June 6, 1961 O. HAUGWITZ 2,987,268

BOBBIN FRAME MECHANISM

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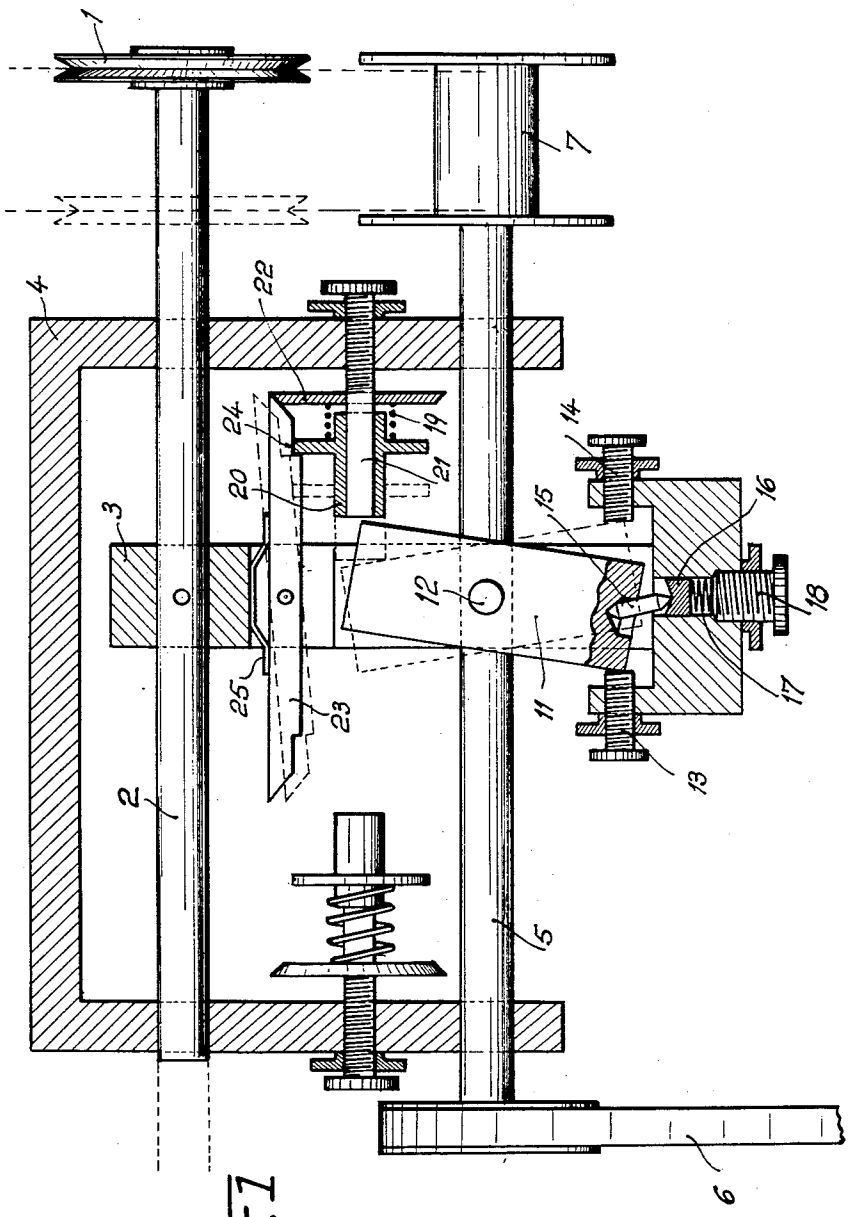


