June 14, 1949. J. V. WEINBERGER 2,472,929

DOUBLE CONDENSER HIGH DRAFT MECHANISM FOR ROVING AND SPINNING FRAMES

Filed July 16, 1945 2 Sheets-Sheet 1

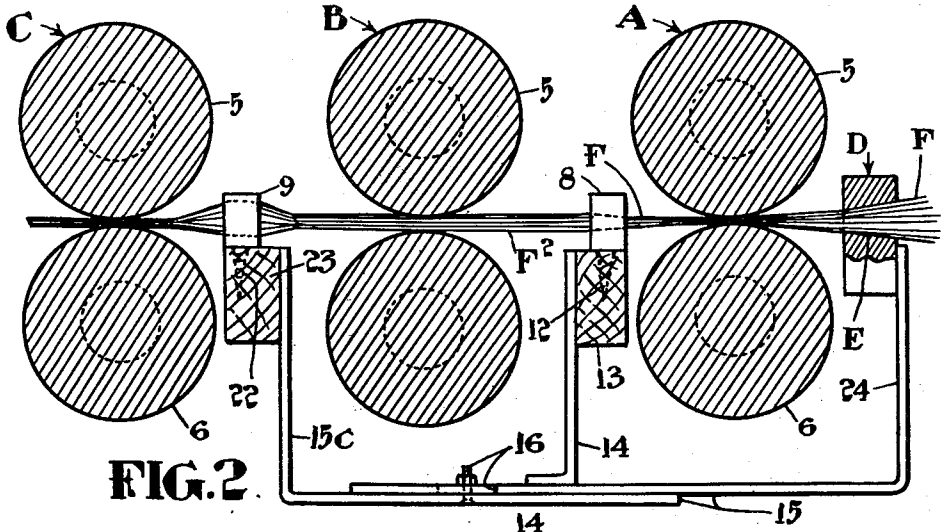


FIG. 2.

