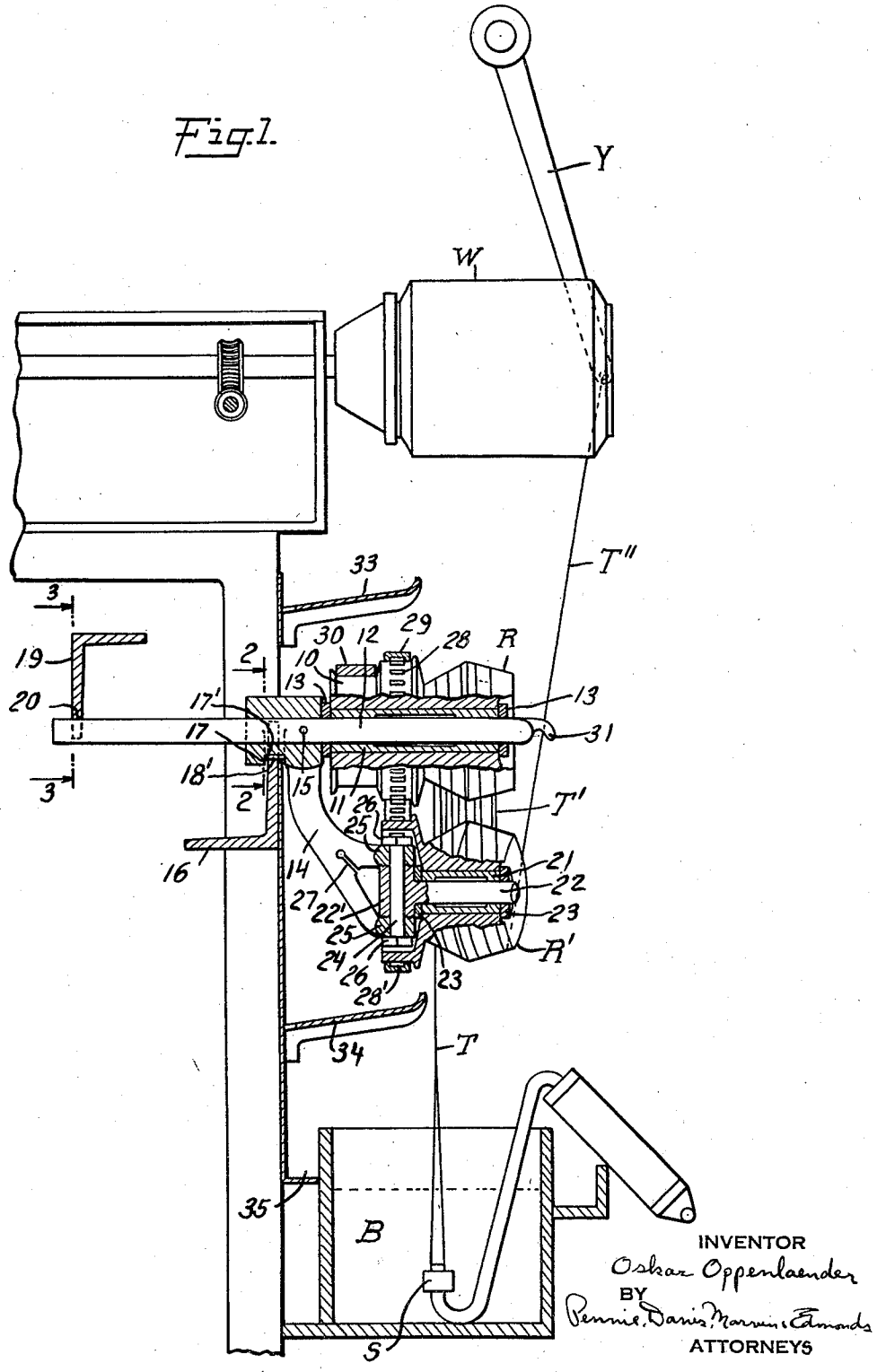
Aug. 17, 1937. O. OPPENLAENDER 2,090,064

SPINNING APPARATUS

Filed Oct. 5, 1935 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

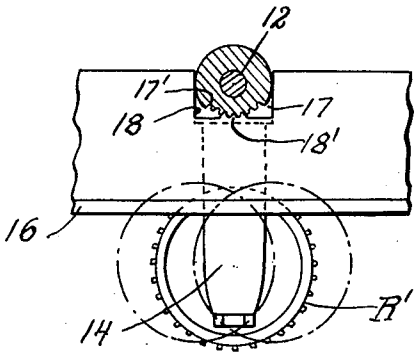


Fig. 3.