Fig. 1

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FIG. 2

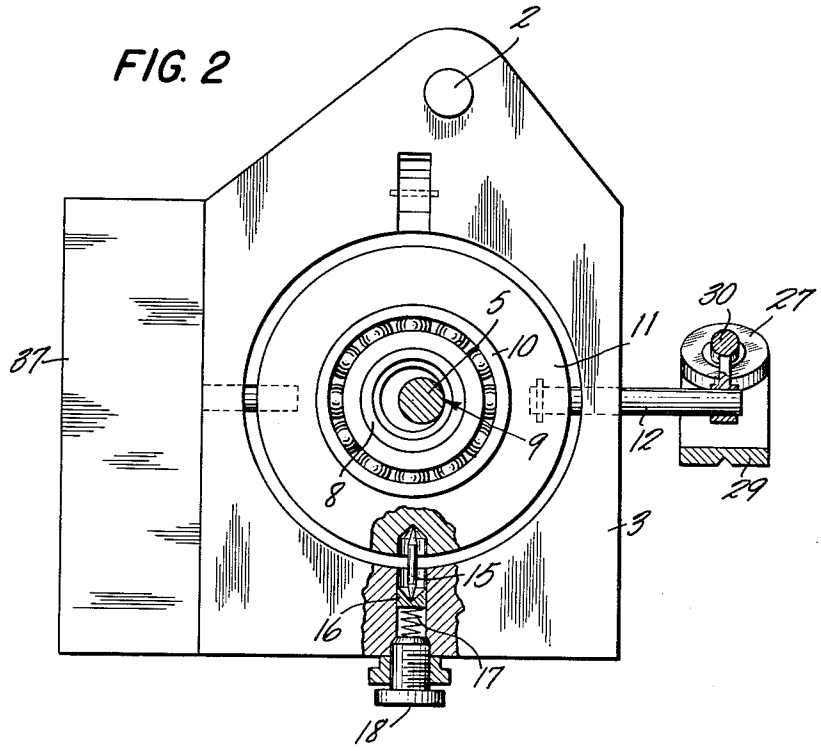
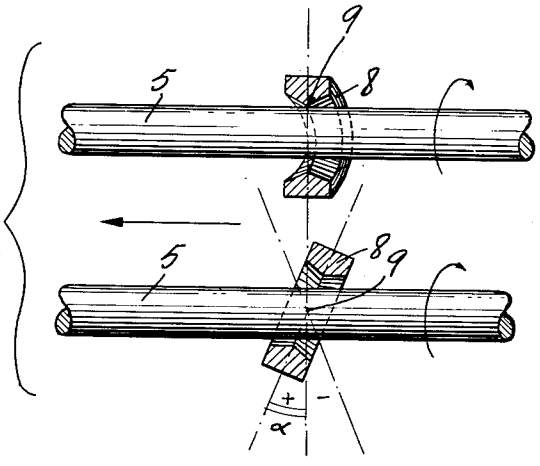


FIG. 3



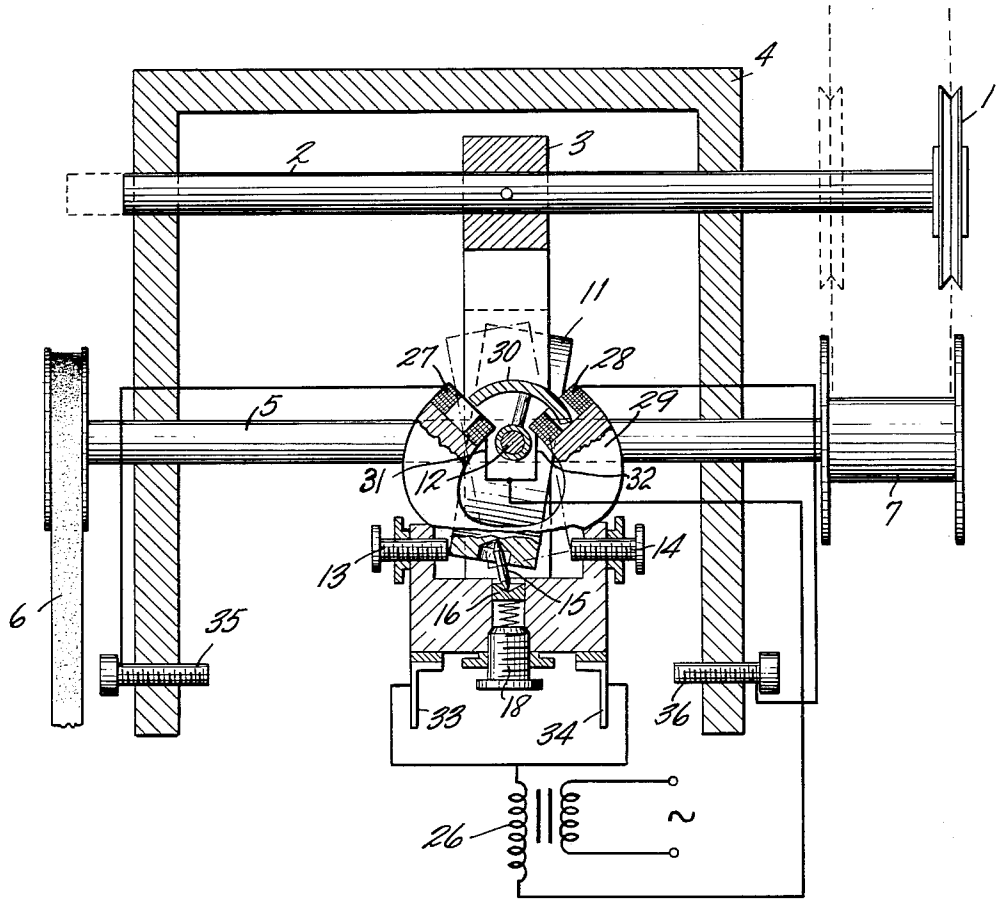
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FIG. 4



