June 1, 1926. 1,586,735

B. DE A. FONSECA

DRAWING APPARATUS OF ROVING AND SPINNING FRAMES

Filed Jan. 9, 1925 2 Sheets-Sheet 1

Fig. 1.

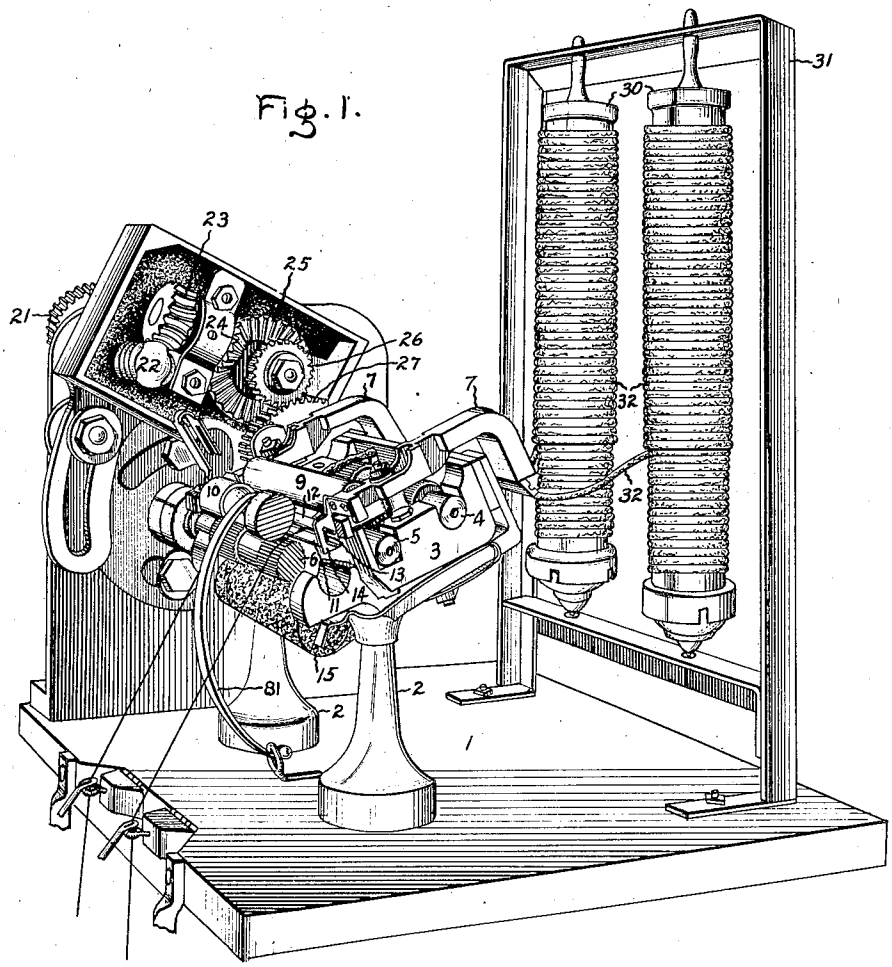
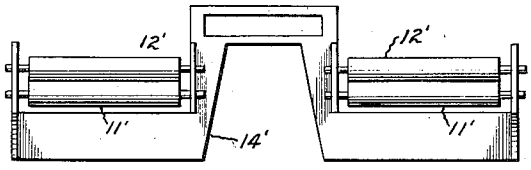


Fig. 4.



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Belizario DeAssis Fonseca,
by Edwin L. Rick
His Attorney.