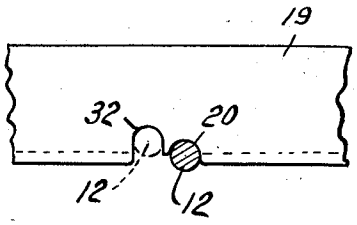
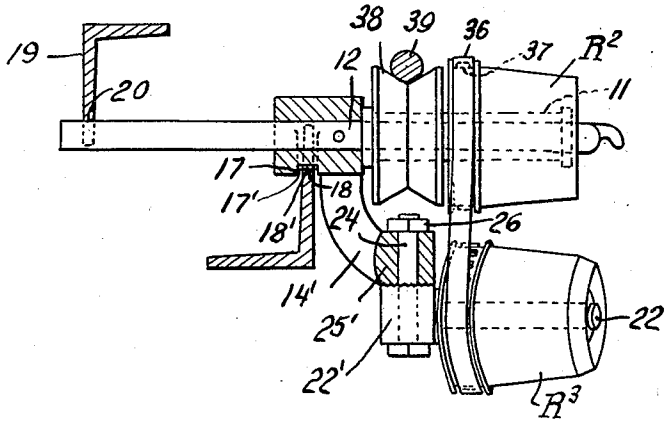


Fig. 4.



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UNITED STATES PATENT OFFICE

2,090,064

SPINNING APPARATUS

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Application October 5, 1935, Serial No. 43,749

6 Claims. (Cl. 18—8)

This invention relates to apparatus for spinning rayon and the like, and has for its object the provision of certain improvements in such apparatus. More particularly, the invention contemplates a spinning apparatus embodying an improved construction and arrangement of two power-driven rotors or godets (hereinafter referred to as "rotors") about which freshly coagulated rayon, artificial silk, and similar products, such as artificial horsehair, artificial human hair, ribbons, casings, etc. (hereinafter referred to as "thread"), is looped (preferably a number of times) in its passage from the spinnerette to the thread-collecting device.

In the manufacture of thread by the viscose, cuprammonium, cellulose acetate, etc. processes, high and different tensions are, in many instances, imparted to the semi-coagulated thread during the spinning operation and while the thread is passing from the spinnerette to the collecting device. In such cases, equalization of the considerable tension differences prevailing in the different zones or stages of tension must be prevented, since any uncontrollable equalization impairs, directly or indirectly, the characteristics of the yarn on the collecting device and of finished products made therefrom. Such undesirable equalization of differing thread tensions can be prevented by a pair of power-driven rotors about which the freshly coagulated thread is looped in its passage from the spinnerette to the collecting device.

One object of the present invention is to provide an improved structural unit of power-driven rotors which may readily and conveniently be attached and detached from a suitable support on the spinning machine. To this end, the carrier of the rotor pair is of simple and inexpensive construction, and the spinning machine may conveniently be provided with any number of such structural units driven from the same source of power by a belt, rope, or the like.

Another object of the invention is the provision of a flexible driving means permitting rapid yet gentle switching of each individual rotor pair to and from a common driving means without the use of driving shifts, gears, clutches, etc., thereby preventing undesirable shocks in the parts engaged (or disengaged) as well as to the thread, an especially important factor in high speed spinning for stopping and starting another rotor pair at will without interfering with the operation of other rotor pairs.

A further object of the invention is the provision of improved means for pivotally mounting the obliquely positioned feeding rotor in such a way that the axis of pivoting lies in the center plane of the individual driving means of each rotor pair, for improving the drive with slip-proof driving means and thereby obtaining smoother operation.

The novel and improved features of the apparatus of the invention will be better understood from the following description taken in conjunction with the accompanying drawings, in which

Fig. 1 is an elevation, partly in section, of an apparatus embodying the invention;

Figs. 2 and 3 are detailed sectional views on the section lines 2—2 and 3—3 of Fig. 1; and

Fig. 4 is a vertical section of a portion of a spinning apparatus embodying a modified form of the invention.

