

July 19, 1949.

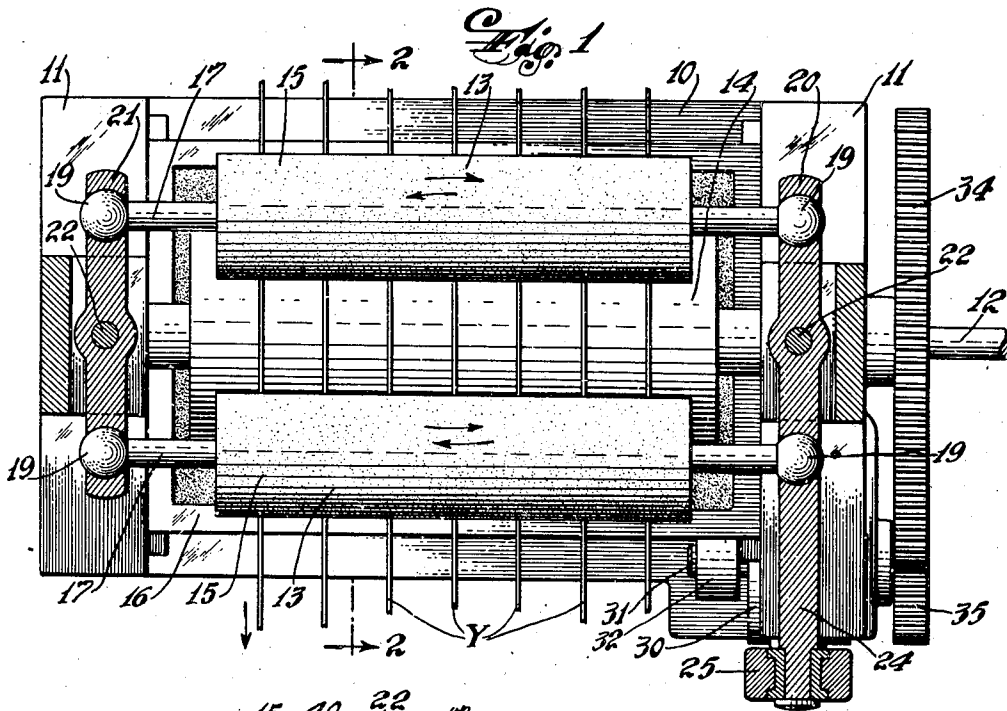
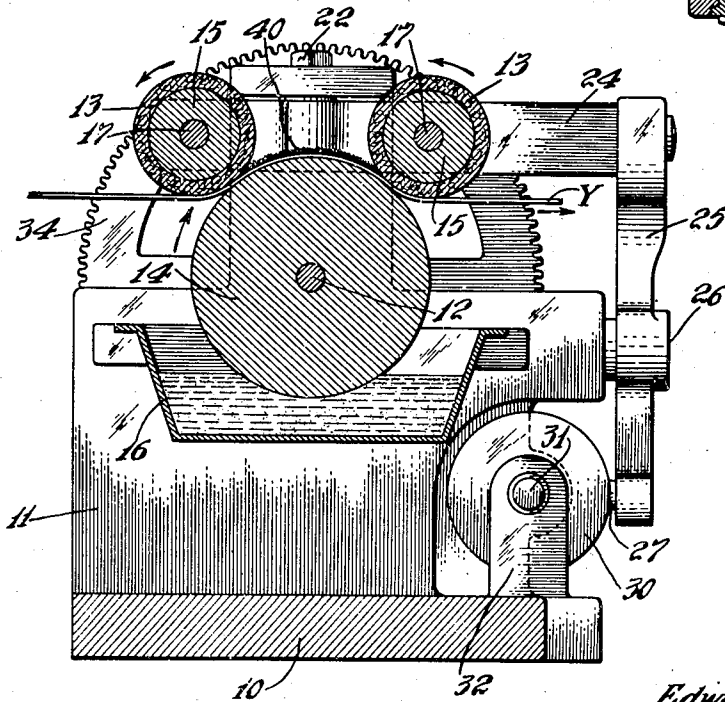
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YARN IMPREGNATING MACHINE

