Sept. 2, 1930. J. S. RABERT 1,774,666

SPINNING AND TWISTING MACHINE

Filed July 14, 1928 2 Sheets-Sheet 1

FIG. 1

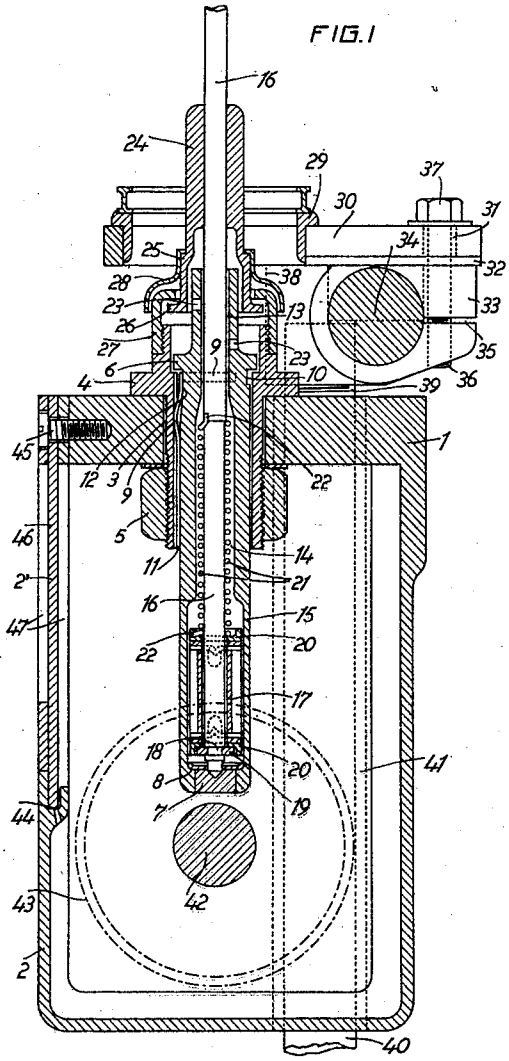


FIG. 2

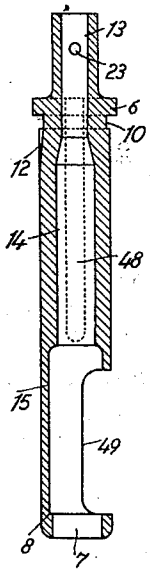


FIG. 3

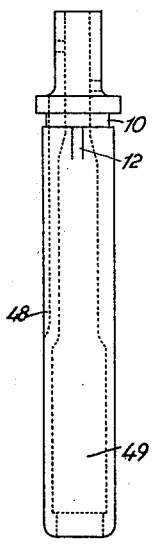


FIG. 4



FIG. 5

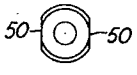


FIG. 6



FIG. 8



FIG. 7

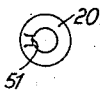


FIG. 9



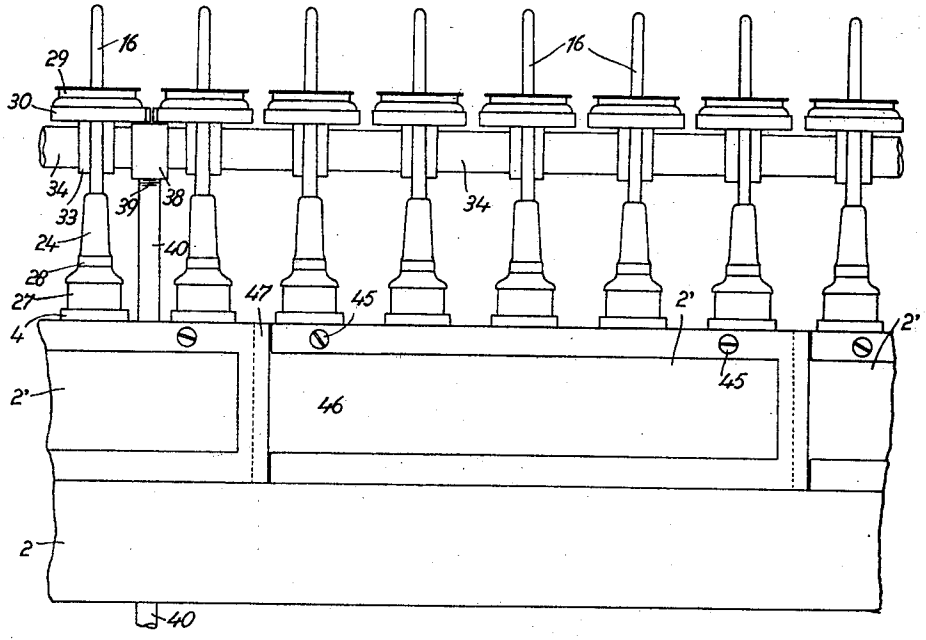
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FIG. 10



