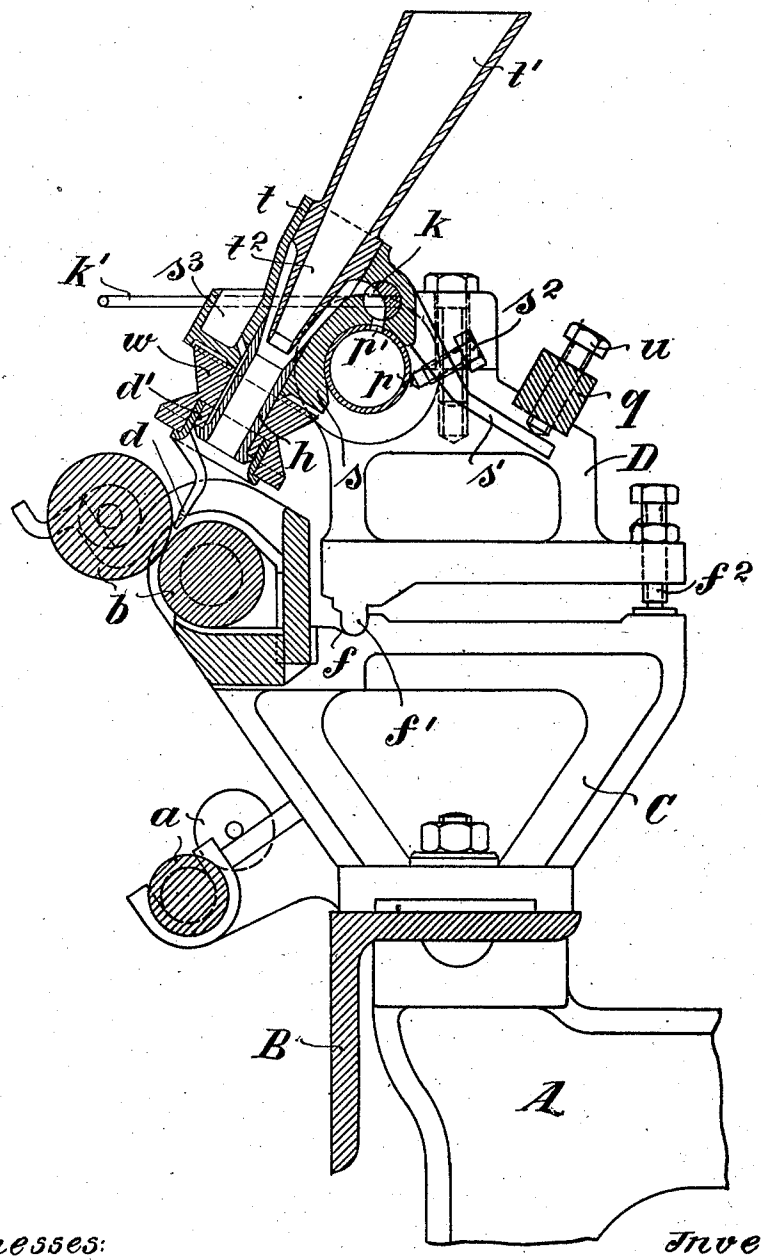
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TWIST TUBE FOR USE IN RING SPINNING MACHINES

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TWIST TUBE FOR USE IN RING-SPINNING MACHINES.

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This invention relates to improvements in twist tubes used in conjunction with ring spinning machines and designed to impart a preliminary twist to the sliver or yarn before the same is subjected to the drawing and ring spinning action. In such twist tubes it has been proposed to provide an air blast or current which is intended to assist in collecting the fibres and incorporating them in the twist. This air blast has hitherto been directed either radially or axially into a rotating twist tube which thereby tends to cause a swirl of the air and interferes with the proper collecting action of the air blast.

The fibers in the process of being incorporated in the yarn twist, under the air blast action, are apt to become caught in the rotating parts and it is therefore advisable that the yarn or sliver should have received most of its twist and been subjected to the collecting action of the air current prior to coming to the actual rotating parts. It is also necessary that, as far as possible all whip should be removed from the twist, as this too tends to undo the work of collecting the fibres which has been effected by the air current. To remove such whip the axis of the twist tube should be tangential to the drawing rolls at the point of their "bite", or in some cases, it may be found advisable to cause the yarn to cling more or less to the top roll.