Filed June 17, 1947

2 Sheets-Sheet 1



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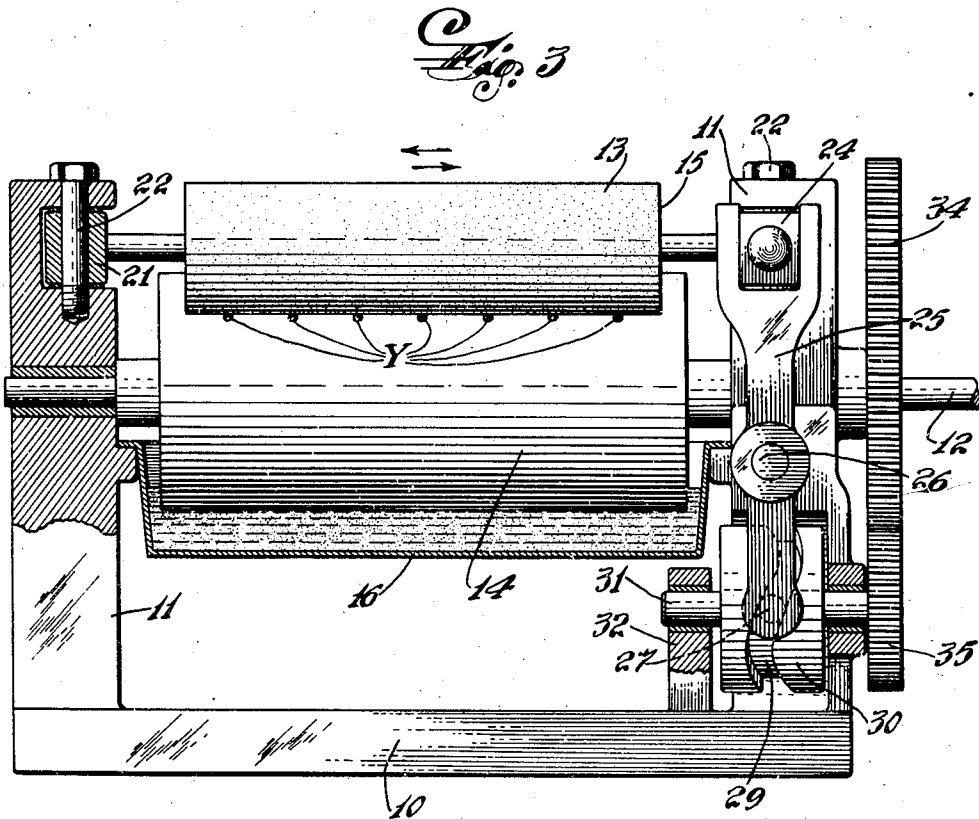
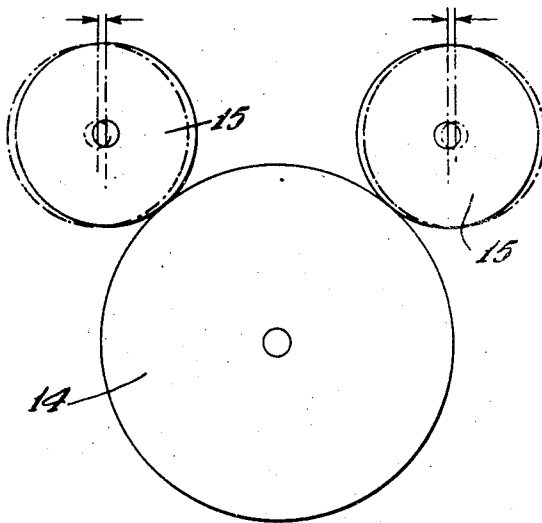
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2 Sheets-Sheet 2



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YARN IMPREGNATING MACHINE

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10 Claims. (Cl. 91—51)

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The present invention relates to a machine for impregnating yarn or the like, and more particularly to improvements in such machines wherein the yarn is subjected to operations acting to loosen its fibers to render the yarn more susceptible to complete impregnation.

An object of the present invention is to provide a machine for untwisting and twisting yarn repeatedly prior to and during its impregnation.

Another object is to provide such a machine wherein the rate of impregnation is increased, thereby enabling the yarn to be fed through the machine more rapidly.