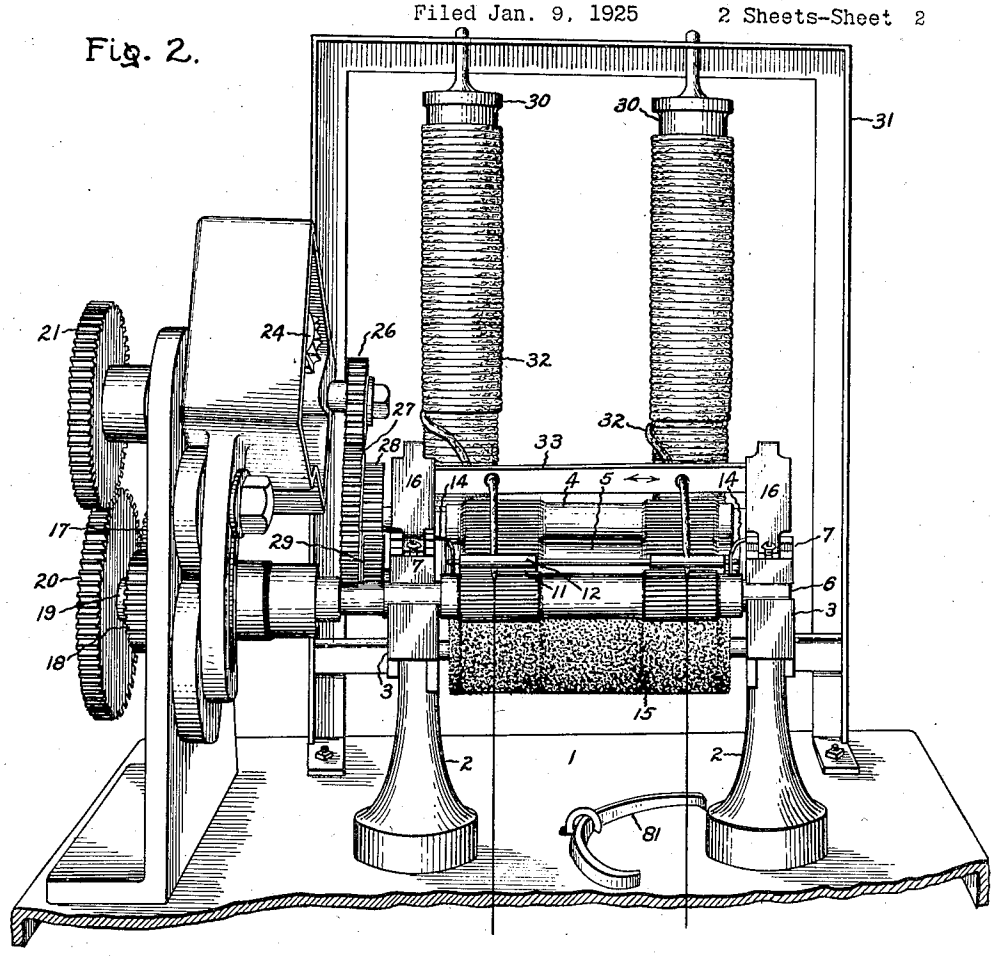
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Fig. 2.



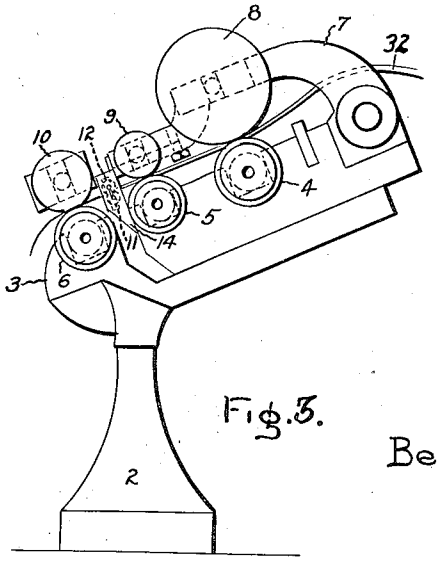


Fig. 3.

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Patented June 1, 1926. 1,586,735

UNITED STATES PATENT OFFICE.

BELIZARIO DE ASSIS FONSECA, OF SAO PAULO, BRAZIL.

DRAWING APPARAUS OF ROVING AND SPINNING FRAMES.

Application filed January 9, 1925, Serial No. 1,489, and in Brazil January 19, 1924.

My invention relates to textile mills, and particularly to the portion of such mills known as roving and spinning frames, both of which I shall designate as yarn frames.