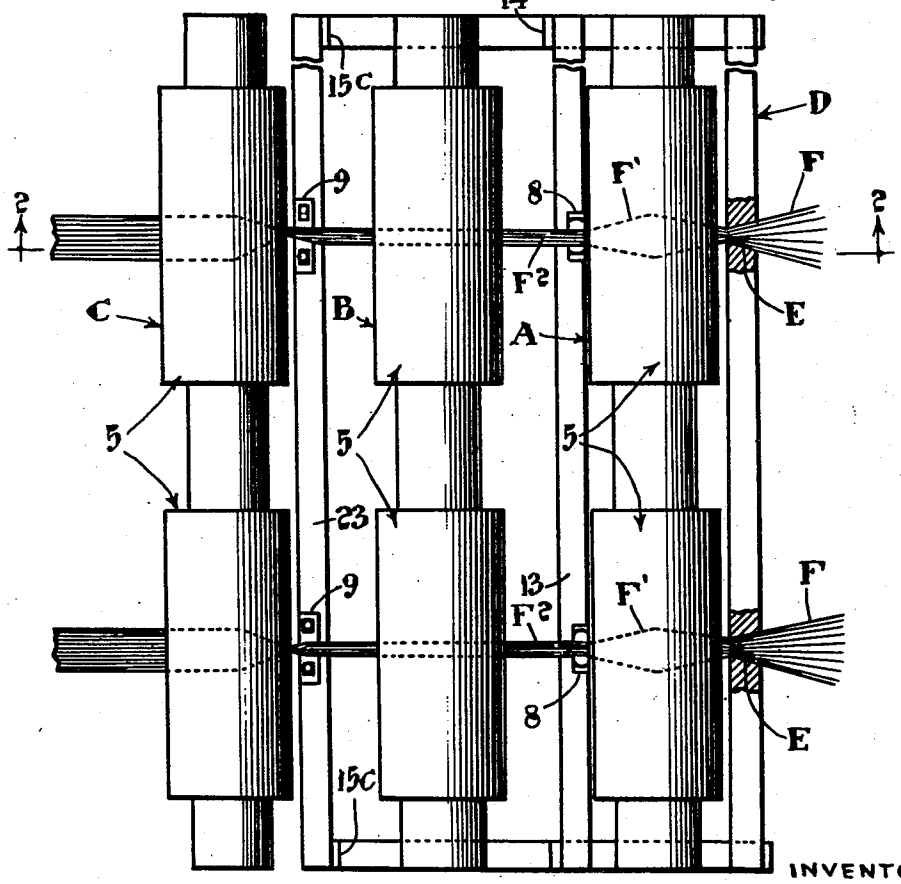


FIG. 1

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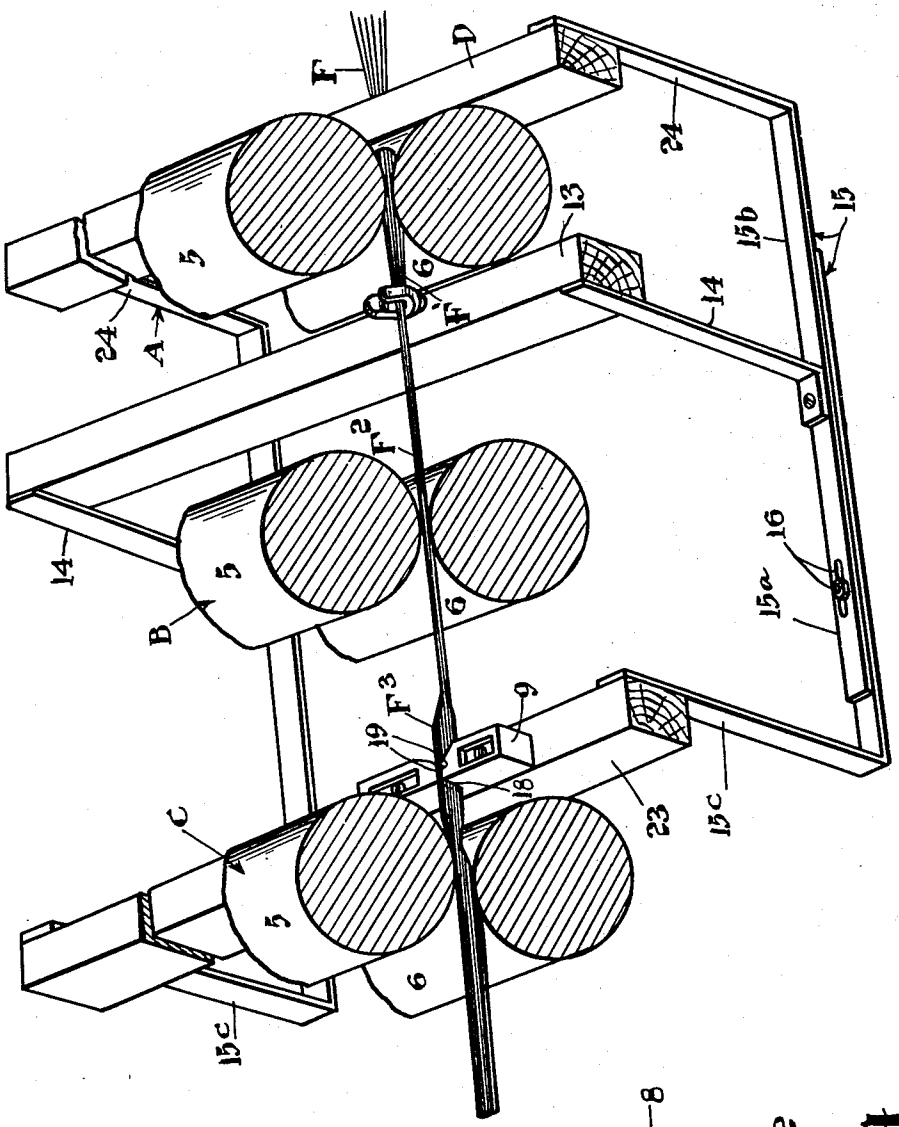