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BOBBIN FRAME MECHANISM

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10 Claims. (Cl. 242—158.4)

This invention relates to control mechanisms for bobbin frames and the like, and its chief object lies in the provision of improved mechanisms whereby the thread to be reeled will be laterally guided at uniform speed and the direction of operation will be instantaneously reversed as the thread reaches the end points of its path of travel.

Heretofore, mechanisms of the specified type generally have involved the use of a camshaft or a simple—or cross—thread screwshaft, cooperating with a reverser device. Such mechanisms were relatively slow-acting and complicated and the thread was guided in a somewhat loose and ineffectual manner.

Mechanisms according to the invention may comprise a biconical ring member operative to convert the rotational movement of a shaft into a translatory reciprocation imparted to the thread guide, whereby the displacement velocity or roving pitch can readily be adjusted by controlling the angular inclination of the biconical ring member relatively to its axis, and the direction of operation can be instantaneously reversed by simply reversing the ring's angular inclination from one sense to the opposite sense.

The invention will be more clearly understood with reference to the accompanying drawings wherein:

FIG. 1 is a front view, partly in section, of a mechanism according to the invention;

FIG. 2 is a side view of the general assembly;

FIG. 3 is a front view of the body of the ring member at different angular inclinations on the rotary shaft; and

FIG. 4 is a front view, partly in section of an electromagnetic reverser device.

Referring to FIGS. 1, 2 and 3, a thread-guide pulley 1 is connected for unitary movement with a plate 3 by means of a shaft 2 normal thereto, slidable in a frame 4 and extending parallel to a rotary shaft 5 driven in rotation from one of its ends by means of a drive belt 6 and carrying a bobbin 7 on its opposite end.

Engaging a point 9 of the shaft 5 in line with a pivotal axis 12 is a ring 8 having an inner diameter slightly greater than that of the shaft and having a biconical inner profile, as shown in Fig. 3, the ring 8 being freely rotatable by means of a ball bearing 10 in a disc 11 which is pivoted by pivot pins 12 in the plate 3.

To adjust the reeling velocity and roving pitch, the angular position of the disc 11 is adjusted relative to the rotary shaft 5 by adjusting suitable stops 13 and 14 mounted on the plate 3, and herein comprising a pair of set screws provided with lock nuts thereon.

The disc 11 is resiliently retained in its position applied against the stop 13 or the stop 14 by a spring pressing device comprising a spindle-shaped pin 15, a slider 16, a spring 17 and a screw and lock nut assembly 18.

Reverser means are provided for pivoting the disc 11 about the axis 12 so as to bring it instantaneously from one position to a reversely angled position, and said means comprise herein a spring 19 (FIG. 1) maintained in a compressed condition by a part 20 slidable on a pin 21 projecting from the frame, into engagement with a disc 22 having a conical rim surrounding the pin 21. One assembly similar to that just described is provided at each end of the frame 4, and the discs 22 provide adjustable abutments for rocking lever 23 having notches 24

formed in it and conical edges, the lever being retained in a position normal to the plate 3 by a leaf spring 25 as shown.

In operation, the shaft 5 supporting the bobbin 7 is rotated and the shaft 2 is simultaneously reciprocated axially between end positions in which the thread guide pulley 1 assumes the positions respectively illustrated in full and broken lines in FIG. 1. Each time the sliding shaft 2 approaches one or the other of its end positions the notch 24 in the lever 23 engages the slider 20 and compresses the spring 19 and thereafter the bevel end of the lever 23 engages the conical rim of the disc 22, whereupon the lever 23 is rocked so as to release the slider 20. The slider 20 is then violently propelled by the action of stressed spring 19 and strikes the disc 11, rocking it instantaneously to its opposite angled position on the shaft 5.

FIG. 4 illustrates a modified construction of the reversing device, utilizing electromagnetic means. Carried by the plate 3 are a transformer 26, a pair of electromagnets including the solenoids 27 and 28, a relay 29 having a permanent magnetic core, and a vane armature 30 which is suitably mounted on pin 12, as seen in FIG. 2, and which is held by said magnetic core in contact with either one of contacts 31 or 32 connected with the solenoid windings 27 and 28 respectively.

