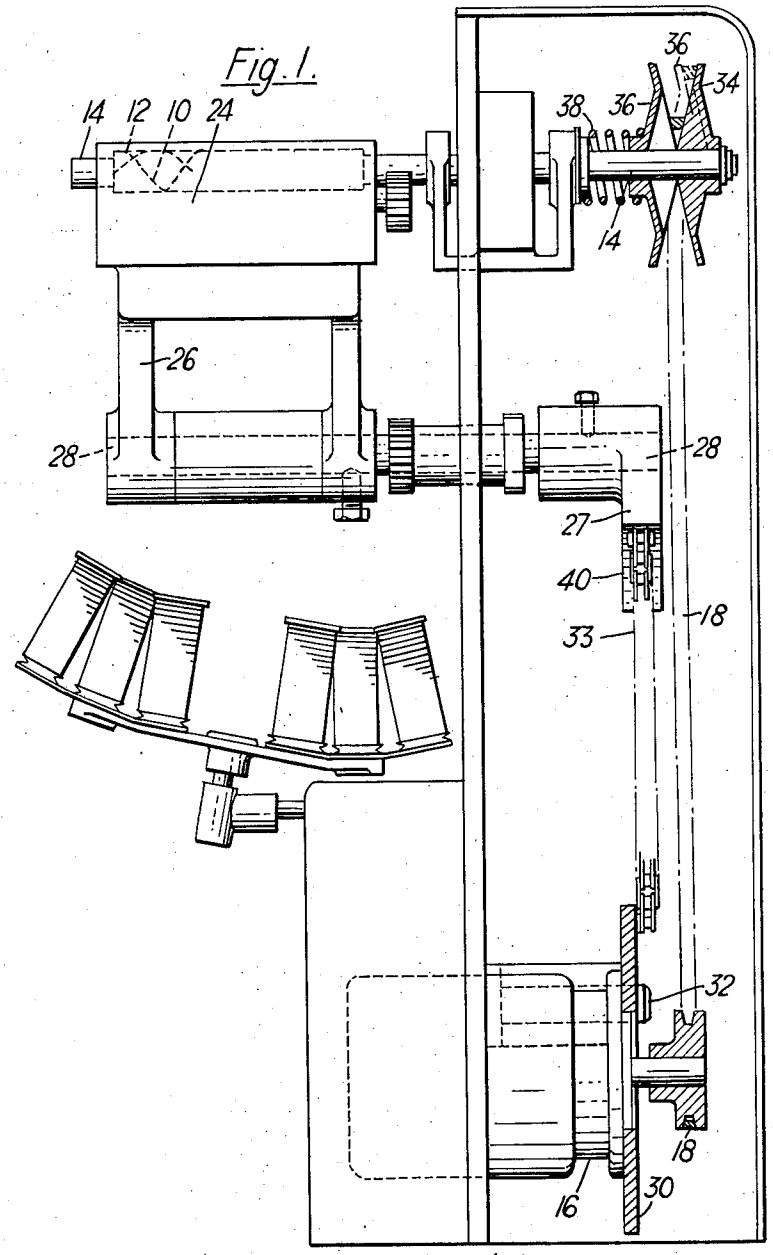
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TEXTILE WINDING MACHINE

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Fig. 1.