The object of the present invention is first of all to ensure that the maximum collecting and consolidating action is carried out on the yarn or sliver prior to its passing to the rotating twist member and a further object is to provide means for facilitating the adjustment of the angle of "run in" of the yarn to the drawing rolls.

The present invention comprises a non-rotating twist tube having the whorl of the twist arm mounted on its exterior and a nozzle directing an annular current axially into the twist tube at one end thereof in the direction of feeding of the yarn through the twist tube, whilst the twist arm engages the yarn at the other end of the non-rotating twist tube. A lead in or guide funnel is preferably provided coaxially with the twist tube and this funnel may form the inner wall of the annular nozzle. The invention also comprises a suitable form of twist arm or flyer for use in combination with the device. The invention further comprises a carrier frame adjustable angularly and carrying the air blast supply pipe on which the twist tubes are mounted, whereby on adjusting the carrier, the twist tubes as a group may be adjusted as regards the inclination of their axes and each individual twist tube is also independently adjustable.

The invention is illustrated by way of example in the accompanying drawing, which is a sectional elevation of the upper part of a ring spinning machine and shows the arrangement of a single twist tube in accordance with this invention. It will be understood that any suitable number of such twist tubes are arranged side by side in the same manner as the spindles of a spinning machine.

The ring spinning and cop building mechanisms are located in the machine frame below the apparatus shown in the drawing and these may be of any desired form. The frame of the ring spinning machine is indicated by the reference letter A and on this there rests an angle B which bridges the side frames A and supports the bed plate frame C for the drawing rolls a and b, which may be of any suitable type, and the twist tubes. On the bed plate frame C there is mounted a carrier frame D which has at its front a curved ledge f^1 which rests in a groove f on the bed plate frame C. The rear of the carrier frame D is supported on a set pin f^2, which may be threaded more or less into the base of the carrier frame D and thereby it is possible to adjust the inclination of this carrier frame together with all the parts mounted thereon. The set pin f^2, after suitable adjustment is clamped by means of a lock nut as shown.

The carrier frame D forms the support for an air blast pipe p, which at suitable intervals on its upper surface, has ports p^1 spaced apart at the lateral distance between the twist tubes. On the blast pipe p, there rests a saddle piece s. It will be understood that there are several such saddle pieces corresponding in number to the number of spindles in the ring spinning machine. The saddle or rocking piece s has a tail piece s^1 in which a clamping screw s^2 is threaded, whilst the end of the tail s^1 comes under an adjusting pin u threaded in a cross bar q provided on the carrier frame D. A port in the saddle s is adapted to register with a port p^1 in the blast pipe p and this port in the saddle

leads to a conical nozzle t opening downwards in the direction in which the yarn is fed through the twist tube. An oil pocket s^3 may also be formed in the saddle s. In the upper part of the nozzle body t, there is fitted, preferably with a slight taper, a funnel shaped lead in tube t^1 which carries a nozzle shaped extension t^2, extending inside the nozzle t and spaced therefrom, so that the two nozzle bodies t and t^2, direct an annular stream of air into the front end of the twist tube h. The interior face of the nozzle t is machined and into the lower part thereof, which is parallel, there is tightly fitted the bush h which constitutes the twist tube proper. The bush h forms a stationary bearing for the whorl w in which, there is tightly fitted a socket d^1 embracing the retaining collar on the lower end of the twist tube and carrying the twist arm d. The yarn is engaged in the twist arm d in any convenient and well known manner.

The operation of this device is as follows: The yarn or sliver is introduced at the wide upper end of the funnel t^1 and passes down the central opening and through the twist tube h to engage the twist arm d prior to entering the draw rolls b. The twisting will take place over the whole of this stretch of yarn, but the maximum twist occurs near the arm d and falls off as the distance from the draw roll bite is greater. It follows from this that the greater part of the twist is effected in the twist tube h and it is thus in this tube that the fibres are most liable to be projected out from the yarn by centrifugal force. Such fibres, if coming in contact with rotating parts are apt to get caught and cause damage by blocking the free passage of the yarn. Owing to the total absence of rotating parts in the twist tube h no such danger can arise. Moreover, the fibres which may be projecting from the yarn are, according to this invention, gently swept into the twist by the axial stroking or brushing action of the annular air current issuing from the blast pipe p, through port p^1 and the annular space between the nozzle bodies t and t^2. A cock k operable by means of a yoke k^1 controls the annular air current.

