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THREAD GUIDE DRIVING ARRANGEMENT FOR ARTIFICIAL SILK SPINNING MACHINES

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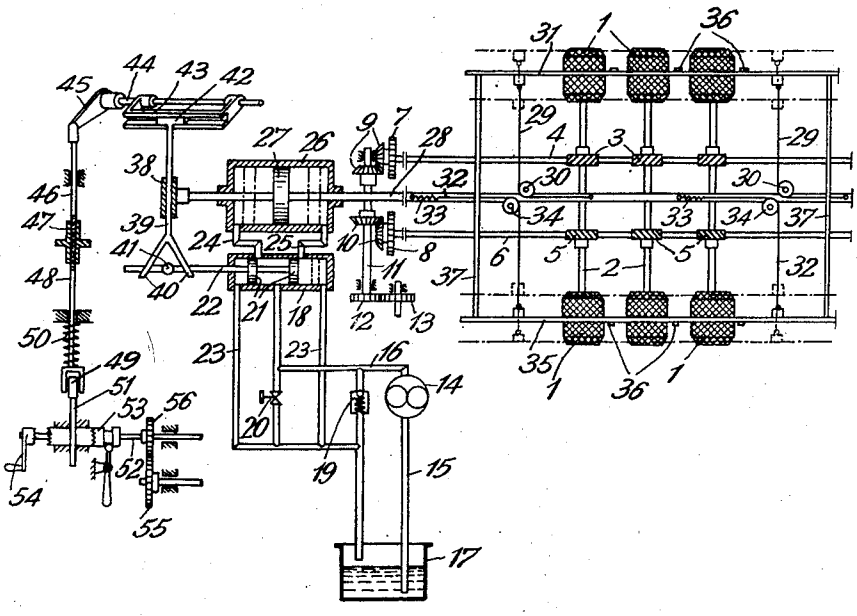

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THREAD GUIDE DRIVING ARRANGEMENT FOR ARTIFICIAL SILK SPINNING MACHINES

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The present invention relates to a thread guide driving arrangement for use with artificial silk spinning machines of any suitable kind, that is, spinning machines operating on the principle of bobbin winding or cake generating by action of centrifugal force.

It is generally known that the influence of the thread guides which operate to control the winding of bobbins or the formation of cakes of artificial silk filaments emanating from the spinning nozzles is of decisive significance for the uniformity of the finished artificial silk package. The effect of the thread guides is accordingly markedly felt in the subsequent handling of the filaments, when these are wound on bobbins or formed into cakes in centrifugal (Topham) boxes.

The most reliable proof of correct working of a thread guide consists in the manner in which the guide reverses from one direction into the other, that is to say, each time the thread guide reaches one of the two ends of traversing movement and starts on its reverse movement. Dependent upon whether the thread guide changes its direction of traversing too rapidly or too slowly, the physical character of the filaments is likely to be altered or uneven distribution of the bearing surfaces of the thread package may result, which renders unwinding more difficult and causes losses of manufacturing.

Several remedies have already been proposed in order to obtain maximum uniformity of working of the thread guides. To this end, for instance, heart shaped eccentrics have been resorted to, whereby the backward and forward movement of the thread guides is positively controlled. These heart shaped eccentrics have however several disadvantages, as it is almost impossible to adjust the cusp of the heart form exactly into alinement with the tip thereof, so that the two ends of the bobbin winding are not supplied with exactly the same number of thread windings. Further, the guide roller is liable to jump across the tip of the heart form, so that for a certain time the prescribed curve is not followed, in consequence whereof, a material amount of driving energy is squandered in passing across the tip as well as the cusp of the heart form.

If the unwinding is effected at a relatively high speed, it may happen that the heart shaped eccentric causes vibrations which have a detrimental influence on the spinning process. A further disadvantage of these thread guide drives is the liability of disuniformity of guidance of the threads ensuing at both points of reversal, thereby to cause the winding at both ends of the bobbins to become uneven, and to form knots or bulges.

With an arrangement according to the present

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invention, these disadvantages are intended to be avoided in that the thread guides operate in conjunction with the piston of a hydraulic telemetric system, whereby the length of the piston travel can be utilised, by means of a cam, for producing the desired form of bobbin.

In the accompanying drawing an embodiment of the invention is shown, by way of example only, in the form of a driving arrangement as applied to a spinning machine.

Each pair of bobbins 1 is mounted on a winding spindle 2 and all these spindles 2 are connected by means of screw gears 3 and 5 with driving shafts 4 and 6 respectively. The driving shaft 4 serves for driving the winding spindles 2 in one direction of rotation, and the driving shaft 6 for driving the shafts 2 in the other direction of rotation, the winding spindles 2 being driven by means of a coupling (not shown) either by the shaft 4 or the shaft 6.

On the driving shafts 4 and 6 are mounted spur gears 7 and 8 which are driven by means not shown on the drawing. A gear pump 14 is driven by bevel wheels 9 and 10, a shaft 11 and back gears 12 and 13. This pump is connected with a suction pipe 15 and a pressure pipe 16. The suction pipe 15 dips into a pressure-agent reservoir 17 and the supply or pressure conduit 16 leads to a piston control valve 18. Included in a conduit branching from the pressure pipe 16 is a safety valve 19 which holds the pressure in the main or supply conduit 16 constant. In another branch conduit is included a cock valve 20 which serves for regulating the pressure-agent pressure in the main conduit 16. In the piston control valve 18 is contained a double piston 21 which is carried by a piston rod 22. Further, two return pipes 23 and two connecting pipes 24 and 25 are connected with the piston control valve 18 which lead to an actuating cylinder 26 the piston 27 of which is arranged on a piston rod 28 the portion of the latter projecting out of the cylinder extending the entire length of the machine.