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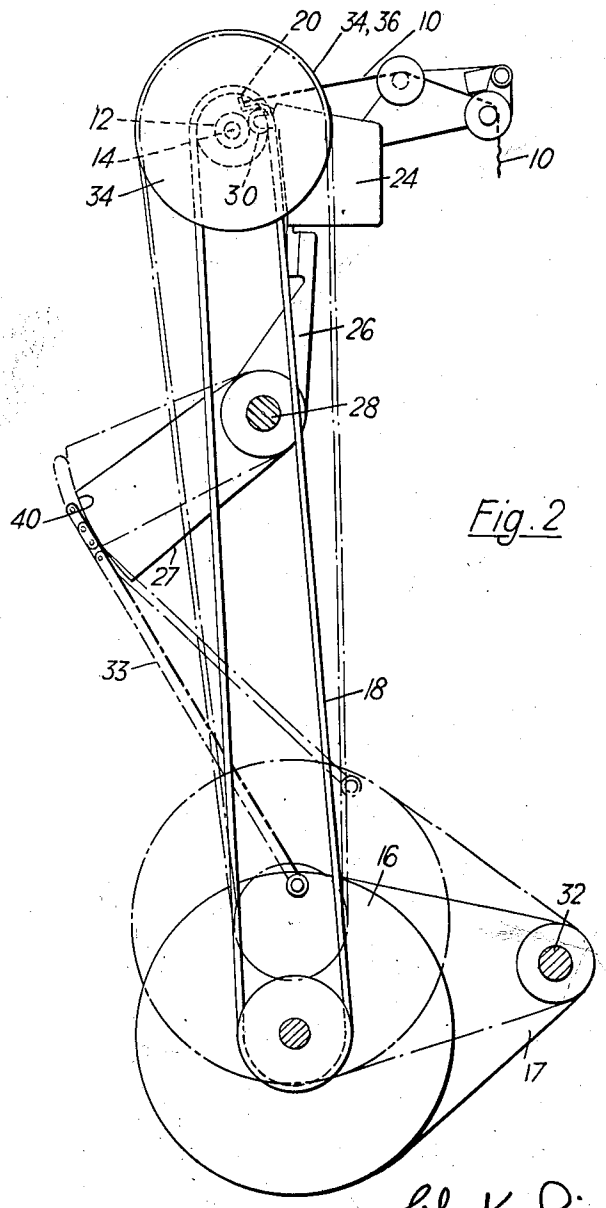


Fig. 2

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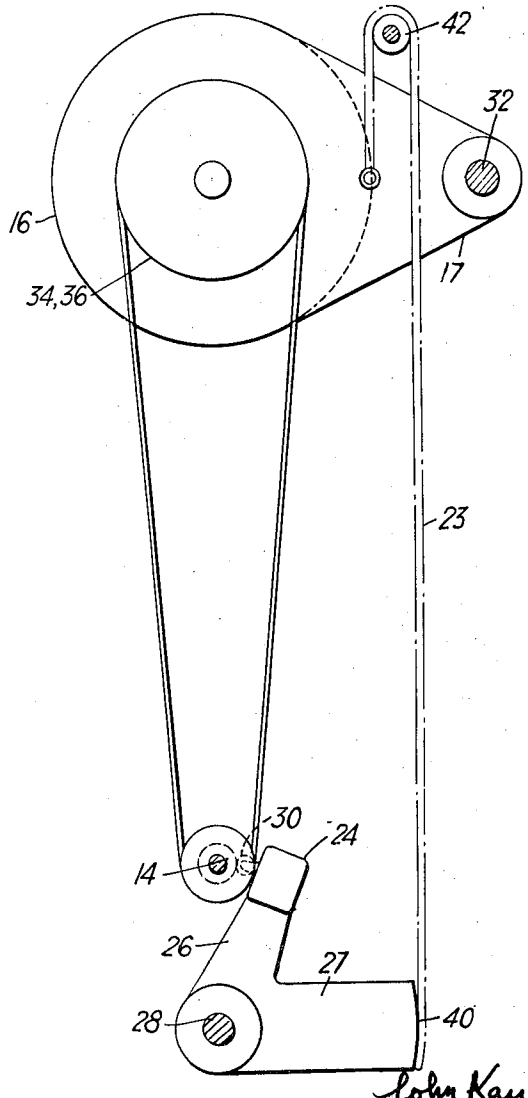
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Fig. 3.



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TEXTILE WINDING MACHINE

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7 Claims. (Cl. 242—18)

This invention relates to textile winding machines.

In yarn winding machine for the production of cones, cheeses and like packages by laying the yarn through the agency of a traversing device on a rotary spindle, it is necessary to decrease the angular velocity of the spindle as the diameter of the package increases so that the linear speed of the yarn laid on the surface of the package does not increase unduly.

The invention is concerned with the solution of that problem.

