COTTON SPINNING.

RING SPINNING:—A General Description of the Modern Ring Frame—The Creel—Roll Stands—Weighting Rolls—Top Rolls—Bottom Rolls—Clearers—Care of Rolls and Roll Stands—Faulty Work of Rolls—Thread Boards—Rings—Ring Holders—Size of Ring to Use—Traveler Clearers—Setting Rings—Care of Rings—Finishing of Rings—Ring Travelers—The Action of the Traveler—How Travelers are Made—Weight of Travelers—Spindle Rails—Spindles—Setting Spindles—Lubrication of Spindles—Bobbins—Bobbin Clutches—Banding—Banding Machines—Band Tension Scale—Tin Cylinders—Ballooning and Separators—Winding—Builder Motions—The Warp Builder—How to Set the Builder Motion—The Filling Builder—Spinning Filling on Paper Tubes—The Combination Builder—The Care of Ring Rails and Lifter Rods—Some Causes for Badly Shaped Bobbins—Doffing.

NOTES:—Management of the Spinning Room—Data on Ring Frames—A new Spindle Drive Device—Care of Machines—Oiling—Leveling Frames—Power Tests—Power Consumption—Arrangement of Machinery.

FAULTY YARNS:—Knots and Bunches—Variations in Counts—Uneven Yarn—Thick and Thin Places—Weak Yarn—Kinky Yarn—Dirty Yarn—Kockled, Curled or Knotty Yarn—Slack Twisted Yarn—Hard Twisted Roving—Cut Yarn—Harsh or Wiry Yarn—Badly Wound Yarn—Bobbins Wound too Low—Soft Wound Bobbins—How to Prevent "Double"—Colored Work—Waste—Breaking Strength of Yarn.

CALCULATIONS:—A general Description on the Subject of Draft, Twist, Production and Gearing—Calculating the Draft from the Gearing—To find the Draft—To find a Constant—To ascertain Draft Change Gear—To Ascertain Hank Roving—To Ascertain Draft—Twist—Standard Twists—Contraction Due to Twist—Notes on Twist—Calculating Twist—To Ascertain Speed of Spindles—Calculating Twist from Gearing—Traverse Gear—Taper—Sizing the Counts—The Grading of Cotton Yarns, Single, Two or More Ply—Production—Programs for Spinning Yarns of Various Counts, from Bale to Spun Thread—Illustrations with Descriptive Matter of the Different Makes of Ring Frames.

The Ring Frame.

(*Continued from page 71.*)

Roll Stands. The drafting rolls and the roll stands of all the various styles of ring frames are pretty much alike, even when the frames are made by different builders, and where marked differences or variations exist these are mainly due to the peculiar specifications required by the mill ordering the machines. The principles, construction, etc., of the

drafting rolls, stand, etc., of the ring frame are the same as the drafting rolls, etc., of the fly frame, and the reader is referred to the chapter on fly frames in Part 2 of this work, only that the mechanism in connection with the ring frame is constructed on a more delicate scale.

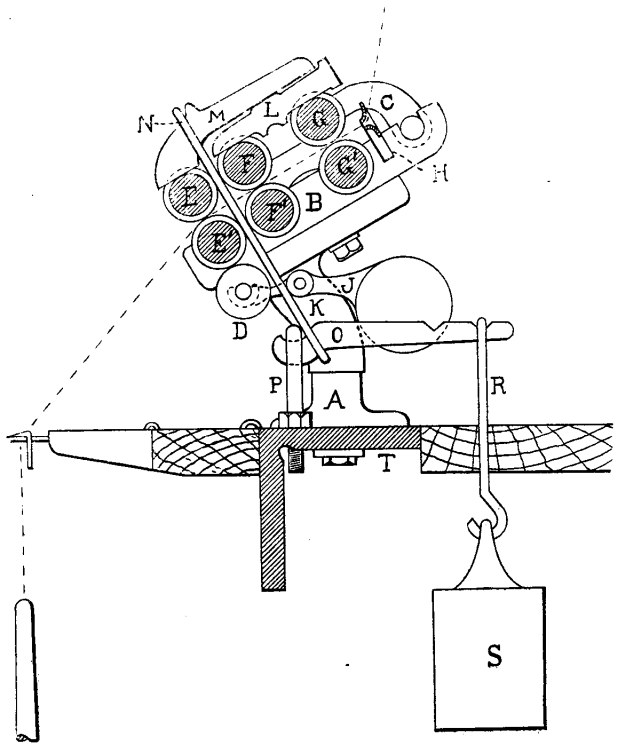

FIG. 230.

