July 16, 1946. A. CROSSLEY 2,404,218

APPARATUS FOR DRAWING

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Fig. 1.

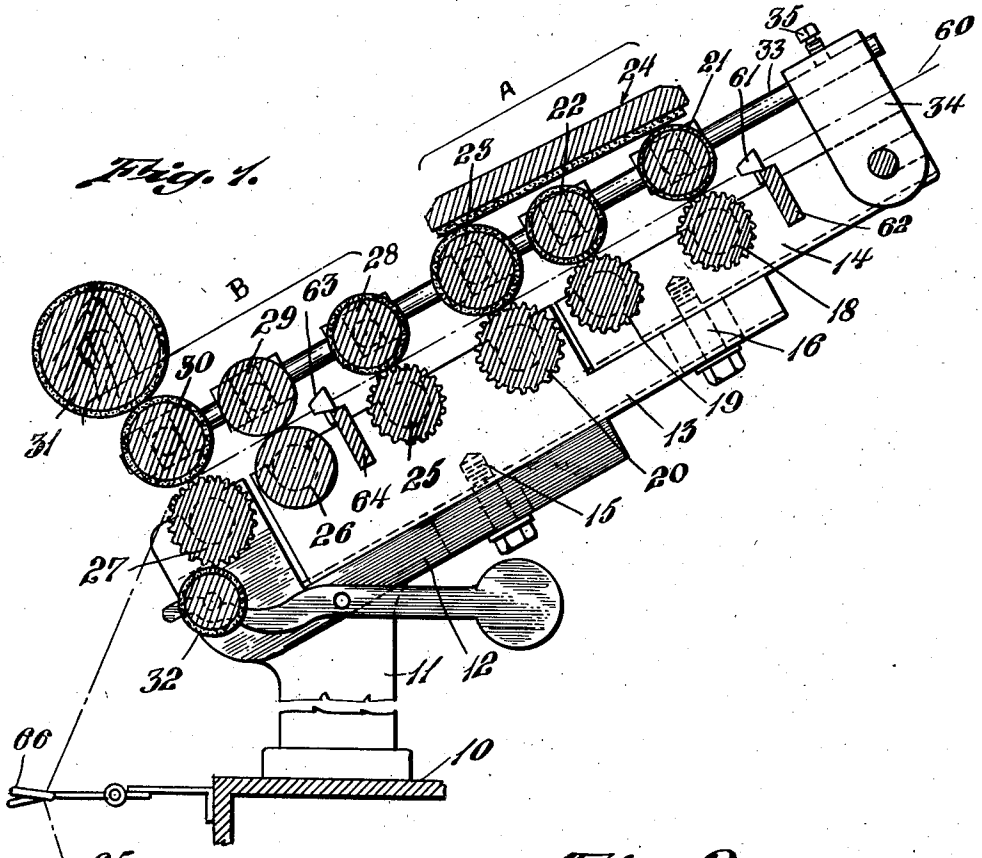
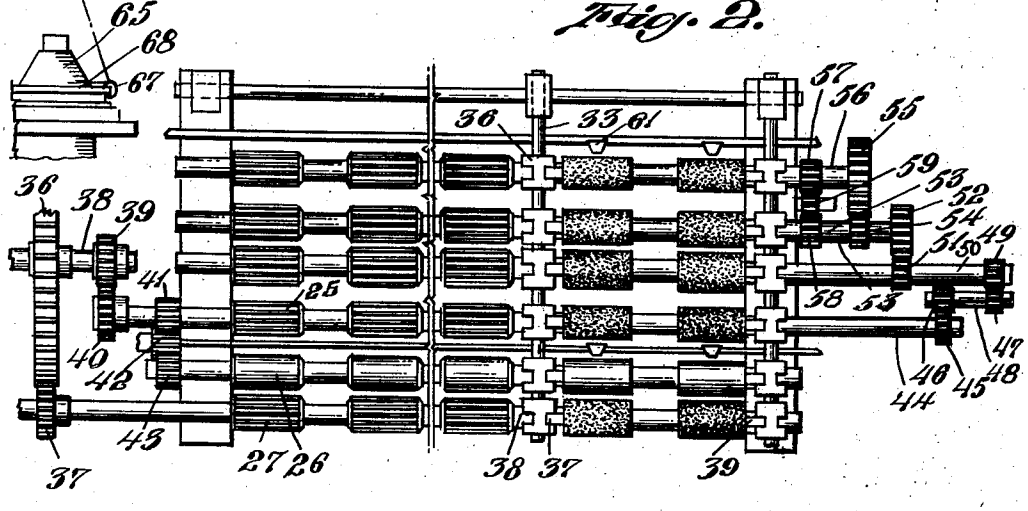


Fig. 2.