To this piston rod are connected transmission cables 29 by means of one of their ends so as to pass over sheaves 30, the other cable ends being secured to a thread guide carrier rod 31. Further cables 32 are secured at one of their ends by means of a spring 33 to the piston rod 28, and are passed over sheaves 34 and secured at their other ends to a second thread guide carried rod 35. Both thread guide carrier rods 31 and 35, on which thread guides 36 are arranged, are rigidly connected to each other by cross rods 37, so as to be compelled to move together. By virtue of the springs 33 intermittent movement transmission is avoided.

A guide member 38 which is fitted to the piston

rod 28 receives a guide rod 39 in axially displaceable relation thereto. One end of this guide rod is in form of a fork 40 the divergent arms of which cooperate with a control member 41 which is arranged on the control piston rod 22. The other end of the guide rod 39 is connected to a lug which is displaceably guided in a rotatable stirrup 43. On the axle 44 of the rotatable stirrup 43 a lever arm 45 is fixed to the free end of which a rod 46 is pivoted. This rod 46 is connected by means of a socket-joint 47 with another rod 48 in such a manner that by turning the sleeve 47 the rods 46 and 48 can be forced against each other. The rod 48 is provided at its bottom end with a roller 49 which by action of a pressure spring 50 which surrounds said rod, is pressed against a cam 51, the latter being movably arranged on a shaft 52. The cam can be connected with this shaft 52 by the aid of a coupling sleeve 53.

The drive of the shaft 52 is effected by means of a driving arrangement (not shown on the drawing) through the medium of the gear wheels 55 and 56.

The manner of operation of the arrangement described is as follows:

By means of a drive (not shown) the winding spindles 2 are driven in unison with the bobbins 1 via either of the spur gears 7 or 8, the shafts 4 or 6 and the screw gears 3 or 5. At the same time the gear pump 14 is driven from the shaft 11. By this means the pressure-agent is conveyed through conduit 16 into the control cylinder 18 whence, dependent upon the setting of the control piston 21, it passes either through conduit 24 on the left hand side or through conduit 25 on the right hand side of the actuating piston 27 into the cylinder 26. Consequently, the actuating piston 27 is forced together with the piston rod 28 to the right or left hand side of the figure of the drawing by the pressure of the pressure-agent.

If the piston rod 28 is pushed to the right, the thread guide carrier rods 34 and 35 are moved in the downward direction by action of the cable 29, whereas if the piston rod 28 is pushed to the left the thread guide carrier rods are moved by action of the cable 32 in the upward direction. At the end of each stretch of travel of the piston one or the other of the two arms of the fork 40 cooperates with the control member 41 on the control piston rod 22, whereby the control piston 21 is moved in that direction, due to which the pressure-agent is changed over to the other side of the pressure piston 27. By this means, the piston rod 28 is moved in the opposite direction until the fork 40 cooperates with the control member 41 so as to change over the control piston anew.

By the action of the cam 51 through the rods 48 and 46 the lever arm or crank 45 is displaced so that the rotatable stirrup 43 is also displaced through the shaft 44. Due to this, the rod 39 received in the guide member 33 is shifted, whereupon the fork 40 cooperates with the control member 41 upon a longer or shorter travel of the piston 27 so that the changing over thus takes place upon a shorter or longer travel of the piston 27. In this manner the length of the piston travel and consequently also the form of the bobbin can be controlled by means of the cam 51.

I claim:

1. In a thread guide driving arrangement for artificial silk spinning machines for producing thread packages by rotary motion, rotary thread package supporting means, thread guide means arranged on rod like carriers for traversing relative to said thread package supporting means in the axial direction thereof while distributing the thread material thereto so as to form said package as required, a hydraulic telemetric system including an actuating piston connected with said thread guide means with said piston arranged on a guide rod, separate transmission means intercalated between said piston guide rod and said thread guide carrier rods and cam means for controlling the length of traverse of said thread guide means in either direction of traversing movement, and cam means for controlling the length of travel of said actuating piston guide rod for accordingly determining the length of traverse of said thread guide means, thereby to control the form of said package.

2. In a thread guide driving arrangement for artificial silk spinning machines for producing thread packages by rotary motion, rotary thread package supporting means, thread guide means arranged on rod like carriers for traversing relative to said thread package supporting means in the axial direction thereof while distributing the thread material thereto so as to form said package as required, a hydraulic telemetric system including an actuating piston connected with said thread guide means with said piston arranged on a guide rod, separate transmission cables intercalated between said piston guide rod and said thread guide carrier rods, and cam means for controlling the length of travel of said actuating piston guide rod for accordingly determining the length of traverse of said thread guide means, thereby to control the form of said package.

3. In a thread guide driving arrangement for artificial silk spinning machines for producing thread packages by rotary motion, rotary thread package supporting means, thread guide means arranged on rod-like carriers for traversing relative to said thread package supporting means in the axial direction thereof while distributing the thread material thereto so as to form said package as required, a hydraulic telemetric system including an actuating piston connected with said thread guide means with said piston arranged on a guide rod, separate transmission cables intercalated between said piston guide rod and said thread guide carrier rods for controlling the length of traverse of said thread guide means in either direction of traversing movement, sheaves for passing said transmission cables thereover for changing the direction of said transmission cables, flexible end connections provided on at least part of said transmission cables for securing the respective cables to said piston guide rod, and cam means for controlling the length of travel of said actuating piston guide rod for accordingly determining the length of traverse of said thread guide means, thereby to control the form of said package.

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