Another object is to provide such a machine wherein the fibers are loosened in the presence of a surplus amount of impregnant while permitting entrapped air to diffuse outwards and impregnant to diffuse inwards.

A further object is to provide a relatively simple, practical and economical machine for accomplishing the foregoing objects and advantages.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings, forming a part of the specification, wherein:

Figure 1 is a plan view, partly in section, of an impregnating machine illustrating the present invention.

Figure 2 is a sectional view taken along the line 2—2 on Figure 1.

Figure 3 is an end view of the machine, partly in section and partly in elevation.

Figure 4 is a schematic view illustrating the action of the rollers on the yarn.

Referring to the drawings, and more particularly to Figures 1 to 3 thereof, there is shown a yarn impregnating machine comprising a base 10 and a pair of upright side frames 11 on the base each having a bearing for rotatably mounting a drive shaft 12 adapted to be driven by a suitable source of power (not shown). A roll 14 is keyed on the shaft 12 for rotation therewith, and a pair of idler rolls 15 having a soft covering 13 are supported above the roll 14 in rolling contact therewith by means about to be described and in a manner whereby yarn Y is adapted to be fed between the roll 14 and the rolls 15 as shown in Figure 2. A receptacle 16 adapted to contain impregnant is supported by the side frame 11 in a position whereby the underside of the roll 14

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passes through the impregnant and applies the same to the yarn passing between the rolls.

Each of the rolls 15 is supported by a shaft 17 each of which has its respective ends supported by means of a spherical bearing 19 on levers 20 and 21, respectively, constructed and arranged to support the shafts 17 in parallel relation with respect to each other and to the drive shaft 12. The levers 20 and 21 each are pivotally mounted for oscillation on the side frames by a pin 22 or the like extending therethrough (Figures 1 and 3).

The lever 20 has an extension arm 24 (Figure 1) suitably connected to one end of a rocker arm or lever 25 pivotally mounted on the frame 11 at 26 which has a cam follower 27 at its other end positioned in the groove 28 of a rotatable cam drum 30 on a shaft 31 mounted parallel to the drive shaft 12 between one of the side frames 11 and an upright bearing support 32 (Figure 3). Rotation of the cam drum is effected by a gear 34 on the drive shaft meshing with a gear 35 on the cam shaft 31. The cam drum effects rocking of the arm 25 which in turn oscillates the lever 20 and the lever 21 through the shafts 17, whereby the rolls 15 are moved back and forth endwise in an arcuate path.

In operation, as the rolls 15 move endwise in an arcuate path, they increase and decrease the pressure thereof on the roll 14 at the nips (Figure 4). At the end of the stroke, with the least endwise motion, the nips are the tightest, while at mid-stroke, with rapid endwise motion, the nips are the loosest. The yarn is fed between the nips in a lengthwise direction and is rotated or rolled in one direction when pinched at one of the nips due to increased pressure and is rotated or rolled in the other direction when pinched at the other of the nips. This tends to equalize the action on the yarn to give substantially uniform penetration of the impregnants throughout the length of the yarn.

While the arcuate motion is highly advantageous, equally successful results may be attained by reciprocating the pair of rolls 15 endwise in a straight line motion at a high frequency. By moving the rolls 15 back and forth endwise at a relatively rapid rate with respect to the lengthwise movement of the yarn, the yarn is alternately twisted and untwisted repeatedly as it is fed through the rolls.

Twisting of the yarn makes it more compact, while untwisting loosens the fibers, so that the above action causes the yarn to "breathe." This breathing action causes the entrapped air to be diffused outwards and the impregnant carried from the receptacle 16 by the roll 14 to diffuse inwards or penetrate into the loosened fibers. Impregnation further is improved by enabling a surplus of impregnant to be carried between the

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nips when loose and be supported on the upper surface of the roll 14 at 40 (Figure 2) between the pair of rolls 15. The surplus of impregnant provides for maximum absorption thereof by the yarn. Due to the efficient impregnation of the yarn, the yarn can be fed through the machine at relatively high speed.

The frequency of the endwise motion may be synchronized with the speed of the yarn in a lengthwise direction, whereby a point in the yarn untwisted between one of the nips will be twisted at the other nip, and vice versa.