In the machine in accordance with the invention, the spindle is driven by a motor through a belt and an expansible pulley which may be on the spindle or on the motor shaft and speed control means are provided which move away from the axis of the spindle as the diameter of the package increases and, in so doing, cause the motor to be moved relatively to the spindle and thus allow the pulley to adjust itself to a larger diameter and decrease the angular velocity of the spindle.

As the diameter of the package grows, the yarn traversing member must be moved away from the axis of the spindle and, therefore, it is most convenient for that member to be used as the speed control means.

In the preferred form of the invention, the motor is carried by a pivotally mounted bracket the angular position of which determines the position of the motor relatively to the spindle. This bracket is suspended from a part which partakes of the movement of or moves with the traversing member towards and away from the spindle, by a flexible member such as a chain so that as the package grows, the motor is lifted towards the spindle. The expansible pulley has a pair of cheeks which are spring urged towards each other so that as the motor rises, the cheeks are brought closer to each other to increase the effective diameter of the pulley and to decrease the angular speed of the spindle.

The relationship between package diameter and yarn speed can be kept constant or be varied in accordance with any desired law. To maintain the desired relationship, it is generally required that the movement of the motor towards the spindle be a non-linear function of the movement of the speed control means away from the spindle. This can be provided for very simply in the arrangement envisaged above in which the motor is suspended by a chain or the like by causing that chain to pass over a suitably designed cam surface on the speed control means serving to vary the effective length of the chain at different angular settings of the speed control means.

Two examples of machines in accordance with the invention will now be described with reference to the accompanying drawings in which:

FIGURE 1 is a diagrammatic elevation form of machine;

FIGURE 2 is a side elevation of the parts with which the invention is particularly concerned; and

FIGURE 3 is a sketch of the vital parts of another form of machine.

The drawings show yarn **10** being wound on to a centre **12** on a spindle **14**. The spindle is driven by a motor **16** through a belt **18** and the yarn is laid on the centre by a traversing member **20** which is reciprocated along the

spindle by means such as a roller having an endless groove or scroll within a casing **24** and driven from the spindle **14**. These means form no part of this invention.

The casing **24** is carried by a two-armed bracket **26** pivotally mounted at **28**. It has a roller **30** which bears against the package being formed on the centre **12** so that as the diameter of the package increases the bracket **26** is caused to turn clockwise on its pivot **28**.

The motor **16** is carried by a soleplate or bracket **17** which is pivotally mounted at **32** and is connected by a chain **33** to an arm **27** of the bracket **26**. As the package increases in size and the bracket **26** swings clockwise, the motor bracket **17** is thus also caused to swing clockwise and the motor to be moved towards the spindle **14** as shown in chain lines in FIGURE 2.

The motor drives the spindle through the belt **18** and an expansible pulley having two cheeks **34, 36** which define a V-shaped groove. The cheek **34** is fixed to the spindle **14** both axially and circumferentially. The cheek **36**, however, is free to slide along the spindle and is urged towards the cheek **34** by a spring **38**.

At the beginning of the winding of a package, when the parts are in the positions shown in full lines, the package is at its smallest diameter and the cheeks of the expansible pulley are at their maximum distance apart and the effective diameter of that pulley is at its smallest. As the package grows the parts move into the positions shown in chain lines in the drawings. The cheeks of the expansible pulley are forced towards each other by the spring **38** so that the effective diameter of the pulley is increased and the angular speed of the package is decreased.

The arm **27** of the bracket **26** terminates in a cam face **40** against which the chain **33** bears. The shape of this cam face determines the relationship between the movement of the traversing member **20** and that of the motor and by appropriate design any desired relationship can be established.

On removal of a finished package from the machine, the parts resume the full-line positions under the influence of the weight of the casing **24** and the motor against the action of the spring **38** of the expansible pulley That spring could, of course, be replaced by any equivalent such as a pneumatic or electromagnetic device.

FIGURE 3 shows diagrammatically the lay-out of the vital parts of a modified winding machine in which the expansible pulley is on the motor shaft instead of on the spindle.