Referring to Fig. 1 of the drawings, the invention is illustrated in a spool spinning machine of the viscose spinning type. The spinning solution is extruded through spinnerette S into a spin bath B, and the resulting semi-coagulated thread portion T is pulled by rotors R and R' and fed forwardly on the rotors by the obliquely positioned rotor R' in as many loops T' as predetermined for securing a positive non-slipping adhesional grip on both rotor surfaces. Thread portion T'' is drawn by the thread-collecting device (take-up spool W and winding guide Y) with such a tension as may be advantageous for yarn quality and efficient after-treatment of the yarn package on the spool. This arrangement permits the isolation of the different thread tensions, such as the extrusion tension, the various stretch tensions, the contraction tensions and the winding tension, necessary for satisfactory spinning conditions and resulting in more uniform properties of yarn, and fabrics made therefrom, in regard to denier, dyeing characteristics, shrinkage, surface adhesion, pliability, appearance, etc.

The rotor R and a driving pulley 10 are pressed immovably onto a common self-lubricating bearing 11 rotatably mounted on a shaft 12 and held in position on the shaft by collars 13 secured to the shaft.

The shaft 12 is secured to a carrier 14 by a pin 15. The carrier 14 is adapted to be removably suspended from an angle-iron support 16. To this end, the carrier has a notch 17 in its head portion fitting in a recess 18 in the support 16. Preferably (Fig. 2) the notch 17 and recess 18 are provided with a few meshing gear-teeth 17' and 18', respectively, for the purpose of holding the carrier arm (bearing rotor R') in a position deviating if necessary from a vertical line (with respect to rotor R) to permit an unobstructed passage of

the thread from spinnerette over the rotors and to the collecting device.

The shaft 12 extends beyond the support 16 and beneath an angle-iron 19, the end of the shaft being adapted to engage a recess 20 in the angle-iron. In this manner the carrier is securely suspended in position from the support 16.

The rotor R' is pressed immovably onto a self-lubricating bearing 21 rotatably mounted on a shaft 22 and held in position on the shaft by collars 23 secured to the shaft. The shaft 22 has an apertured head 22' by which it is pivotally mounted on a bolt 24 extending between forked ends 25 of the carrier 14. The shaft 22 may thus be held in any desired oblique position (with respect to shaft 12) by pivoting bolt 24 and its cooperating nut 26 exerting frictional pressure on the two surfaces of contact between the forks of the carrier and the shaft-head, these contact surfaces being preferably roughened or serrated for increasing the friction. A small cut 27 at the splitting end of the carrier fork provides the necessary elasticity for pressing the forked ends against the shaft-head without undue strain.

The rotors R and R' are provided with tooth-like projections 28 and 28', respectively, over which fits a correspondingly notched flexible silent chain, rubber belt or the like 29 of acid resistant material, as a slip-proof driving means between the pair of rotors. The axis of the pivoting bolt 24 is positioned in the mid-center plane of the rotor driving means (28'—29) whereby the driving of rotor R' is advantageously influenced, and all pivot parts are protected against splashing and entanglement from waste thread.

In practice, a plurality of pairs of rotors R and R' are suspended from a common support 16, and are driven by a common flexible belt 30, or the like, cooperating with the driving pulley 10 of each pair of rotors. In order to thread-up each rotor pair individually without hampering the other operating rotor pairs, it is advantageous to disengage the rotor pair from the main driving means (30) and to engage it again smoothly after the loops of thread have been laid easily around the rotor pair, and to start simultaneously winding the thread onto the collecting device (W—Y). In the apparatus of the invention, this operation is accomplished by a slight manual lift of the shaft 12 at its hooked end 31, and immediately thereafter moving the hook a little to the side and downwardly so as to move the other end of the shaft 12 from its engagement in recess 20 into engagement with another recess 32 somewhat deeper than the recess 20 (Fig. 3). The result of this operation is to depress or lower the driving pulley 10. Since the flexible belt 30 cannot drop to the same extent as the pulley 10, these members become disengaged and rotation of the rotor pair ceases. In order to set the rotor pair again in motion reverse actions are effected by manual manipulation of the hook 31, whereby the rotor pair is gradually speeded up due to the frictional engagement of belt and pulley, a very desirable operating feature in view of the tender threads which must be handled.

The apparatus may advantageously be equipped with drip pans 33 and 34 arranged to catch and discharge liquids into a gutter 35.

