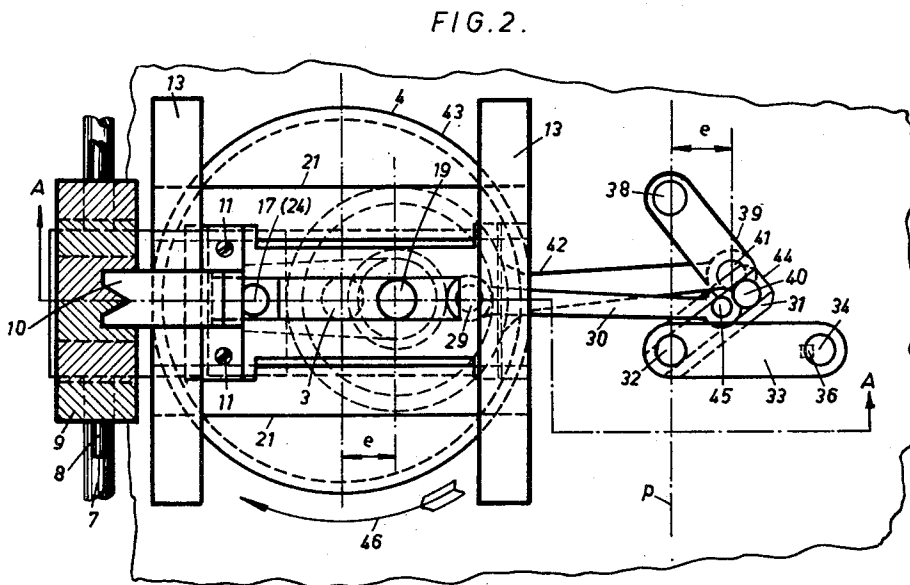
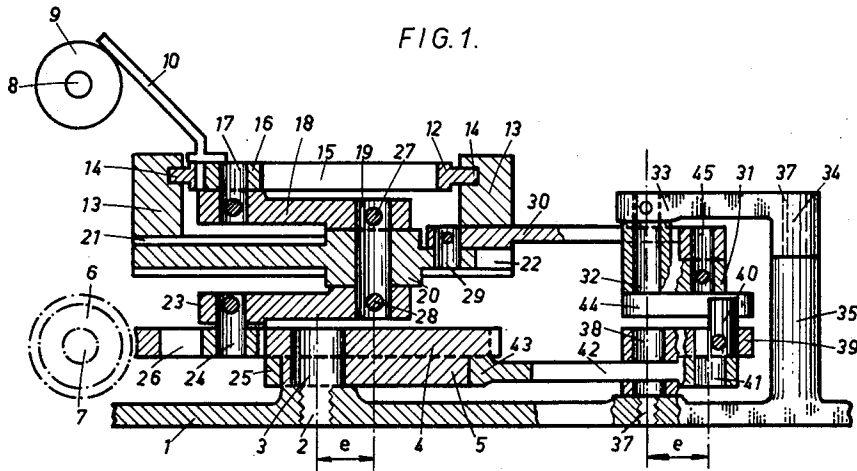


Nov. 17, 1953

O. STENGLEIN
THREAD GUIDING DEVICE
Filed Oct. 8, 1952

2,659,539



INVENTOR:
OSWALD STENGLEIN

By *[Signature]*

UNITED STATES PATENT OFFICE

2,659,539

THREAD GUIDING DEVICE

Oswald Stenglein, Mammendorf, Upper Bavaria, Germany, assignor to Maschinenbau- & Gieserei A. G., Basel, Switzerland, a joint-stock company

Application October 8, 1952, Serial No. 313,766

Claims priority, application Germany
October 11, 1951

5 Claims. (Cl. 242—43)

1

This invention relates to a thread guiding device of a machine for winding cross-wind spools.