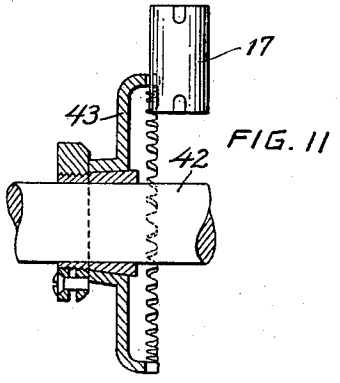


FIG. 11

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SPINNING AND TWISTING MACHINE

Application filed July 14, 1928, Serial No. 292,725, and in Spain March 12, 1928.

Where the spindles of spinning and twisting machines are set into operation by positive means, that is to say, by gear no account is usually taken of gyroscopic effects upon the mass of thread wound upon the spindle.

The gyroscopic effect involves continual shocks imparted to the spindles against the walls of their sleeves, which results in their wear and leads to considerable vibration which renders spinning impossible under such conditions.

With spindles which receive their movement of rotation by means of cords or bands this disadvantage is eliminated by mounting the sleeve with a spring which permits the automatic centering of the gyratory mass, whereby in this way the rapid wear of the sleeve is avoided.

The present invention has for its object to impart to the spindles that are actuated by positive means, that is to say, by gearing, the necessary flexibility for centering the gyratory mass possessed by spindles operated by means of cords or bands, and the absolute immobilization of its position by reference to the driving axis that is to say by the mounting of the spindle in an orifice of the same diameter in the spindle carrying frame. This property of the spindle positively actuated by gear ensures that for centering the axis of the spindle with the cursor carrying ring this latter may take any position around the axis and this may be secured by two displacements normal to the ring.

In order to impart these advantages to spindles operated positively by gearing an arrangement is provided according to the invention which consists in providing a socket which fixes the relative position of the spindle in the carrying frame, which socket is traversed by a tube or sleeve which forms part, in the upper part, of the bearing for the journal of the spindle, and, at the lower part, the seating for the support of the same journal of the spindle. This seat presents a circular opening of a diameter sufficient to permit the introduction of the journal of the spindle with its coupling arrangement, since the journal of the spindle is raised to the interior of the tube or sleeve where it is disposed to permit the passage through a lateral opening of the same tube or sleeve of the support, which is placed in position on its seating, the journal of the spindles being finally lowered till it rests upon the support. The said tube or sleeve carries rigidly secured thereto the spring which permits the automatic centering of the gyratory mass. The socket is fixed in the supporting frame by the screwing home of a nut and through the upper part of the same is introduced the tube or sleeve, which is fixed in its working position by the contact of a projecting part or shoulder of the socket. For preventing in the course of working on withdrawing the bobbin of the spun thread that the operative does not carry away the spindle with it this latter is arrested by a screw-threaded part upon the fixed support or socket which retains the spindle by contact of the projecting part of a circular crown which carries the fixed part on the spindle and which serves for centering of the tube upon which the thread is wound. For preventing the introduction of threads, fluff and dust through the free space between the fixed parts and the movable parts a cover is provided which forms part of the gyratory combination of the spindle. The mounting of the spindle in its sleeve is effected by introducing through the lower part of the "sleeve tube" the axis of the combination described in the specification filed on the co-pending application Serial No. 261,951 dated 15th March 1928. The support for the spindle is then placed in position in which it remains in the working position by means of an enlargement or rim of larger diameter as hereinafter described.

The coupling arrangement carried by the journal of the spindle is of the kind described in the specification of the co-pending application by the same applicant, to which reference has been made, and, to assist in the construction in series and the fixing in height of the friction discs of the said coupling arrangement on the journal

of the spindle, this fixing is effected by means of a simple key. This result is obtained by forming a mortise upon the spindle and introducing into the same a key having on exterior circular form; and, for avoiding that this part is displaced from its position under the operation of centrifugal force it is retained in a cavity provided in the friction disc, an internal projection of the said part coinciding with the opening in the key. Thus the friction disc participates in all the movements of the spindle.

The centring of the rings is effected by the suspension of the said rings from a support where by means of a guiding disc provided at its rear or lower part a transverse part slides through a shaft which extends the length of the machine (which shaft is divided into sections to facilitate construction) in such manner that the pressure of a single screw fixes the position of the two elements, permitting displacement in two normal directions.