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APPARATUS FOR DRAWING

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3 Claims. (Cl. 19—130)

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This invention relates to spinning, more particularly to the spinning of cotton yarn or a strand formed of staple fiber analogous thereto.

In the working of cotton fibers after a sliver has been formed in order to reduce this sliver from a soft thick fleecy form to a hard twisted thread the sliver is subjected to a succession of drafting operations which elongate and simultaneously reduce it in size until in the last stage it reaches the condition of a finished twisted commercial yarn. These successive drafting operations whereby the sliver is converted into commercial yarn require, in present mill practice, simple drawing and twisting operations carried out successively on a number of separate machines. At the end of each of these various drafting operations the strand is wound upon a spool or bobbin and then transported to the next machine where further drafting operation takes place and so on until the final yarn is produced. As the sliver is reduced in size it is sometimes referred to as roving and in other stages referred to as yarn. However, in this specification I use the word strand as indicating the sliver, roving, yarn, or thread in any of its various conditions from beginning to end.

One of the objects of this invention is to provide in a single drafting frame a high draft of the strand.

Another object of this invention is to simplify the various steps in drafting or attenuating strands by eliminating certain packaging operations and the number of machines or separate units which are utilized to accomplish the results. Another object of this invention is to provide in one unit or spinning frame a drafting which has heretofore been accomplished by two or more frames, thus eliminating a packaging operation which occurred between the two frames by doing the work in one machine or mechanism.

Another object of this invention is to cause drafting in a plurality of stages with a transfer of the strands from one stage to the other without drafting whereby a control of the strand is provided which will permit of successive operations.

Another object of this invention is to control the strand and fibers thereof between successive operations of a drafting or attenuating character.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompaying drawing:

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Fig. 1 is a sectional view looking endwise or axially of the rolls;

Fig. 2 is a top plan view illustrating somewhat diagrammatically the drive and with the top rolls omitted.

In proceeding with this invention I provide a group of rolls for performing a usual draft of the staple fiber strand and in the same roll stand I provide a second group of rolls for drafting the strand a further amount, which second group may perform a draft which has heretofore been performed upon the strand. The transfer of the strand from the first group to the second group of rolls is without draft and the delivery of the strand from the first group is such that the strand is traveling at substantially the same speed as it is received by the second group. In the second group some condensing means such as a trumpet may be used if desired.

With reference to the drawing 10 designates a supporting deck of the spinning frame upon which rests the pedestal 11 with the L-shape bracket 12 upon which additional L-shaped brackets 13 and 14 are positioned and held in adjustable relation by the bolts 15 and 16. Each of these brackets are provided with bearings for the drafting rolls, these being provided in such a manner that adjustment of the distance between back and front roll centers of the roll groups may be had. A group of rolls designated A comprise a back feed roll 18, an intermediate feed roll 19, and a delivery feed roll 20, which rest in suitable bearings in the roll stand brackets at intervals spaced along the frame and are driven from one end of the frame. Upper rolls 21, 22, and 23 are provided with a clearer 24 for picking up fibers which wrap about these upper rolls 21 and 23.

A second group of rolls designated B comprising lower feed roll 25, intermediate roll 26 and delivery roll 27 are mounted in suitable bearings on the roll stand brackets at spaced intervals of the spinning frame and are driven by gearing at one end of the frame. These rolls are also arranged in pairs with the upper or top roll 28 for the roll 25, 29 for the intermediate roll 26, and 30 for the delivery roll 27. A clearer roll 31 is provided for this top roll 30 while a clearer roll 32 is provided for the lower delivery roll 27.

Each of the top rolls is supported in slotted bearing blocks mounted upon over arms 33 which extend from suitable supports 34 at the rear end of the roll stand and are held in position by set screw 35. Each of these over arms carries a block 36 which is slotted as at 37 and 38 on oppo-

site sides so as to receive the trunnion 39 at the opposite ends of the upper rolls of the pairs of rolls which grip the strand to be attenuated.

The lower rolls are driven through gearing as diagrammatically shown in Fig. 2. The main drive shaft 38 drives gear 36 which drives directly the front delivery roll 27 by a gear 37 meshing with the gear 36. Feed roll 25 of group B is driven from the main drive shaft 38 through the gears 39 and 40 on the roll shaft 25 while the intermediate roll 26 is driven from the gear 41 through the idler 42 meshing with the gear 43 on the shaft of the intermediate roll 26. The shaft 44 of the feed roll 25 is extended on the opposite end of the machine for the drive of the group of rolls 18, 19, and 20. Gear 45 on shaft 44 drives idler 46 on shaft 48 while in turn gear 47 drives gear 49 on shaft 50 which provides the drive for the delivery roll 20 of the rolls of group A. The drive is taken from this shaft 50 by means of gears 51 and 52 to drive shaft 53 while from this shaft the feed roll 18 is driven by means of gears 54 and 55 on shaft 56 which is the shaft extending to the roll 18. The intermediate rolls 19 are driven from the shaft 56 by gear 57 driving gear 58 on an extension of the roll 19 through intermediate gear 59. This manner of drive will permit of great flexibility through the change gears whereby a wide variety of drafts may be provided.