A machine for winding cross-wind spools is known which has a thread guiding device with a thread guide moved to and fro parallel to the axis of the spool by means of a slider-crank drive, means being provided for periodically displacing the crankshaft in order to guide the thread accurately at the points of reversal of the thread guide so as to overcome in an accelerated manner the dead point positions of the slider crank drive. In this known machine the crankshaft of the slider crank drive is displaced by means of an arm in which this crankshaft is journaled, the arm being rotatable about an axis at right angles to the axis of the spool and being moved to and fro about its mean position by means of a control lever. The control lever carries a cam follower which projects into a groove in a disc-shaped rotating driving member. This groove is endless and consists of two arcuate grooves of different radii concentric to the axis of rotation, and two transitional grooved portions which join the two arcuate grooves and are so constructed and regulated that during continuous rotation of the driving member the crankshaft of the slider crank drive is caused to overcome the dead point positions in an accelerated manner, in that shortly before each dead point position is reached, the said cam follower of the control lever is caused to pass in the course of a short path from one arcuate groove through one of the transitional groove portions into the other arcuate groove.

This method of displacing the crankshaft of the slider crank drive is associated with disadvantages in as much as the crankshaft describes an arc during its periodical displacement because it is journaled in the said arm. Consequently in the middle part of the spool the thread guide is displaced to one side of the median plane of the spool lying at right angles to the axis of the spool, so that the lay of the thread is displaced correspondingly at this place and the spool is wound to one side at this place. Moreover the positive movement of the cam follower of the control lever from one arcuate groove to the other through the transitional groove portion, which is effected in the course of a short path, when the driving member is running fast, leads to a reverse movement of the control lever linkage including the arm which is associated with a shock effect which is the greater the more rapidly the driving member rotates. Apart from the acoustic disagreeableness of this shock effect arising at a

2

high speed of rotation, the effect also leads to the danger of breakage of the control parts. For these reasons this known thread guiding device cannot exceed a certain critical working speed which lies below the working speed which would be permissible having regard to the strength of the thread to be spooled.

It is an object of the invention to overcome these disadvantages of the above mentioned known thread guiding device by achieving a displacement of the crankshaft, which takes place in the said median plane of the spool and is not associated with a shock effect upon the control members, but nevertheless ensures the desired accelerated displacement of the crankshaft in the region of the dead point positions of the slider crank drive to a degree sufficient to ensure accurate guiding of the thread at the ends of the spool. The invention consists in that the crankshaft of the slider crank drive is guided to slide in a straight line in the median plane of the spool and is controlled by a crank and connecting rod drive with a stationary crankshaft, the crank of which is coupled through a coupling pin with the crank of a further crank and connecting rod drive with a stationary crankshaft, the connecting rod of which is linked eccentrically to a rotating driving member, while the said coupling pin is rigidly connected to one of the two cranks and is guided to slide with respect to the other crank in the longitudinal direction of the arm thereof.

The accompanying drawing shows an embodiment by way of example of the construction of the invention.

Figure 1 shows an elevation of the thread guiding device partly in section and in vertical median longitudinal section on the line A—A of Figure 2, which shows a plan view.

A base plate 1 is provided with a screwed hole into which the screwed end 2 of an axis pin 3 is tightly screwed. A worm wheel 4 rotates freely on the axis pin 3. The worm wheel 4 is provided on its lower side with an eccentric drive 5 and meshes with a worm 6, the shaft 7 of which is connected in a manner not shown with the drive of a cross-wind machine which drives a spindle 8 on which is mounted the cross-wind spool 9 on which the thread is to be laid. The thread of the cross-wind machine, the rest of which is not shown, runs in manner known per se through the fork of a thread guide 10 which is secured by means of screws 11 to a slide 12. The slide 12 is arranged between two stationary guide rails 13, the mutually facing sides of which are each provided with a longitudinal groove 14, in which

the slide 12 is mounted to slide to and fro parallel to the axis of the spindle 8 of the spool. The slide 12 is also provided with a parallel sided guideway 15 extending transversely of the spindle 8 of the spool. In the mean position of the slide 12 shown in the drawing the vertical longitudinal median plane of the guideway 15 lies in the transverse median plane of the spool. A slider 16 is guided to slide longitudinally in this guideway 15. The crank pin 17 of a driven crank 18 is journaled for rotation in the slider 16. The crankshaft 19 of this crank is journaled to rotate in a second slide 20 which is guided to slide to and fro between two rails 21 extending parallel to the said median plane of the spool. For this purpose the two rails 21 are each provided on their mutually facing sides with a longitudinal groove 22 in which the slide 20 engages.