The annular air current acts like a gentle air brush causing the fibres to align themselves with the yarn and also supports the yarn on an air cushion centrally with the twist tube. Whip of the yarn may thus be minimized and the yarn guided in the most advantageous manner to the twist arm d. In order to take full advantage of this arrangement, I provide for the adjustment of the twist tube so that its axis may be arranged tangential to the point of contact of the drawing rolls b or slightly inclined one way or the other as may be found most suited for the yarns under treatment. There is first a bodily adjustment of the whole gang of twist tubes mounted in a single carrier frame D and effected by the set pin f^2. This adjustment sets the pipe p on which all the saddles s are mounted. Then each individual saddle s may be adjusted by slacking back its clamping screw s^2, whereby the saddle is free to swing on the pipe p, then operating the pin u to rock the saddle till the required angular position has been obtained. The clamping screw s^2 in the tail s^1 is then again tightened so as to retain the parts firmly in the adjusted position. The clamping screw s^2 is non-radial to the pipe p so that it not only clamps the saddle s in angular position but also causes the upper part of the saddle to bed tightly on the pipe p and prevent leakage of air from the port p^1.

I claim:

1. A twist tube for use with a ring spinning machine having in combination, a non-rotating twist tube, an air nozzle directing an annular current of air into the front end of said twist tube, a whorl mounted to rotate on the outside of said twist tube and a twist arm driven by said whorl.

2. A twist tube for use with a ring spinning machine, having in combination an outer nozzle member, an inner member, means for introducing air between said outer and inner nozzle members to form an annular current of air, a non-rotating twist tube located in said outer nozzle member, a whorl rotatably mounted on said twist tube and a twist arm driven by said whorl.

3. In combination with draw rolls for a ring spinning machine, a plurality of independently-pivoted outer nozzle members, an inner nozzle member located concentrically within each outer nozzle member, means for introducing air between said outer and inner nozzle members to form an annular current of air, a non-rotating twist tube located in each of said outer nozzle members, a whorl rotatably mounted on each of said twist tubes, a twist arm driven by each of said whorls, and means for adjusting the angular position of said nozzle members as a whole, and of each nozzle member independently.

4. In combination with draw rolls for a ring spinning machine, a pivotally-mounted carrier frame, a plurality of pivotally-mounted outer nozzle members mounted on said frame, means for adjusting the angular position of each nozzle member independently, means for adjusting the angular position of said carrier frame and thereby of said nozzle members as a set, an inner nozzle member located concentrically within each outer nozzle member, means for introducing air between said inner and outer nozzle members to form an annular current of air, a non-rotating twist tube located in each of said outer nozzle members, a whorl rotatably

mounted on each of said twist tubes, and a twist arm driven by each of said whorls.

5. In combination, a carrier frame, means for adjusting the angular position of said frame, a ported air pipe on said carrier frame, a ported rocking piece on said pipe, means for rocking and clamping said rocking piece on said pipe, an annular nozzle communicating with the port in said ported rocking piece, a non-rotating twist tube fixed tightly in said rocking piece, a whorl rotatable on the exterior of said twist tube and a twist arm carried by said whorl.

6. In combination with a ring spinning machine, a supporting bridge, a bed plate frame fixed to said bridge, draw rolls supported in said bed plate frame, a carrier frame resting on said bed plate frame and having a curved front ledge nested on said bed plate frame and a set pin located laterally of said ledge and resting also on the top of the bed plate frame, an air blast pipe mounted in said carrier frame and having ports therein, a ported saddle piece resting on said pipe and having its port registering with the port on the pipe, a cock controlling said port in the saddle piece, an annular nozzle in said saddle piece and communicating with the port therein, a twist tube tightly fixed in said saddle piece co-axially with said annular nozzle and in front thereof, a whorl rotatable on the exterior of said twist tube and a twist arm carried by said whorl and projecting from the end of the twist tube to the bite of the draw rolls.

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