In the arrangement described the centring requires for its equilibrium the suspension of the whole of the rings by means of balancing bars which traverse the spindle carrying frame and are situated in a plane displaced from the rear of the plane of the axes of the spindles at the same time as it permits the passage of the axis of the driving shaft in the example of transmission of movement by means of straight gears.

The accompanying drawings represent a construction according to the present invention.

Figure 1 represents a transverse section taken through the centre of a spindle and the centring supports on the spindle carrying frame showing the common operating shaft.

Figure 2 represents a vertical transverse section of the bearing of the spindle.

Figure 3 is an elevation corresponding to Figure 2.

Figures 4 and 5 show in detail the spindle support respectively in section and in plan.

Figures 6 and 7 show in detail the friction disc disposed normally to the axis of the spindle and respectively in section and in plan.

Figures 8 and 9 show in detail the part which transmits movement from the axis of the spindle to the friction disc, the figures being respectively a section and a plan.

Figure 10 is the general arrangement in front elevation showing the spindles and centring supports and covers of the spindle carrying frame, this view being on a smaller scale than Figure 1.

Figure 11 is a detail view partly in section showing the manner in which movement is imparted to the respective spindles from the common operating shaft.

In Figure 1 the part 1 represents the upper part of the spindle carrying frame; 2 2' the lower part and the protecting cover respectively for the whole of the mechanism; 3 is the hole in the frame through which is introduced the stationary part or socket 4 for the spindle which stationary part or socket is of the same diameter as the hole and is securely mounted upon the frame by means of the nut 5. The stationary part or socket 4 carries centrally within it the sleeve 6 and the spindle support 7 which is held in its operative position by the projecting part or rim 8. A spring 9 applied upon the sleeve 6 within the grooves 10 and 12 permits apart from the automatic centring, to fix the relative position of the stationary part or socket 4 with reference to the sleeve 6, the spring 9 being set within a slot 11 provided on the interior face of the stationary part or socket 4. The sleeve 6 is divided into three sections of different diameter; the first 13 is the sleeve proper, the second 14 of larger diameter permits of the passage of oil which is raised by the spring 21 while the third 15 permits the free rotation of the parts which comprise the coupling described in the specification of the co-pending application referred to.

Upon the spindle 16 is freely mounted the pinion 17 and, to fix the position in height of the same at its lower end, grooves 18 are formed which are parallel and oppositely disposed for the reception of a slotted key 19 of circular form which is maintained in concentric and constant relation with the spindle by the friction disc 20. The upper friction disc 20 is made part with the spring 21 by means of a projecting part at its extremity 22 which engages in a recess provided in the part 20 and in the spindle 16. The orifices 23 permit the outlet of surplus oil for return to supply. The part 24 fixed upon the spindle 16 by pressure applied to its cone of contact comprises three surfaces, the first is conical for the centring of the tubes upon which the thread is to be wound, the second surface 25 is cylindrical and serves to fix the position of the cover 28, and the third surface 26 is a protruding circular rim which serves to limit by contact with the inwardly protruding end of the part 27 screwed upon the socket 4, the upward movement of the spindle 16 caused by the operative when he withdraws a bobbin either because the bobbin is spent or in order to join a broken thread, and thus to avoid the excessive displacement of the spindle 16 which would cause the fracture of the pinion 17 and of the wheel 43.

The ring 29 is fixed by pressure in the part 30, which is provided with an orifice 31 in which freely passes the screw 37, and comprises at its lower part a guide plate 32 normal to the shaft 34 upon which is adjusted and slides a part 33. The part 33 is slotted at 35 so that thus the screw-threaded pin 37 which is screw-threaded within the part 33

at its lower end 36 may cause the boss 33 firmly to engage the shaft 34 for ensuring its fixity of position and thus at the same time the fixity of the position of the part 30 and the ring 29. The whole of the assembly of rings and supports rest upon the part 38 which is screw-threaded at 39 so as to be capable of receiving an upward or downward movement upon rods 40 passing through guides 41, exactly in the same way as in known spinning and twisting machines.

The characteristic of this system of rings is that the alignment of the bars and guides 40, 41 is in a plane displaced to the rear of the plane formed by the alignment of the spindles 16.

The part 42 represents the common driving spindle upon which is mounted the respective driving wheels 43 which transmit rotary movement from the shaft to the spindles. The pinion 17 causes the rotation of the spindle 16 by reason of pressure of the rings 20 against the ends of the pinion, produced by the spring 21 in a maner similar to that described in the specification of the copending application No. 261,951 dated 15th March 1928.