FIG. 3

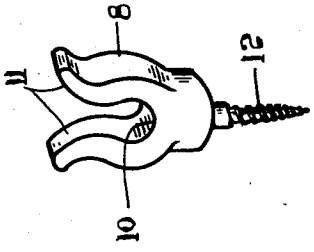


FIG. 4

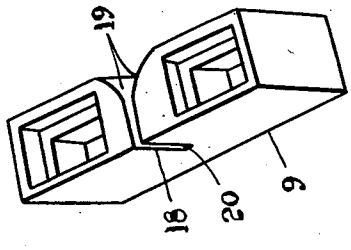


FIG. 5

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UNITED STATES PATENT OFFICE

2,472,929

DOUBLE CONDENSER HIGH DRAFT MECHANISM FOR ROVING AND SPINNING FRAMES

Jan V. Weinberger, Truro, Nova Scotia, Canada

Application July 16, 1945, Serial No. 605,343
In Canada March 23, 1945

2 Claims. (Cl. 19—130)

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This invention relates to high-draft mechanism for roving and spinning frames.

The primary object of the invention is the provision of simple means for effectively counteracting detrimental effects of electrical and other conditions which are encountered in the operation of such high-draft mechanisms and tend to interfere with the production of a smooth roving or yarn and cause breakage and stoppages.

In the operation of high-draft roving and spinning frames the disposition of the component fibres of the sliver during its passage between the top and bottom rolls of the various roll units is an important factor. The ideal fibre arrangement is that presented by a circular sliver since, in this case, all the component fibres are as close to the central longitudinal line of the sliver as is geometrically possible. In a circular sliver the fibre adhesion is such that the surface and sub-surface fibres tend to remain with the central fibres to a much greater extent than in a sliver of any other cross section. However, the maintenance of the ideal circular shape of the sliver during its passage through the various roll units of the high-draft mechanism is not practically possible.

In ordinary practice the slivers are passed to the entry roll unit of the frame through circular openings provided in the usual reciprocating bar mounted adjacent said unit. The top and bottom rolls of this unit are subjected to spring or weight pressure and tend to flatten the sliver so that it tapers toward its side edges, the fibres at and adjacent said edges being much less thickly and densely bunched as compared with the fibres at and adjacent the central longitudinal line of the sliver. When the sliver is passed in this form between the top and bottom rolls of the front or delivery draft roll unit the edge fibres of the sliver which are furthest from the longitudinal centre of the sliver exhibit a reduced tendency to remain with the sliver and an increased tendency to wrap themselves around the delivery rolls. These edge fibres of the sliver are also the ones which are most strongly attracted by the delivery rolls as the result of electric charging of the fibres and rolls by static electricity generated by the pressure and/or friction obtaining between the sliver and rolls during the spinning operation. The net result is that, in many instances, the fibres most strongly attracted by the delivery rolls will leave the sliver for the rolls and will cause other fibres to be similarly diverted from the sliver until finally a point is reached where the mass of fibres

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wrapped around the rolls will break the roving or the yarn and cause other damages or stoppages.

According to the invention described herein the foregoing difficulties are eliminated by subjecting each sliver to a fibre-controlling condensing or reshaping operation before and after its passage through the carrying roll unit or units located between the entry roll unit and the delivery roll unit. In the first condensing or reshaping operation the sliver which, as previously described, has been flattened during its passage through the entry roll unit, is reformed into a substantially circular sliver. This circular shape of the reformed sliver is not substantially altered during passage of the sliver through the carrying roll unit since the pressure exerted on the sliver by the top and bottom rolls of this unit is not strong enough to cause any considerable deformation. In the second condensing or reshaping operation which takes place immediately adjacent the rolls of the delivery roll unit the substantially circular sliver is reformed into a flattened sliver of substantially oval cross section having its major axis lying in a vertical plane perpendicular to the contact line of the delivery rolls. This second condensing or reshaping operation is accomplished by passing the substantially circular sliver coming from the carrying rolls through a fibre controlling member provided with a relatively deep narrow slot presenting parallel side wall portions which crowd the contacting fibres toward the longitudinal centre line of the sliver and thereby reforms the substantially circular sliver into a substantially oval sliver whose major axis is perpendicular to the contact line of the delivery roll. The fibres which are thus crowded toward the centre line of the sliver by the side walls of said slot are the fibres which, when the sliver is again flattened during its passage between the delivery rolls, are displaced furthest from the centre line of the sliver and would ordinarily tend to leave the sliver and adhere to said rolls. I have found, however, that the aforesaid crowding of these fibres toward the centre line of the sliver as the sliver enters the nip of the delivery rolls has the effect of decreasing the electrical attraction of these fibres by said rolls and otherwise counteracting the tendency of these fibres to be diverted from the sliver during its passage through the carrying roll unit. The fibres at the top and bottom of the oval sliver produced by the fibre crowding action of the aforesaid slot walls are uncontrolled during the passage of the sliver through the slot

but when the sliver is flattened during its passage between the delivery rolls, these fibres are located in the central portion of the sliver and are controlled by the rolls so that they exhibit no tendency to leave the sliver.