In a textile mill, the final processes through which the yarn goes are known as those of roving and spinning, both of which consist primarily in drawing, twisting and winding. The roving process comprehends a series of machines called roving frames, all of similar construction, only differing as to the diameter of the roving which they are able to turn out. In the usual counts of yarn only three of these machines are used, namely, the slubbing, intermediate and fine roving frames, but when working with fine yarns, a fourth machine or jack frame is required. The spinning process is similar to the roving process preceding it, and consists as above, in drawing out the yarn to the count desired, twisting it and winding it upon bobbins. This process is done in a machine called a ring spinning frame.

Roving and spinning frames, as heretofore constructed, comprise a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, these rolls being positively driven at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased. Mounted above each of these rolls, there is a freely rotatable roll. These freely rotatable rolls are weighted and the yarn passes between the positively driven rolls and these freely rotatable rolls and is drawn therebetween. There is a slight draft between the back and middle roll and a large draft between the middle and front roll.

In both of these finishing processes it will be noted that the operation is that of drawing out the yarn, and getting it finer and finer until the requisite diameter of yarn is reached, and this repeition of similar operations is due, among other things, to the impossibility of increasing the long draft between the middle and front rolls in either the roving or spinning frames as heretofore constructed.

A great difference between the relative speed of the middle roll and the front roll in a roving or spinning frame, as heretofore constructed, tends to increase the proportion of the floating yarn fibers over those that are caught by the rolls, and so causes great irregularities in the roving or yarn, besides contributing to a large waste of fiber because those that are not caught by the rolls fall on the frame stands.

The number of these floating fibers might be reduced by decreasing the distance between the front and middle rolls, but the distance between them is governed by the length of the staple and cannot be reduced without decreasing the pressure between the positively driven and the freely rotatable rolls to avoid rupture of the fibers caught simultaneously by the adjacent rolls.

However, it is a fact long recognized that if the long draft could be increased in spinning and roving frames, it would improve and shorten considerably the finishing processes and would reduce time, labor and waste to a considerable extent.

My invention has for its object a novel construction of yarn frames, by which it is possible to increase the long draft of both roving and spinning frames. To this end I provide between the middle and front rolls of a yarn frame, as heretofore constructed and described above, a pair of idle freely rotatable rolls through which the yarn is drawn.

Other features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of my invention reference may be had to the following description taken in connection with the accompanying drawings in which Fig. 1 is a perspective view of a portion of a spinning frame with parts broken away, embodying my invention; Fig. 2 is a front view of the portion of the frame of Fig. 1 with the top rolls removed; Fig. 3 is an end view of the rolls and supports therefor of the frame of Fig. 1; and Fig. 4 is a view of a modified form of my freely rotatable rolls.

Referring to the drawings, I have shown my invention applied to a ring spinning frame. 1 is a frame on which are mounted uprights 2, which in turn carry roll stands 3 in which are mounted a plurality of positively driven fluted rolls 4, 5 and 6 arranged in a succession by which yarn is drawn over the rolls in sequence. These rolls are driven at different speeds by suitable gearing, each at a greater speed than the preceding one, whereby the draft on the yarn between suc-

cessive rolls is increased. The difference in speed between the back roll 4 and the middle one 5 is small, as the draft on the yarn between these rolls is slight, but the difference in speed between the middle roll 5 and the front one 6 is greater, in order to give a large draft to the yarn between these rolls. Mounted above each of these rolls on a pivoted top roll stand 7 is a freely rotatable roll, a large roll 8 above the roll 4, a small roll 9 above the roll 5 and a small roll 10 above the roll 6. The freely rotatable rolls 8, 9 and 10 are weighted and held in place by the member 81 and weight (not shown).

Mounted on the top roll stands 7 are a pair of freely rotatable rolls 11 and 12, the top surface of the bottom of these rolls 11 being in the same plane as the top surfaces of the adjacent rolls 5 and 6. These rolls 11 and 12 are of small diameter, say 2 to 6 millimeters, and are light in weight, being made of some light material, such as aluminum. These rolls are idle, that is, they are not driven except by the yarn passing between them.