The cover 2′ is fixed in its position and its lower edge is held within a groove 44, while at the upper part it is held in position upon the spindle carrying frame by means of screws 45. The cover is provided as a plate 46 of uniform thickness having at each side two parallel transversely disposed parts 47. The type of construction described having cover plates of short length permits of the withdrawal of a single cover plate (which protects a number of spindles) without the necessity of uncovering the neighbouring spindles.

In Figure 2 the numbers 6, 7, 8, 10, 12, 13, 14, 15 and 23 are applied to the same parts as in Figure 1. The sleeve 6, as represented in detail, is provided with a groove 12 in which the spring 9 (Figure 1) may lie. Furthermore a groove 48 permits the return of oil in excess which passes through the orifices 23, 23 to the supply. An opening 49 provided in its lower part permits the driving wheel 43 to effect its engagement with the wheel 17 (Figure 1). The width of the said opening permits the introduction of the support represented in Figures 4 and 5 when this is presented with the parallel faces 50, 50 adjacent the sides of the opening and the parts 7 and 8 (Figure 4) are caused to coincide with those also lettered 7 and 8 (Figure 2) whereby the support may be thus set in working position.

Figures 6 and 7 represent the friction disc which is disposed normal to the axis of the spindle and is provided with a projecting part 51 to effect the transmission of movement to the spindle by means of the key 19 represented in Figures 8 and 9 in the opening 52 of which is engaged the projecting part 51 (Figures 6 and 7).

Figure 10 represents an external view of the whole of the mechanism described, the same figures indicating the parts detailed in the preceding figures.

I claim:—

1. A flexible spindle mounting for continuous spinning and twisting machines having gear driven spindles, comprising a spindle carrying frame, a socket traversing the said frame through an orifice of the same diameter, a nut engaging the said socket and serving to fix the position of the spindle of the said frame, a spindle to be co-axially disposed in the said socket, a support for the lower end of the said spindle, a tube traversing the socket and forming the bearing for the spindle and the seating for the support thereof, the said tube having a circular opening to form the said seating and a lateral opening for the introduction of the spindle support, a shoulder upon the said tube for fixing the position of the latter with reference to the socket, and a spring provided between the tube and the interior of the socket substantially as hereinbefore described.

2. A flexible spindle mounting for continuous spinning and twisting machines having gear driven spindles, comprising a spindle carrying frame, a socket traversing the said frame through an orifice of the same diameter, a screw engaging the said socket and fixing the position of the spindle in the said frame, a tube traversing the socket, a spring to afford flexibility provided between the tube and the interior of the socket, a spindle mounted in the interior of the tube and a cap supporting member fixed on the spindle, the said supporting member being provided with a projection at the lower end and a sleeve member carried by the socket and provided with a flange at the upper end to retain the projection of the supporting member and thus to retain the spindle within the tube substantially as hereinbefore described.

3. A flexible spindle mounting for continuous spinning and twisting machines having gear driven spindles, comprising a spindle carrying frame, a socket traversing the said frame through an orifice of the same diameter, a nut engaging the said socket and fixing the position of the spindle in the said frame, a tube traversing the said socket, a spring affording flexibility provided between the tube and the interior of the socket, a spindle mounted in the interior of the tube, the said spindle being formed with parallel and oppositely disposed grooves at the lower end, a key of circular form for engagement within the said grooves, the said key being slotted, and a friction disc by which the said slotted key is maintained in concentric and constant relation with the spindle, substantially as hereinbefore described.

4. A flexible spindle mounting for continuous spinning and twisting machines having gear driven spindles, comprising a spindle carrying frame, a socket traversing an orifice of the same diameter in the said frame, a nut engaging the said socket and serving to fix the position of the spindle of the said frame, a tube traversing the said socket, a spring affording flexibility provided between the tube and the interior of the socket, a spindle mounted in the interior of the tube, a ring surrounding the said spindle, and means for centering the ring with respect to the spindle, comprising a support for the ring provided with a guide and an orifice, a horizontal shaft, a slotted supporting boss carried by the said horizontal shaft, each of the arms of the said boss being formed with an orifice, that of the lower branch being screw-threaded, the said supporting boss serving to receive the guide, and a screw traversing the three orifices and engaging the screw-thread of the orifice to the lower branch of the supporting boss and serving to fix the position of the said support and the supporting boss in such manner as thus to permit regulation in two normal directions substantially as hereinbefore described.

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