In view of the foregoing description, it will be seen that the present invention provides an improved machine for impregnating yarn more rapidly and effectively in a simple and practical manner.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim:

1. In a yarn impregnator, the combination of a roll, a pair of rolls in rolling contact with said first roll and cooperating therewith to feed yarn therebetween, means for supplying impregnant to one of said rolls, and means for moving said pair of rolls back and forth endwise with respect to said first roll.

2. In a yarn impregnator, the combination of a roll, a pair of rolls in rolling contact with said first roll and cooperating therewith to feed yarn therebetween, means for supplying impregnant to one of said rolls, and means for moving said pair of rolls back and forth endwise with respect to said first roll and with respect to each other.

3. In a yarn impregnator, the combination of a roll, a pair of rolls in rolling contact with said first roll and cooperating therewith to feed yarn therebetween, means for supplying impregnant to one of said rolls, and means for moving said pair of rolls back and forth endwise with respect to said first roll and alternately in opposite directions with respect to each other.

4. In a yarn impregnator, the combination of a lower roll, a pair of upper rolls in rolling contact with said lower roll and cooperating therewith to feed yarn therebetween, a receptacle adapted to contain impregnant positioned to supply impregnant to said lower roll whereby impregnant is carried between said upper rolls, and means for moving said upper rolls back and forth endwise with respect to said lower roll.

5. In a yarn impregnator, the combination of a lower roll, a pair of upper rolls in rolling contact with said lower roll and cooperating therewith to feed yarn therebetween, a receptacle adapted to contain impregnant positioned to supply impregnant to said lower roll whereby impregnant is carried between said upper rolls, and means for moving said upper rolls back and forth endwise with respect to said lower roll and with respect to each other.

6. In a yarn impregnator, the combination of a roll, a pair of rolls in rolling contact with said

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first roll and cooperating therewith to feed yarn therebetween, means for supplying impregnant to said first roll, means for supporting said pair of rolls including a pair of pivotally mounted levers, and means for oscillating said levers to move said pair of rolls back and forth endwise in an arcuate path and with respect to said first roll.

7. In a yarn impregnator, the combination of a roll, a pair of rolls in rolling contact with said first roll and cooperating therewith to feed yarn therebetween, means for supplying impregnant to said first roll, means for supporting said pair of rolls including a pair of pivotally mounted levers, and means including a cam for oscillating one of said levers to move said pair of rolls back and forth endwise in an arcuate path and with respect to said first roll.

8. In a yarn impregnator, the combination of a roll, a pair of rolls in rolling contact with said first roll and cooperating therewith to feed yarn therebetween, means for supplying impregnant to said first roll, a pair of parallel shafts each supporting one of the rolls of said pair of rolls, a pair of pivotally mounted levers adjacent the ends of said shafts having arms each adapted for supporting an end of one of said shafts, and means for oscillating one of said levers to effect back and forth endwise movement of said shafts and said pair of rolls in an arcuate path and with respect to said first roll.

9. In a yarn impregnator, the combination of a roll, a pair of rolls in rolling contact with said first roll and cooperating therewith to feed yarn therebetween, means for supplying impregnant to said first roll, a pair of parallel shafts each supporting one of the rolls of said pair of rolls, a pair of pivotally mounted levers adjacent the ends of said shafts having arms each adapted for supporting an end of one of said shafts, means including a cam for oscillating one of said levers to effect back and forth endwise movement of said shafts and said pair of rolls in an arcuate path and with respect to said first roll, and driven means for effecting rotation of said first roll.

10. In a yarn impregnator, the combination of a roll, a pair of rolls in rolling contact with said first roll and cooperating therewith to feed yarn therebetween, means for supplying impregnant to said first roll, a pair of parallel shafts each supporting one of the rolls of said pair of rolls, a pair of pivotally mounted levers adjacent the ends of said shafts having arms each adapted for supporting an end of one of said shafts, means including a cam for oscillating one of said levers to effect back and forth endwise movement of said shafts and said pair of rolls in an arcuate path and with respect to said first roll, and driven means for effecting operation of said cam and rotation of said first roll.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,197,396	Price	Sept. 5, 1916
1,972,824	Danielson	Sept. 4, 1934
2,025,079	Whitehead	Dec. 24, 1935
2,398,516	Burgeni	Apr. 16, 1946