The spindle is shown at **14** and the traversing mechanism at **24**, the latter, as before being carried by a lever **26, 27** having a pivot **28**. The motor **16** is carried by a bracket **17** pivotally mounted at **32** but, in this case, it is above instead of below the spindle. The expansible pulley **34, 36** is on the motor shaft and is connected to an ordinary pulley on the spindle by a belt **18**. The motor bracket **17** is suspended by a chain **33** which passes over a runner **42** and is attached to the arm **27** of the traversing mechanism carrying lever. The end face **40** of the arm **27** forms a cam similar to the cam face **40** shown in FIGURE 2. Thus, the arrangement shown here duplicates that of FIGURE 2 part for part but the disposition of the parts is different.

As the package grows, the lever **26, 27** is turned clockwise as is the motor bracket **17**. The driving belt **18** is thus brought further down into the groove of the expansible pulley and the angular speed of the spindle is reduced.

I claim:

1. A yarn winding machine for the production of cones, cheeses and like packages comprising a rotary spindle, means for travering the yarn along the spindle, an expansible driving pulley on said spindle, means continuously tending to expand the effective diameter of said pul-

ley, a motor mounted for substantially vertical movement towards and away from said pulley, a flexible driving member connecting said motor to said pulley, pivotally mounted speed control means arranged for pivotal movement in response to increase in diameter of the package being wound and a link connecting said speed control means and said motor whereby increase in diameter of the package results in movement of said motor relatively to said pulley, expansion of the effective diameter of said pulley and reduction in the angular velocity of the spindle.

2. A yarn winding machine for the production of cones, cheeses and like packages comprising a rotary spindle, yarn traversing means mounted for reciprocation along said spindle, pivotally mounted means carrying said traversing means adapted, as the package thereon increases in diameter to be swung in a direction to cause the traversing means to move away from the spindle, a motor, an expansible pulley on said spindle, a belt transmitting power from said motor to said pulley, a bracket supporting said motor mounted for pivotal movement, a link suspending said motor bracket from said pivotally mounted means so that pivotal movement of said last-mentioned means causing the traversing means to move away from the axis of the spindle results in pivotal movement of the bracket bringing the motor towards said pulley in a substantially vertical path and means continuously tending to expand the effective diameter of said pulley and thereby to keep said belt tensioned in spite of the movement of the motor towards the pulley and to decrease the driving transmission ratio.

3. A yarn winding machine as claimed in claim 2 in which the said link is flexible and bears against the face of a cam moving with the said pivotally mounted means so as to influence the movement of the motor bracket occasioned by increase in the diameter of the package.

4. A yarn winding machine for the production of cones, cheeses and like packages comprising a rotary spindle, yarn traversing means mounted for reciprocation along said spindle and for movement away from said spindle as the package increases in diameter and a motor driving said spindle directly through a belt and an expansible pulley, said motor being carried by a pivotally mounted bracket connected by a link to said yarn traversing means so that the weight of the motor urges the traversing means towards the spindle and so that movement of said yarn traversing means away from said spindle causes pivotal movement of said motor bracket and substantially vertical movement of said motor and alteration of the effective diameter of said pulley with consequent reduction in the angular velocity of the spindle.

5. A yarn winding machine for the production of cones, cheeses and like packages comprising a rotary spindle, yarn traversing means mounted for reciprocation along said spindle and for movement away from said spindle as the package increases in diameter and a motor driving said spindle directly through a belt and an expansible pulley on said spindle said motor being carried by a pivotally mounted bracket connected by a link to said yarn traversing means so that the weight of the motor urges the traversing means towards the spindle and so that movement of said yarn traversing means away from said spindle causes pivotal movement of said bracket in a direction to cause substantially vertical movement of said motor towards said spindle and alteration of the effective diameter of said pulley with consequent reduction in the angular velocity of the spindle.

6. A yarn winding machine as claimed in claim 4 in which the said expansible pulley is carried by said spindle and the said substantially vertical movement of said motor is a movement towards the spindle.

7. A yarn winding machine as claimed in claim 4 in which the said expansible pulley is carried by said motor shaft and the said substantially vertical movement of said motor is a movement away from the spindle.

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