The lower end of the crankshaft 19 is connected with a driving crank 23 the crank pin 24 of which is journaled in a slider 25 which is guided to slide in a radial parallel sided guideway 26 in the worm wheel 4 which serves as the driving member for the crank. The crankshaft 19 is rigidly connected to the cranks 18 and 23 by means of pins 27, 28 which pass through them.

The slide 20 is connected by a pin 29 to the connecting rod 30 of a crank and connecting rod drive, the crank 31 of which is mounted for rotation about a stationary crankshaft 32. The crankshaft 32 is mounted on a lever 33 which is set on the spigot-shaped upper end 34 of a column 35 mounted on the base plate 1 and is prevented by a key 36 from rotating with respect to this spigot 34.

The base plate 1 also carries a screwed hole into which is screwed a corresponding screwed spigot portion 37 of the crankshaft 38 of a further crank and connecting rod drive, the crank 39 of which carries a crank pin 41 which is simultaneously constructed as a coupling pin 40 to which one end of the connecting rod constructed as an eccentric rod 42 is connected, whilst the other end of this rod constructed as an eccentric strap 43, is journaled about the above mentioned eccentric disc 5 of the worm wheel 4. The coupling pin 40 mounted on the crank 39 engages in a median longitudinal slot 44 provided in the arm of the crank 31, the coupling pin 40 being guided to slide longitudinally in this crank 31. 45 indicates the crank pin of the crank 31 to which the connecting rod 30 is connected. The eccentricity of the eccentric drive 5, 43 is indicated by e . In the position shown in the drawing the thread guide 10, as already mentioned, is in its mean position with respect to the spool 9 and the eccentric is approximately in the extreme right-hand position. In this position the crank pin 41 which is connected to the eccentric rod 42, is spaced by the distance e of the eccentricity of the eccentric from the longitudinal median plane p passing through the mutually parallel stationary crankshafts of the two crank and connecting rod drives.

In operation the worm 6 drives the worm wheel 4 and consequently the eccentric disc 5 continuously in the direction of the arrow 45 shown in Figure 2. This rotation is transmitted to the crank pin 24 so that the crank 23 rotates in the same direction whilst the slider 25 slides in the radial guideway 26 in accordance with the spacing between the centre lines of the crankshafts 3 and 19. This spacing in the position shown is equal in magnitude to the eccentricity e . The crank 23 transmits its rotation

through the crankshaft 19 to the driven crank 18. The crank 18 forms with the slide 12 a slider-crank drive and thus sets the slide 12 in to and fro motion parallel to the spindle 8 of the spool, while the slider 16 in which the crank pin 17 of the crank 18 is journaled, slides correspondingly to and fro in the guideway 15. The thread guide necessarily participates in the motion of the slide 12 and consequently lays the thread on the spool 9.