A sectional view of the side elevation of a roll stand and its system of weighting the top rolls is given in Fig. 230, where the various parts are shown lettered to correspond with the following description: The roll stand proper consists of the front stand *A* which is bolted to the thread board *T*, the slide *B* and the cap bars *C*. The front stand *A* carries the lower front roll *E'*, the slide *B* carries the lower middle roll *F'* and the lower back roll *G'*, whereas the cap bars *C* hold the three upper rolls *E*, *F* and *G* in place. The lower rolls are of steel, fluted and are carried in bearings set into the front stand and slide. The lower rolls alone receive power. The slide for the back rolls is made in one piece, and is generally made adjustable on the front roll stand by means of a nut. The distance between the back and middle rolls is not changed, but the middle roll may be set at any desired distance from the front roll, this setting of the rolls depending upon the principles set forth in connection with the drawing frame in Part 2 of this work, the distance between the two rolls being regulated by the length of the staple of the cotton used. The importance of properly setting the rolls on these machines cannot be too often, nor too strongly, emphasized. Scarcely any draft is put in between the middle and back rolls, the total draft on the machine being usually between 8 and 13.

The top rolls are always leather covered and are either solid or shell. They are supported at their ends by cap bars *C*, in the same way as explained in connection with the drawing frame. The front neb is adjustable by means of a screw. These cap bars hold the top rolls in their proper position. They are constructed so as to prevent the rolls from sliding backwards or forwards or endways, and are adjustable for different lengths of staples, and will also turn backwards out of the way when cleaning the rolls. Beneath the front bottom roll *E'* is a clearer roll or scavenger *D*, supported at each end by the weighted lever *J* pivoted at *K*. When the lever weighting system is used, the top rolls are held in contact with the bottom rolls by levers and weights, as shown here. The two back rolls *F* and *G* are surmounted by the back saddle *L* resting on the bearings of the rolls. Over said saddle is placed the front saddle *M*, resting on it and on the bearings of the front roll *E*. Over this saddle *M* fits a downward hanging stirrup *N*, connected with the lever *O*, at the end of which is suspended the weight *S* by means of the weight hook *R*. This lever *O* is usually notched, so that by suspending the weight from one or another of the notches, the desired weighting may be obtained. The fulcrum of this lever is at the lever screw *P*, which is fastened to the thread board *T*. The system of self-weighted top rolls will be explained later.

The scavenger or clearer roll *D*, upon which the yarn collects when an end breaks, preventing a roller lap, is a wooden roll covered with denim or light weight flannel. In each end of the scavenger are wire gudgeons which rest in open bearings in the scavenger self-weighted lever *J*, the scavenger roll being held lightly against the lower front drafting roll *E'* by means of this lever. Sometimes a spring is used for holding the scavenger roll in place, but this is not so satisfactory as the former method, because springs are apt to weaken or break.

In addition to the scavenger roll, top roll clearers are employed, the same being held in place by a metal clip. These clearers are placed between the saddles at each side of the rolls and therefore are not shown in the illustration.

At *H* is shown the traverse guide rod which conducts the roving from the bobbins on the creel, to the drafting rolls, the guide rod carrying trumpets *I*, of brass, usually made with as small a hole as is possible to use, and through which the roving strands are drawn by the action of the rolls. This guide rod rests in a $\frac{1}{4}$ inch slot, cut into the slide *B*, just behind the back rolls. It is traversed a distance a little short of the length of the fluted portion of the steel lower rolls, this motion being given by the guide rod to the roving, so that wear from friction will not come at the same part of the drafting rolls all the time. The roving traverse should have careful attention. It should travel a little quicker at the ends when changing direction; it should lap in the center on long boss rolls, to avoid a shoulder forming on the top roll.

Figs. 231 and 232 give an illustration of an improved type of traverse motion, as brought out by the Whitin Machine Works and as applied to the

roll stand, showing its parts and operation. Fig. 231 is a transverse sectional view of this traverse motion, showing the relation of the parts to the drawing rolls. Fig. 232 is a view, partly in section, of the forked lever, the actuating arm, the eccentric actuation, the lever and the cam operating the arm.

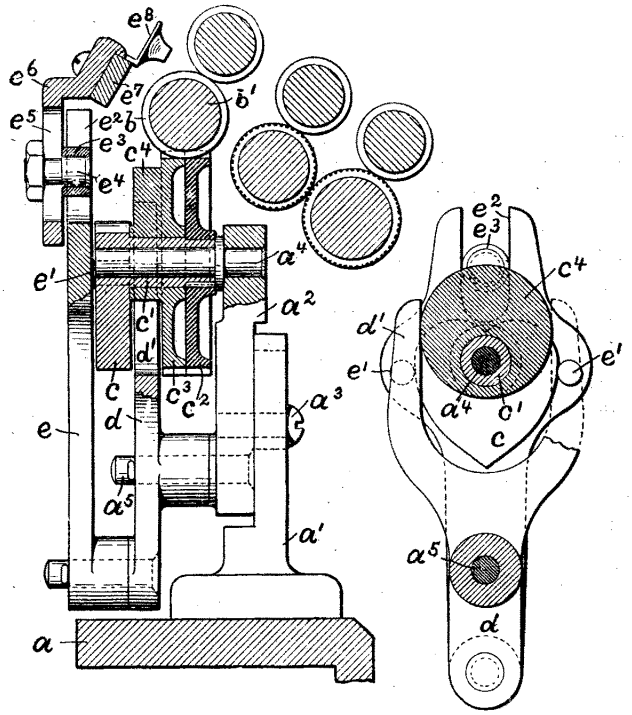

FIG. 231.

