

Jan. 23, 1934.

K. B. COOK

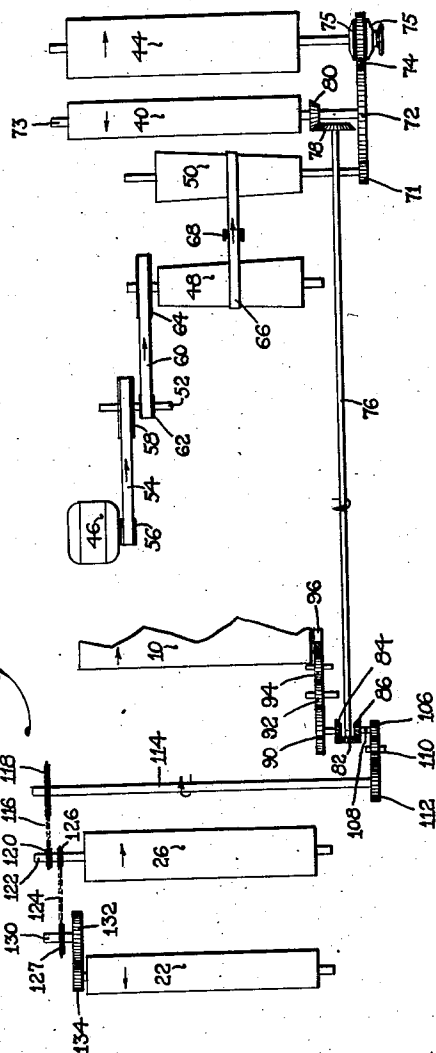
1,944,221

SLASHER

Filed April 5, 1933

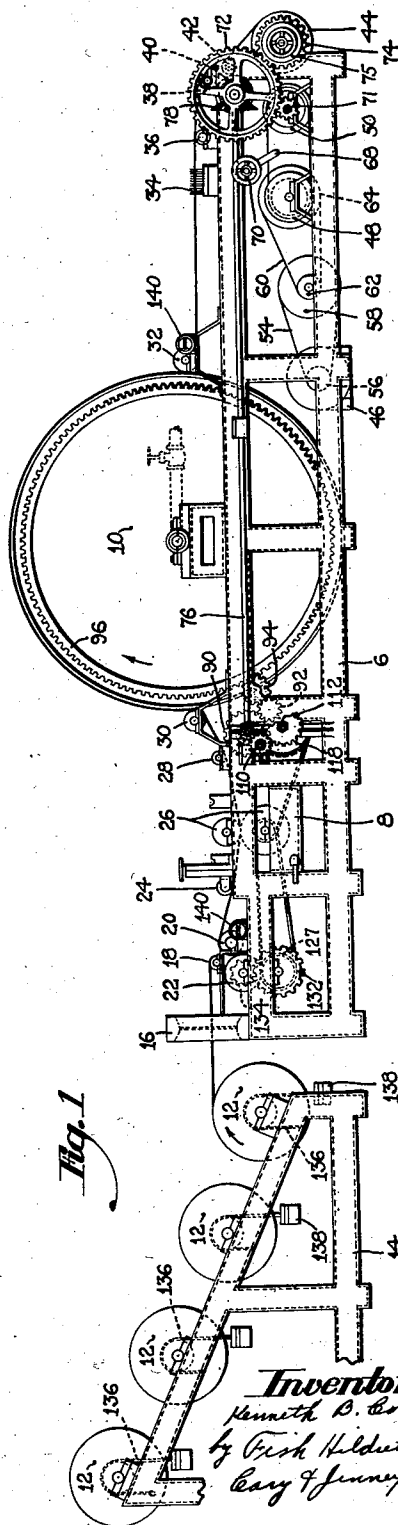
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Fig. 2