The rolls 11 and 12 are supported in properly designed slots 13 in brackets 14, which are fastened to the top roll stand 7. The journals of the rolls 11 and 12 in the slots are made of steel. I have shown these rolls as being smooth, but if desired they may be made fluted in the same way as the rolls 4, 5 and 6.

The distance between the middle roll 5 and front roll 6 may be varied as is usual in spinning and roving frames. The distance between the corresponding freely rotatable rolls 9 and 10 may be similarly adjusted to correspond with the movement of rolls 5 and 6. In order to remove any fiber caught in the roll 6, a felt covered roll 15 is provided. A similar roll is mounted above roll 10 in brackets 16 fastened to the top roll stand 7.

The drive for the positively driven rolls is transmitted to a gear 17 which drives a gear 18 on a shaft 19 connected to the front roll 6. Mounted on this shaft 19 is a gear 20 which meshes with a crown gear 21 on the shaft of which is a worm 22, meshing with a worm wheel 23. The worm wheel 23 drives a shaft on which is a bevel gear 24 which meshes with a second bevel gear 25. Bevel gear 25 drives a shaft on which is draught gear 26, which meshes with back roll gear 27, which is on a shaft direct connected to the back roll 4. On this shaft there is also a second gear 28 which drives middle roll gear 29 through an intermediate gear (not shown). The gear 29 is on a shaft direct connected to middle roll 5.

The operation of the spinning frame is as follows:

Bobbins 30 made on roving frames are placed in the creel 31 of the ring spinning frame and the yarn 32 is guided over a polished rod (not shown) to the transverse motion rod 33 and then to the back roll 4 of the frame. The yarn 32 is then brought to the middle draft roll 5, suffering a very slight or break draft designed to open it up. In leaving the middle rolls, the yarn is then passed in between the small rolls 11 and 12, and from there to the front draft rolls, the speeds of the front and middle rolls being adjusted to give the desired long draft. The cylinders 11 and 12 have no motion of their own, but being free to rotate, are turned by the slight friction created by the yarn passing in between them, the weight of the top cylinder 12 giving enough pressure to hold the fibers and create the friction. These small cylinders 11 and 12 thus have a double action, for they not only guide, but hold all the floating fibers, that is, those that are not caught by either one of the draft rolls 4 and 5. By being free and unhampered in their rotation they are always able to be governed by the speed of the yarn being drawn, thus creating no possible disturbance in the draft process. By being placed in between the draft rolls, these cylinders have the effect of reducing the spread between those rolls, without releasing the pressure on the yarn, exerted by the freely rotatable weighted rolls.

It will be apparent to those skilled in the art that the rolls 11 and 12 may be readily added to standard roving and spinning frames, the necessary speed reducing gearing being added between the crown gear and the back roll gear of such standard frames.

Each of the rolls 11 and 12 is shown in Figs. 1 and 2 as having two bosses, one cooperating with one set of bosses on rolls 4, 5 and 6 and one bobbin 30, and the other with another set of bosses on rolls 4, 5 and 6 and another bobbin 30. The rolls 11 and 12 may, however, be made as shown in Fig. 4. In the construction shown in this figure, each of the rolls 11′ and 12′ has a single boss and is separate from the adjoining rolls 11′ and 12′, and each pair of rolls 11′ and 12′ cooperates with a single bobbin 30 and a set of bosses on rolls 4, 5 and 6. These rolls 11′ and 12′ are mounted in a bracket 14′, arranged to be fastened to the top roll stand carrying the freely rotatable weighted rolls.

The use of the freely rotatable rolls 11 and 12 simplifies very remarkably the roving and the spinning processes. By its property of allowing higher drafts than are practicable in roving and spinning frames, as heretofore constructed, it is possible to produce from a limited number of roving counts a larger variety of yarn counts, and in this way it also makes unnecessary the constant changes of roving bobbins in the creels, when changing the count of the yarn

being produced. The higher draft obtained makes it possible to use a fewer number of roving processes to produce any count of yarn, thus reducing the roving equipment of a textile mill. The use of these rolls also avoids the necessity of changing the distance between the middle and front draft rolls with every slight change in the length of the staple.