When either one of two side contacts 33, 34 projecting from the opposite sides of the assembly engages the related one of the two grounded, adjustable limit stops 35 and 36 in the respective end positions of the plate 3, a voltage pulse is fed to the magnetic winding and the vane 30 swings to its opposite position, in which power is supplied to the other one of the two windings 27, 28. This imparts the desired rocking movement to the disc 11.

As shown in FIG. 2, an additional weight 37 may be secured to the plate 3 in order to increase the adhesion of the ring 8 to the rotary shaft.

I claim:

1. In a bobbin frame having a rotating bobbin shaft and a thread-guide shaft disposed in parallel spaced relationship to said bobbin shaft and axially reciprocable between two end positions, a support secured to and projecting from said thread-guide shaft toward said bobbin shaft, an annular rim member surrounding the bobbin shaft and pivoted to said support and comprising means in contact with said bobbin shaft, first means for holding said rim member with its axis titled at a constant oblique angle with respect to a plane perpendicular to the axis of said bobbin shaft and passing through the point of contact of said rim member with said bobbin shaft and with respect to said bobbin shaft during substantially all the axial travel of said support and said rim member, and second means for substantially instantaneously titling said rim member to the other side of said plane at the moment said thread-guide shaft reaches each of said end positions.

2. In a bobbin frame having a rotating bobbin shaft and a thread-guide shaft disposed in parallel spaced relationship to said bobbin shaft and axially reciprocable between two end positions, a support secured to and projecting from said thread-guide shaft toward said bobbin shaft, an annular rim member surrounding the bobbin shaft and pivoted to said support about an axis perpendicular to said bobbin shaft and comprising a ring member rotatable in said rim member coaxially therewith and having an inside diameter larger than the diameter of the bobbin shaft and in point contact engagement therewith, first means for holding said rim member with its axis tilted at a constant oblique angle with respect to a plane perpendicular to the axis of said bobbin shaft and passing through the point of contact of said ring

member with said bobbin shaft and with respect to said bobbin shaft during substantially all the axial travel of said support and said rim member, and second means for substantially instantaneously tilting said rim member to the other side of said plane at the moment said thread-guide shaft reaches each of said end positions.

3. The combination defined in claim 2, wherein said ring has an inwardly tapering substantially biconical internal profile with the innermost diameter of said profile being somewhat larger than the diameter of the bobbin shaft.

4. In the combination defined in claim 2, wherein said means for holding said rim member with its axis tilted at a constant oblique angle is adjustable for adjusting the tilt angle of said rim member with respect to the bobbin shaft.

5. In the combination defined in claim 2, adjustable limit stops carried on said support on opposite sides of said rim member for adjustably limiting the angular movements of said rim member.

6. In the combination defined in claim 2, wherein said means for tilting said rim member comprise adjustable limit stops carried on said support on opposite sides of the rim member for adjustably limiting the angular movements of the rim member, and toggle-like spring means having two opposite equilibrium positions for maintaining said rim member in each of its tilted end positions selectively in engagement with one of said stops.

7. In the combination defined in claim 2, a weight attached to said support for increasing the engagement pressure of the ring against the bobbin shaft at the point of contact thereof.

8. In a machine of the type described, a rotating shaft, an axially reciprocable shaft disposed in parallel spaced relation thereto and movable between two end positions, an element secured to and projecting from the reciprocable shaft, a ring member having an inside diameter larger than the outside diameter of the rotating shaft and surrounding said shaft in point-contact engagement therewith, a rim member rotatably supporting said ring member and pivoted in said element about a geometrical axis intersecting the axis of said rotating shaft perpendicularly thereto, first means for holding said rim member with its axis tilted at a constant oblique angle with respect to a plane perpendicular to the axis of said rotating shaft and passing through the point of contact of said rim member with said rotating shaft and with respect to said rotating shaft during substantially all the axial travel of said element and said rim member, and second means for substantially instantaneously tilting said rim member to the other side of said plane at the moment said reciprocable shaft reaches each of said end positions.

9. The combination defined in claim 8, wherein said rim tilting means comprise a pair of pusher members adapted to engage opposite sides of said rim member, springs urging said pusher members against said rim member, latch means carried by said element adapted at each reciprocation of the reciprocable shaft to precompress a related one of said springs and latch the related pusher member with its spring in precompressed condition, and means operated on attainment by said reciprocable shaft of either of its end positions to release the related pusher member from said latch means for forcible propulsion by its spring against said rim member to position the latter in its reverse end position.

10. The combination claimed in claim 8, wherein said rim tilting means comprise electromagnetic means operated by said reciprocable shaft on each reciprocation thereof to position said rim member in either of its reverse end positions.

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