The extent to which the component fibres of the sliver are spread apart and diverted from the sliver during the drawing process is largely dependent on the static electricity with which the sliver and drawing rolls are charged and this, in turn, is dependent on the friction and pressure obtaining between the fibres and the rolls. This friction and the resulting charging of the fibres and rolls with static electricity increases as the difference between the surface speeds of the entry and delivery rolls is increased to provide more draft or elongation of the sliver. The practical draft limit is reached at the point where the sliver tends to disintegrate under the influence of the disintegrating action of the static electricity. However, in the case of high-draft mechanism equipped with my invention the detrimental effects of static electricity are counteracted and nullified so that it is possible to safely exceed to a very substantial extent what has previously been considered the practical limit of the draft and to thereby obtain a far greater elongation of the sliver than has heretofore been obtained with the use of a single condenser.

In the further description of this invention reference will be had to the preferred mechanical embodiment shown in the accompanying drawing, in which—

Fig. 1 is a fragmentary top plan view of the drawing part of a spinning frame assembly equipped with my invention.

Fig. 2 is a cross sectional view taken substantially along the section line 2—2 of Fig. 1.

Fig. 3 is a perspective view in which certain parts are shown in section.

Fig. 4 is a perspective view of one of the sliver condensing or reshaping members by means of which the flattened sliver coming from the delivery roll unit is reformed into a substantially circular sliver; and

Fig. 5 is a perspective view of one of the sliver reshaping or condensing elements by means of which the substantially circular sliver coming from the carrying roll unit is reformed into a flattened sliver having its upper cross sectional axis lying in a vertical plane.

In these drawings my invention is shown applied to a conventional high-draft mechanism for roving and spinning frames comprising an entry roll unit A, a carrying roll unit B, a delivery roll unit C and the usual reciprocating bar D provided with openings E through which the slivers or rovings F are directed between the top and bottom rolls 5 and 6 of the aforesaid roll units.

During its passage through the top and bottom entry rolls of unit A each sliver is flattened as indicated at F' and is transformed into a sliver of substantially oval cross section having its major axis lying in the plane of or parallel with the contact line of the top and bottom rolls or units B and C. The oval shape of the sliver is not materially altered during passage of the sliver between the top and bottom rolls of unit B since the pressure of these rolls on the sliver is not strong enough to cause any considerable deformation. Consequently, in ordinary practice, the sliver passes between the top and bottom delivery rolls of unit C in the substantially flattened oval condition imparted thereto by the entry rolls.

As previously stated the delivery of the sliver in this form to the delivery rolls of unit C results in various difficulties including disintegration of the sliver under the influence of static electricity.

According to my invention a series of sliver condensing or reshaping members 8 are arranged between the rolls of units A and B and a second series of sliver condensing or reshaping members 9 are arranged between the rolls of units B and C.

As each sliver passes through one of the condensing or reshaping members 8 it is reformed into a circular sliver as indicated at F^2. In this connection it will be noted that each member 8 comprises a porcelain or similar element provided with a substantially circular eye 10 through which the sliver travels during the spinning process. Each member 8 is also provided with a flaring vertical slot 11 which serves as an entrance opening through which the sliver is introduced into the eye 10 at commencement of the spinning process. The members 8 are secured by screw threaded shanks 12 or other suitable means to a common horizontally extending supporting bar 13. This bar is supported at its ends by uprights 14 having their lower ends fastened to adjustable horizontal supporting members 15, each of which is composed of two overlapping sections 15*a* and 15*b* adjustably secured together by slot and pin connections 16.