FIG. 232.

a indicates the top rail of the ring frame on which the stands supporting the drawing rolls are mounted. The vertical distance between the rail a, and the back drawing roll b', differs in ring frames made by different makers, for which reason the stand a^1 is provided with a vertical slot for adjustably securing the post a^2 by means of the screw a^3 to the standard a^1. In the post a^2, stud a^4 is secured near the upper end, and the fulcrum pin a^5 near the lower end; the stud a^4 having journaled on it a heart shaped cam c. The worm gear c^2 is secured to the sleeve c^1, and engages with the worm b on the back drawing roll b^1. The worm gear c^3, which has one tooth more or less than the worm gear c^2, is provided with an eccentric cam c^4 and is journaled on the sleeve c^1, said eccentric cam c^4 acting on the two arms of fork d^1 of the lever d as supported on the fulcrum pin a^5, being pivotally connected at its lower end with the lower end of the arm e, carrying the pins e^1 which engage with the cam c. The upper end of the arm e has the slot e^2 in which a slide e^3 is adjustably secured by screw stud e^4 in the slot e^5 of the bracket e^6, secured to the traverse rod e^7 on which the roving guides e^8 are supported.

When the traverse motion is in use, the rotation of the back drawing roll b^1 and the worm b imparts rotary motion to the worm gears c^2 and c^3, and through the same to the eccentric cam c^4 and the cam c, the relative position of the two cams changing gradually by the difference in the number of teeth in the two gears. The eccentric cam c^4 swings the lever d on the fulcrum pin a^5, the lower end of the lever moving the pivot supporting the arm e from side to side, while the heart shaped cam c swings the arm e and by the same imparts reciprocating motion to the traverse rod e^7. The continuous change of the position of the pivotal support of the arm e causes the arm to rock on the cam c and to move the upper end of the lever with the bracket e^6 and the traverse rod, independent of the action of the cam. This extra throw can be increased by adjusting the screw stud e^4 higher on the bracket e^6.

Thus it will be seen that by the continuous changes in the length of the traverse as well as the speed, an even wearing of the leather covered top and fluted bottom drawing rolls is secured, thus increasing their durability. It may be mentioned here, that the drafting rolls are set on the roll stand and spaced apart according to the same principles as apply to drafting rolls used in previous operations on fly frames, etc.

In Fig. 233 is shown the sectional view of a new style of roll stand, in which ready adjustment of the rolls between each other can be made while the frame is in operation, without liability of breaking or damaging the roving or having to stop the machine. This device is somewhat interesting as in the type of roll stand previously described, it is necessary to stop the spinning when readjusting the drafting rolls between each other.

In this roll stand the distance of the rear roll bearing 1 and the front roll 2 is adjusted by means of a screw 3, extending from the forward end of the head 4 and engaging with a nut 5 as situated on the underside of the rear roll bearing 1, said nut sliding in a longitudinal groove or slot 6. 7 and 8 are the carrier and the back rolls respectively and which are set in unison with reference to distance from front roll 2. 9 is the flange upon which the rear roll bearing 1 slides during adjustment of the latter. 10 indicates the cap bar for the top rolls 11, and 12 one of the clearer roll weights.

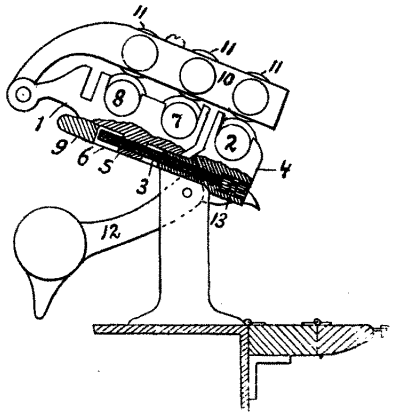

FIG. 233.

By means of arrangement thus described, the rear roll bearing 1 can be quickly adjusted when so required, from the front, by means of a screwdriver, while the machine is running. The screw 3, after proper adjustment has been made, in turn is held against any possible movement by means of a set screw (not shown in illustration) which extends laterally through the head 4 and enters an annular groove 13 formed in the head of screw 3.

(To be continued.)