The drive for the rolls is so constituted that the surface speed of the roll 20 and the roll 25 will be substantially the same so that there is no draft between the rolls of group A and the rolls of group B. The surface speed may be slightly greater for roll 25 so as to just keep tension on the yarn but no draft is contemplated. By this arrangement a nicety of control of the strand is provided and the fibers are not unduly spread.

For example I provide a draft of about 5 in the rolls of group A while I provide a draft of about 20 in the rolls of group B. Thus the total draft will be the product of these two 5×20 equals 100. This draft may be distributed so there will be a breaker draft of from 1.37 to 1.5 between the roll 18 and 19 while the remainder of the draft will be between rolls 19 and 20. In group B the breaker draft between rolls 25 and 26 will be from 1.02 to 1.5 while the remainder of the draft will be between rolls 26 and 27.

Suitable weighting means may be provided for the upper rolls such as 21 and 23, 28 and 30 which has not been illustrated but which will be sufficient to provide a good nip or grip upon the strand which is passing through the apparatus. Preferably the intermediate rolls 22 and 29 will be self weighted and of such character as to permit of some slip occurring along their surfaces. The slip arrangement of the intermediate rolls may be as shown in my co-pending application or may be of a usual character at these locations.

The strand which is to be drafted designated generally 60 extends from a suitable package vertically supported on the rear of the deck 10 and led to the feed rolls 18, 21 through some guide or trumpet 61 carried by a traverse bar 62 which is reciprocated to traverse the yarn or strand along the feed rolls.

In some cases a trumpet or guide 63 is provided between rolls 25, 28, and 26, 29, which may be in the form of a trumpet or funnel-like guide

also supported on a traverse bar 64 which may cause the yarn to be guided in its travel back and forth along the rolls to distribute the wear thereon. This trumpet arrangement 63 also serves to condense the fibers as they are being drawn in the second group of draft rolls B which may be advantageous in such yarns where the fibers are particularly unruly and tend to spread. I do not consider, however, that it is essential that a condenser be used.

After the yarn is delivered from the rolls 27, 30 it is taken up on a bobbin or package 65 being led thereto through a thread guide 66 and traveler 67 moving about a ring 68 which has a traverse motion along the package 65. Twist is placed into the yarn in a desired amount which runs back substantially to the delivery rolls, binding in all of the fibers and making a strong strand yarn, or thread for subsequent use.

I claim:

1. In a spinning apparatus, a group of three pairs of rolls for drafting the strand, a second group of three pairs of rolls adjacent said first group for drafting the strand located to receive the strand from the first group without intermediate feeding or contact, the delivery rolls of the preceding group and the receiving rolls of the succeeding group having substantially the same surface speed for transferring the strand from one group to the next group without draft, means for mounting the delivery rolls of the second group, a slide adjustable relative to said means for mounting the intermediate and feed rolls of said second group and the delivery rolls of the first group and a second slide adjustable relative to said means and the first slide for mounting the intermediate and feed rolls of said first group.

2. In a spinning apparatus, a plurality of drafting units positioned in tandem, each comprising pairs of front draft rolls, intermediate draft rolls and feed rolls, a slide for mounting the front lower draft roll of one unit and the lower feed and intermediate rolls of the adjacent unit, a second slide for mounting the lower intermediate and feed rolls in the unit of the said front lower draft roll, and means for mounting the lower delivery roll of the said adjacent unit, said slides being relatively movable for adjusting the spacing between the front draft roll and the intermediate draft roll of either unit without disturbing the spacing of the rolls of the adjacent unit.

3. In a spinning apparatus, a plurality of drafting units positioned in tandem, each comprising pairs of front draft rolls, intermediate draft rolls and feed rolls, a slide for mounting the front lower draft roll of one unit and the lower feed and intermediate rolls of the adjacent unit, a second slide supported on the first said slide for mounting the lower intermediate and feed rolls in the unit of the said front lower draft roll, and means for mounting the lower delivery roll of the said adjacent unit, said slides being relatively movable for adjusting the spacing between the front draft roll and the intermediate draft roll of either unit without disturbing the spacing of the rolls of the adjacent unit.

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