Fig. 4 of the drawings shows a modified and in some respects a preferred form of the invention. The rotors R^2 and R^3 (of somewhat different dimensions and configurations than the corresponding rotors R and R' of Fig. 1) are rotatably mounted on shafts 12 and 22, respectively, in the same manner as in Fig. 1. The carrier 14' has an apertured head 25' and the pivoting bolt 24 extends through the registering apertures of the carrier head 25' and the shaft head 22'. Thus, the shaft 22 is supported by the carrier and held in any desired oblique position (with respect to shaft 12) by pivoting bolt 24 and its cooperating nut 26 exerting frictional pressure on the surfaces of contact, these surfaces being roughened or serrated for increased friction.

The cylindrically shaped rotor pair R^2 and R^3 is connected by a slip-proof and flexible acid resistant tooth belt 36 meshing with teeth 37 of the gear rims provided on each rotor R^2 and R^3. A modified pulley 38 is pressed immovably onto the bearing 11 and is adapted to be driven by a flexible rope or hose drive 39.

The endless belt 30 (Fig. 1) or the rope 39 (Fig. 4), or equivalent and acid resistant driving means, may be driven by one large driving wheel suitably located in the machine drive-head and of such a diameter as to fit the distances of the mid-centers of the pulleys 10 or 38 located along both machine sides, and being further guided around the opposite end of the machine by an idler pulley of the same diameter. The idler pulley may be arranged also to function as a tension pulley in order to take undesired slack out of the flexible drive. Such an arrangement of one endless belt or rope drive, or the like, around the machine is suitable for all spinning machines on which the spindle rotations are all in the same direction around the machine. In cases where the rotation direction is symmetrical to the longitudinal machine axis, two endless drives must be provided, one for each machine side.

Various modifications may be made in the structural features of the apparatus without departing from the spirit and scope of the invention. Thus, the rotor pair may be located in other positions on the spinning machine, below or above the thread-collecting device, and the invention may be applied to other types of spinning apparatus such as the pot spinning machine, the reeling spin machine, continuous spin machine, cap twisting spin machine, etc. Similarly, the invention is applicable to spinning machines in any of the various processes of manufacturing rayon, synthetic silk, and similar products such as artificial horsehair, wig's hair, ribbons, casings, etc.

I claim:

1. An apparatus for spinning rayon and the like, comprising a shaft adjustably mounted on a stationary support, a carrier secured to and depending from said shaft, a second shaft pivotally mounted on said carrier, a rotor rotatably mounted on each of said shafts, and means operatively connecting said rotors.

2. An apparatus for spinning rayon and the like, comprising a shaft adapted to be removably mounted on a stationary support, means for rotatably adjusting the position of said shaft on said support, a carrier secured to and depending from said shaft, a second shaft mounted on said carrier, a rotor rotatably mounted on each of said shafts, and means for driving said rotors.

3. An apparatus for spinning rayon and the like, comprising a shaft adapted to be removably mounted on a stationary support, a carrier secured to and depending from said shaft, a second shaft mounted on said carrier, a rotor rotatably mounted on each of said shafts, a pulley operatively associated with one of said rotors, means for driving said pulley, and means for manually changing the mounting of said shaft

on said support to engage and disengage said pulley and driving means.

4. An apparatus for spinning rayon and the like, comprising a shaft adjustably mounted on a stationary support, a carrier secured to and depending from said shaft, a second shaft mounted on said carrier, means for angularly adjusting the axis of said second shaft with respect to the axis of the other shaft, a rotor rotatably mounted on each of said shafts, and means for driving said rotors.

5. An apparatus for spinning rayon and the like, comprising a shaft adapted to be removably mounted on a stationary support, means for rotatably adjusting the position of said shaft on said support, a carrier secured to and depending from said shaft, a second shaft pivotally mounted on said carrier whereby its axis may be angularly adjusted with respect to the axis of the other shaft, a rotor rotatably mounted on each of said shafts, and means for driving said rotors in unison.

6. An apparatus for spinning rayon and the like comprising a shaft mounted on a stationary support, a rotor mounted upon the shaft having driving means engaged therewith, a pivotally mounted shaft upon which a second rotor is mounted, and second means for driving said second rotor, said pivotally mounted shaft having its pivotal axis in the center plane of the second driving means.

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