spring 50, counterclockwise about its pivot, due to the pull of the paper in passing around the pin 56. This it will be apparent reduces the pressure which the cushion spring 51 exerts on the brake washer 41 and consequently reduces the frictional driving pressure between the clutch disks 34 and 35, or in other words, to increase the slippage between the disks and thereby maintaining the tension on the paper substantially constant from a full coil to an empty one. The tension of the spring 51 it will be apparent may be varied by increasing the tension of the spring 50 by turning down the cup-shaped collar 49 on the member 32. The tension in the spring 50 should preferably never be greater than that which will maintain the lever 46 in substantially a horizontal direction as indicated in the drawings, in which position the action of centrifugal force will be reduced to a minimum.

The tension of the spring 51 may also be adjusted by increasing or decreasing the number of disks of the clutch 36, which method of adjusting is only done when adapting the apparatus to another quality of serving material wherein, for example, the tensile strength of the material to be served is greatly increased or decreased from the previously served material. After varying the number of disks the final adjustment of the tension lever 46 is made by adjusting the tension of the spring 50 as hereinbefore described, to provide for the predetermined final degree of tension on the material during the serving operation.

The advantages of the herein described serving apparatus reside particularly in its capability of adaptation to the serving of widely differing qualities of serving material and of material of very low tensile strength. These advantages are due to the coaxially arranged elastic elements 50 and 51 acting in opposite directions and concentrically disposed relative to the longitudinal axis of the wire 12 being served taken with the passage of the wire through the stationary guide tube 11. To adapt the apparatus to another material, the tensile strength of which widely varies from the previously served material it is merely necessary to remove the extension 32 of the spindle by unthreading it from the spindle 10. Thereafter by removing the collar 57, lock nuts 44, member 43, nut 52, collar 49, springs 50 and 51 and brake washer 41, all of which are readily removable from the member 32, access may be had to the clutch 36 for increasing or decreasing the number of the disks thereof. Upon reassembling the parts carried by the member 32, the lever 46 is tensioned to provide the normal predetermined degree of tension on the material by turning upwardly or downwardly the adjusting collar 49 to vary the tension of the spring 50, as hereinbefore described. This latter adjustment it will be apparent adjusts the cushion spring 51, which in turn varies the frictional driving pressure between the disks of the clutch.

What is claimed is:

1. In a serving apparatus, a driving element, a driven element carrying material to be served to a core, means intermediate said elements for communicating power to the driven element from the driving element, coaxially arranged elements acting in opposite directions associated with the power communicating means for normally causing the communication of a predetermined amount of power to the driven element, and means responsive to the tension of the material being served for varying the action of the elements acting in opposite directions to change the action of the power communicating means.

2. In a serving apparatus, a driving element, a driven element carrying material to be served to a core, means intermediate said elements for communicating power to the driven element from the driving element, coaxially arranged elastic elements of different tension acting in opposite directions associated with the power communicating means for normally causing the communication of a predetermined amount of power to the driven element, and means responsive to the

tension on the material being served for varying the action of the elastic elements to change the action of the power communicating means.

3. In a serving apparatus, a rotatable driving element, a member carrying a supply of serving material, a friction clutch comprising a plurality of interleaved friction disks, adjacent ones of the disks being operatively connected to the driving element and the member, respectively, for communicating power from the driving element to the member, coaxially arranged elements acting in opposite directions operatively associated with the clutch for normally causing the communication of a predetermined amount of power to the driven member, and a lever pivotally attached to the driving element over which the serving material travels and responsive to the tension thereon during the serving thereof for varying the action of the elements acting in opposite directions to change the action of the friction clutch.

4. In a serving apparatus, a rotatable driving element, a member carrying a supply of serving material, a friction clutch comprising a plurality of interleaved friction disks, adjacent ones of the disks being operatively connected to the driving element and the member, respectively, for communicating power from the driving element to the member, a pair of adjustably mounted coiled compression springs coaxially disposed and operatively associated with the clutch for normally causing the communication of a predetermined amount of power to the driven member, and a lever pivotally attached to and surrounding the driving element over which the serving material travels and responsive to the tension thereon during the serving thereof for varying the action of the springs to change the action of the friction clutch, the springs each operatively related with opposite portions of the lever with one of the springs disposed between the clutch and the lever.

5. In a serving apparatus, a rotatable driving element, a member carrying a supply of serving material, a friction clutch comprising a plurality of interleaved friction disks, adjacent ones of the disks being operatively connected to the driving element and the member, respectively, for communicating power from the driving element to the member, a pair of adjustably mounted coiled compression springs of different tension coaxially disposed and operatively associated with the clutch for normally causing the communication of a predetermined amount of power to the driven member, and a lever pivotally attached to the driving element at one side of the axis thereof and provided with an annular portion coaxially disposed therewith and extending to the opposite side thereof over the latter portion of which the serving material travels and responsive to the tension thereon during the serving thereof for varying the action of the springs to change the action of the friction clutch, the springs each bearing at one end upon opposite portions of the lever with the spring having the greatest tension disposed between the clutch and the lever.

6. In an apparatus for serving material to a core, a rotatable serving head, carrying a supply of serving material and rotated therewith, means over which the serving material travels including elastic elements acting in opposite directions operatively associated with the head in such a manner that the material is wrapped on the core with a predetermined amount of tension on the material, and a stationary member coaxially arranged with the head and provided with an aperture for the passage of the core to be served for preventing the core from contacting with moving surfaces of the apparatus during the serving operation.

7. In an apparatus for serving material to a core, a rotatable driving means, a friction driven means carrying a supply of serving material and driven by the driving means, a stationary member coaxially arranged with the driving means and provided with an aperture for the passage of the core to be served for preventing the core from contacting with moving surfaces of the apparatus during the serving operation, and means over which the serving material travels including elements acting in opposite directions operatively associated with the driven means for varying the effectiveness of the cooperation between the driving and driven means in response to a tendency of the tension on the material to vary from a predetermined amount.

8. In a serving apparatus, a driving element, a driven element carrying material to be served to a core, means for communicating power to the driven element from the driving element, coiled compression springs associated with the means for normally causing the communication of a predetermined amount of power to the driven element, and a lever carried by and surrounding the driving element over which the serving material travels and responsive to the tension thereon during the serving thereof for varying the action of the springs to change the action of the power communicating means, the springs each operatively mounted within oppositely disposed pockets formed in the lever.

9. In a serving apparatus, a driving element, a driven element carrying material to be served to a core, means intermediate said elements for communicating power to the driven element from the driving element, elements acting in opposite directions coaxially arranged relative to each other and the longitudinal axis of the core operatively asso-

ciated with the power communicating means for normally causing the communication of a predetermined amount of power to the driven element, and means responsive to the tension of the material being served for varying the action of the elements acting in opposite directions to change the action of the power communicating means.

In witness whereof, we hereunto subscribe our names this 25th day of May, A. D. 1927.

LESTER OSWALD REICHELT.
JOHN JAMES ROHLOFF.