During the operation of the device the slide 20 carrying the crankshaft 19 is moved longitudinally of the guide rails 21 because of the stroke of the eccentric rod 42. Starting from the extreme right-hand position shown in the drawing this motion initially is only very slow, because the coupling pin 40 mounted on the crank 39 slides in the longitudinal slot 44 when the crank 31 begins to move, so that at the beginning of this movement this crank 31 rocks only relatively slowly. In the course of this motion the coupling pin 40 approaches the stationary crankshaft 32 so that the transmission ratio of the lever 31 increases. When however the eccentric disc 5 is turned through approximately 90° in the direction of the arrow, the crank rocks at a correspondingly accelerated speed about the stationary crankshaft 32. The construction and arrangement of the cranks 31 and 39 are so selected that when the above mentioned 90° rotation has been performed, the axis of the coupling pin 40 lies in the plane p in such a way that in this position the maximum accelerating motion is transmitted by the two crank and connecting rod drives, 42, 39 and 30, 31 to the slide 20. In this position of 90° rotation the thread guide 10 is disposed exactly at one of its two points of reversal. The slider crank drive 18, 12 is disposed in the corresponding dead point position. Since, however, the crankshaft 19 is displaced with maximum acceleration through the mean position, thus overcoming this dead point position, the necessary requirements for accurate guiding of the thread at the ends of the spool are fulfilled, i. e. the dead point position is overcome with maximum acceleration, so that the velocity with which the thread guide moves is checked as little as possible at the points of reversal, without however the need for a hammerlike reversal of the motion of the crankshaft 19 of the slider-crank drive. On the contrary the crankshaft is displaced more steadily by means of the two crank and connecting rod drives 30, 31 and 39, 42 coupled together as described above, the motion of acceleration being relatively small in the mean position of the thread guide 10, but relatively great in the region of the points of reversal of the thread guide 10.

From the symmetrical relationship shown with respect to the drawing it follows that as the eccentric disc 5 rotates further between 90 and 180° the reverse operation takes place as regards the displacement of the two slides 20 and 18, so that on reaching 180° rotation, the two crank and connecting rod drives 30, 31 and 39, 42 have reached their opposite extreme positions, in which the cranks 31 and 39 lie in a position symmetrically opposite with respect to the plane p of the right-hand extreme position shown in the drawing.

In principle on further rotation of the eccentric disc 5 between 180° and 360° the same operations again take place as those on rotation between 0° and 90°, save only that the thread

5

guide 10 moves in the reverse direction to that in which it reached the second point of reversal. In this case also the crank 31 moves slowly at the beginning of its movement and has an accelerated motion at the end of its movement because of the said symmetrical position of the crank 31.

I claim:

1. In a thread guiding device of a machine for winding cross-wind spools, a slide carrying the thread guide, said slide being guided in guides to slide to and fro parallel to the axis of the spool, a driven crank rotating about its crankshaft, a crank pin on said driven crank being guided to slide transversely of the axis of the spool in a guideway in said slide, two crank and connecting rod drives with stationary crankshafts, the said crankshaft of the driven crank being articulately connected to the connecting rod of one of the said crank and connecting rod drives, the connecting rod of the other crank and connecting rod drive being linked eccentrically to a rotating driving member, the two cranks of the said crank and connecting rod drives being coupled together by means of a coupling pin, said coupling pin being rigidly connected to one of said cranks and being guided to slide with respect to the other crank in the longitudinal direction of the arm thereof, said two cranks being so arranged and constructed that the connecting rod of the first mentioned crank and connecting rod drive imparts to the said crank-

6

shaft in the transverse guideway in the said slide accelerated motion to overcome the dead point positions at the two points of reversal of the thread guide.

2. In a thread guiding device according to claim 1, the connecting rod of the second mentioned crank and connecting rod drive being constructed as an eccentric rod and being journalled about an eccentric disc of the said driving member.

3. In a thread guiding device according to claim 1, said driving member being provided with a crank pin guided to slide radially and said crank pin being mounted on a driving crank set on the said crankshaft.

4. In a thread guiding device according to claim 1, said crankshaft carrying a driving crank and being journalled in a slide, which slide is guided to slide transversely of the axis of the spool between the arms of said driving and driven cranks.

5. In a thread guiding device according to claim 1, said crankshaft of the driven crank being journalled in a second slide, said slide being articulately connected to the connecting rod of the first mentioned crank and connecting rod drive and being guided to slide between two stationary rails extending parallel to the transverse median plane of the said spools.

OSWALD STENGLEIN.

No references cited.