The reformed circular slivers pass between the carrying rolls of unit B without any substantial alteration of their circular shape since, as previously stated, the pressure exerted on the slivers by these carrying rolls is not strong enough to cause any considerable deformation.

As each sliver travels from the carrying rolls of unit B to the delivery rolls of unit C it passes through one of the condensing or reshaping members 9 and is reformed into a flattened sliver F^3 of substantially oval cross section having its major axis perpendicular to the contact line of the delivery rolls. In this connection it will be noted that each sliver condensing or reshaping member 9 comprises a porcelain block or the like which is positioned immediately adjacent the delivery rolls 5 and 6 of unit C and is provided with a vertical slot 18 extending horizontally therethrough in a direction perpendicular to the rolls, said slot being bounded by side walls 19 and bottom wall 20 and being open at the top and ends. The side walls of the slot 18 are curved or flared so that they are closely spaced and substantially parallel at the exit end of the slot and are widely spaced at the entrance end. During its passage through this slot the fibres of the substantially circular sliver are gradually compressed by the side walls 19 so that the sliver issues from the narrow end of the lot in the form of a flattened and substantially oval silver having its principal axis vertical to the contact line of the delivery rolls between which the sliver is then passed. As previously described this reformation of the sliver immediately prior to its passage between the delivery rolls gives a fibre controlling effect which counteracts the disintegration of the sliver and the other difficulties which are encountered when the flattened sliver is passed between the delivery rolls with its major axis co-planar or parallel with the line of contact between said rolls.

The sliver condensing or reshaping elements 9 are fastened by screws 22 or otherwise to a common supporting bar 23 carried by upward extensions 15c of the horizontal supporting member 15. Member 15 is also provided with upward

extensions 24 which are secured to reciprocating bar D. It will thus be seen that the reshaping or condensing members 8 and 9 are mounted to move with the reciprocating bar D.

The initial reshaping operation by which the flattened sliver coming from the entry roll unit is reformed into a sliver of substantially circular cross section before passing through the carrying roll unit is an important feature of the invention. This feature of the invention provides for a more gradual transition of the sliver, by compression of the component fibres, from the flattened condition shown at F' to the flattened condition shown at F^3. If the sliver, after being flattened to the condition shown at F', is passed through the reshaping member 9 without the intermediate reforming of the sliver into a sliver of substantially circular cross section, the resulting sliver formation is not as satisfactory as that obtained when the sliver is reformed into a substantially circular silver before being passed through the carrying rolls of unit B.

Having thus described the nature of my invention, and a preferred mechanical embodiment thereof, it will be understood that various modifications may be resorted to within the scope and spirit of the invention as defined by the appended claims.

I claim:

1. A high-draft roving mechanism comprising a roving frame equipped with an entry roll unit, a carrying roll unit and a delivery roll unit through which the slivers are successively passed, sliver condensing or reshaping members through which the slivers are passed from the entry roll unit to the carrying roll unit and by means of which the slivers are reformed into slivers of substantially circular cross section and a second series of sliver condensing or reshaping members through which the slivers are passed from the carrying roll unit to the delivery roll unit and by means of which the slivers are transformed into flattened slivers each having its major cross sectional axis lying in a vertical plane.

2. A high-draft roving mechanism comprising

a roving frame equipped with an entry roll unit, a carrying roll unit and a delivery roll unit through which a plurality of slivers are successively passed, a series of sliver-reforming condensers arranged between the entry roll unit and the carrying roll unit so that each sliver passes through a separate one of said condensers in travelling from the entry roll unit to the carrying roll unit, each of said condensers presenting a substantially circular sliver-receiving eye by means of which the sliver passing therethrough is transformed into a sliver of substantially circular cross section and a plurality of sliver-reforming condensers arranged between the carrying roll unit and the delivery roll unit and close to the draft or delivery rolls of the last mentioned unit, said last mentioned condensers being arranged so that a separate sliver passes through each of said last mentioned condensers in passing from the carrying roll unit to the delivery roll unit and each of said last mentioned condensers presenting a vertical sliver-receiving slot having its side walls shaped so that the sliver passing therethrough is transformed into a flattened sliver having its major cross sectional axis lying in a vertical plane.

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