These advantages not only contribute to a large saving of time in the manufacturing process, but also tend to diminish greatly the waste caused heretofore by these processes, and the yarn produced is more uniform and stronger than that heretofore produced.

I have used the term "yarn" throughout the specification and claims in its broad sense to mean either "sliver," "roving" or the finished yarn.

I desire it to be understood that although I have illustrated the rolls 4, 5 and 6 and the rolls 11 and 12 as having only two bosses between roll stands, one boss for each spindle and bobbin, a large number of bosses between roll stands may be employed and I aim in the appended claims to cover such a modification as well as any other which does not depart from the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:—

1. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, and a pair of idle freely rotatable rolls mounted between the adjacent relatively high speed rolls of said succession and through which said yarn is drawn.

2. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, and a pair of idle freely rotatable rolls mounted between the adjacent relatively high speed rolls of said succession and through which said yarn is drawn, the top surface of the bottom of said freely rotatable rolls being in the same plane as the top surfaces of said adjacent rolls of said succession.

3. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, and a pair of idle freely rotatable rolls mounted between the adjacent relatively high speed rolls of said succession and through which said yarn is drawn, said freely rotatable rolls being light in weight.

4. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, and a pair of idle freely rotatable rolls mounted between the adjacent relatively high speed rolls of said succession and through which said yarn is drawn, said freely rotatable rolls being of small diameter.

5. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, and a pair of idle freely rotatable rolls mounted between the adjacent relatively high speed rolls of said succession and through which said yarn is drawn, the top surface of the bottom of said freely rotatable rolls being in the same plane as the top surfaces of said adjacent rolls of said succession, said freely rotatable rolls being light in weight.

6. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, and a pair of idle freely rotatable rolls mounted between the adjacent relatively high speed rolls of said succession and through which said yarn is drawn, the top surface of the bottom of said freely rotatable rolls being in the same plane as the top surfaces of said adjacent rolls of said succession, said freely rotatable rolls being of small diameter.

7. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, and a pair of idle freely rotatable rolls mounted between the adjacent relatively high speed rolls of said succession and through which said yarn is drawn, the top surface of the bottom of said freely rotatable rolls being in the same plane as the top surfaces of said adjacent rolls of said succession, said freely rotatable rolls being light in weight and of small diameter.

8. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different

speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, a pivoted top roll stand, freely rotatable rolls mounted in said top roll stand above said positively driven rolls, and a pair of freely rotatable rolls mounted on said top roll stand between adjacent positively driven relatively high speed rolls of said succession and through which said yarn is drawn.

9. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, a pivoted top roll stand, freely rotatable rolls mounted in said top roll stand above said positively driven rolls, and a pair of freely rotatable rolls mounted on said top roll stand between adjacent positively driven relatively high speed rolls of said succession and through which said yarn is drawn, the top surface of the bottom of said roll of said pair of freely rotatable rolls being in the same plane as the top surfaces of said adjacent positively driven rolls of said succession.

10. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, a pivoted top roll stand, freely rotatable rolls mounted in said top roll stand above said positively driven rolls, and a pair of freely rotatable rolls mounted on said top roll stand between adjacent positively driven relatively high speed rolls of said succession and through which said yarn is drawn, said pair of freely rotatable rolls being light in weight and of small diameter.

11. In a yarn frame, a plurality of rolls arranged in a succession by which yarn is drawn over the rolls in sequence, means for positively driving said rolls at different speeds, each at a greater speed than the preceding one whereby the draft between successive rolls is increased, a pivoted top roll stand, freely rotatable rolls mounted in said top roll stand above said positively driven rolls, and a pair of freely rotatable rolls mounted on said top roll stand between adjacent positively driven relatively high speed rolls of said succession and through which said yarn is drawn, the top surface of the bottom of said roll of said pair of freely rotatable rolls being in the same plane as the top surfaces of said adjacent positively driven rolls of said succession, said pair of freely rotatable rolls being light in weight and of small diameter.

In witness whereof, I have hereunto set my hand this twentieth day of December, 1924.

BELIZARIO DE ASSIS FONSECA.