Witness
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Fig. 1



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Fig. 4

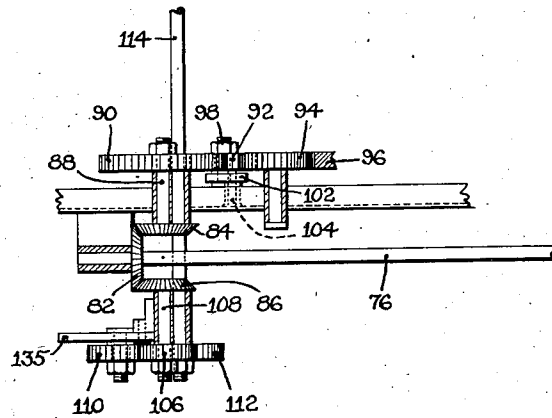
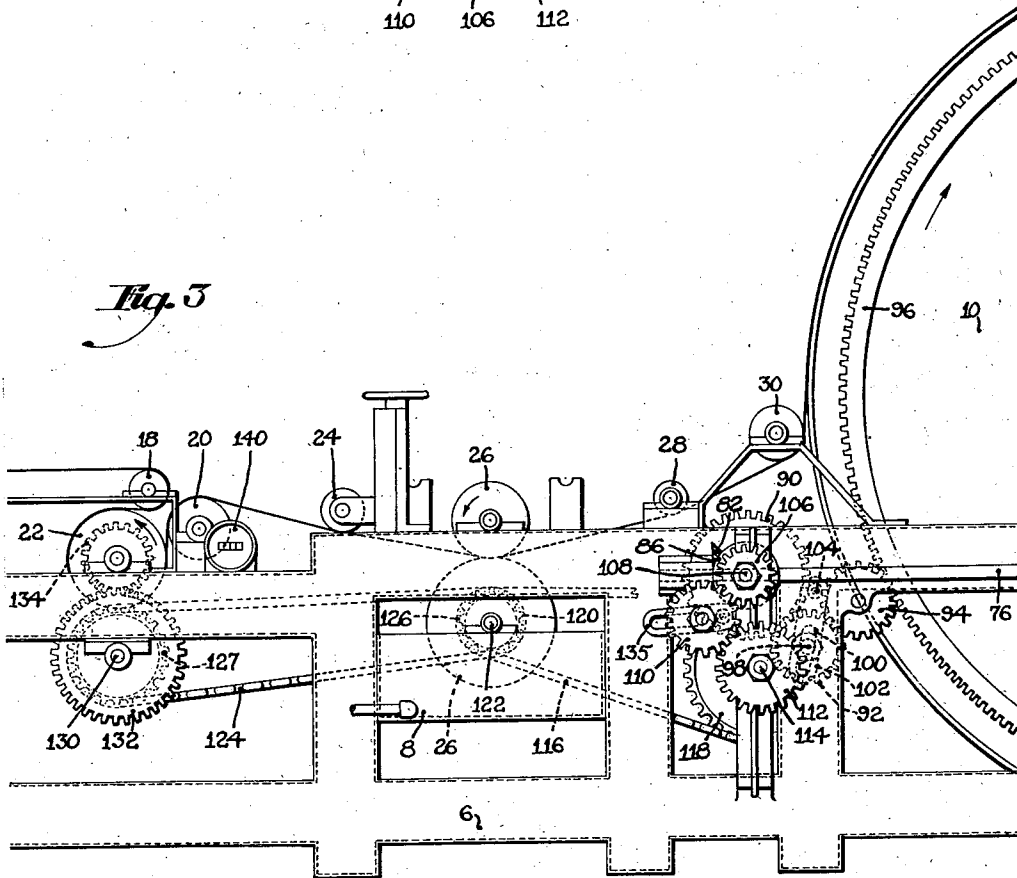


Fig. 5



Witness

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UNITED STATES PATENT OFFICE

1,944,221

SLASHER

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Application April 5, 1933. Serial No. 664,595

4 Claims. (Cl. 28—28)

The present invention relates to improvements in slashers, and more particularly to improvements in machines of this general type adapted for sizing warp threads of rayon or artificial silk.

5 With this type of machine as ordinarily constructed for handling cotton threads, it is customary to pass the threads from the rolls of a creel directly to the rotating rolls of the sizing device for the application of the sizing material. The threads are then passed around one or more drying rolls to a positively driven take-up or feed roll, and are wound onto a warp beam ready for use. While it is customary in machines of this type to impart a positive drive to the size rolls to assist in feeding the warp through the machine, it is well understood that no more than a slipping engagement is obtained between the threads and the moistened size rolls, so that the feed roll referred to operates as a master drive and provides the major portion of the pulling force for drawing the threads through the entire machine from the creel.

A slashing machine constructed and driven in this manner has been found unsatisfactory for handling rayon threads due primarily to the variation in tensile strength of the rayon threads when moistened which tends to produce an uneven and excessive amount of stretch in the threads. It has been found also that any variations in the tensioning strain exerted by the creel brakes are directly communicated to the moistened portions of the warp threads due to the tendency of the threads to slip between the sizing rolls, and result in considerable variation in the amount of stretch produced.

It is a principal object of the present invention to modify and improve the construction and mode of operation of a slashing machine of this general description adapted for handling rayon threads to positively control the amount of stretch imparted to the threads to provide a uniform stretch for the whole length of the threads wound onto the warp beam. With this and other objects in view, as may hereinafter appear, a principal feature of the invention consists in the provision of a supplementary feed roll which is arranged to positively engage and draw the threads from the creel prior to the application of the sizing material, so that any possible variations in the tension of the creel brakes are completely neutralized before the threads reach the sizing rolls.

Another feature of the invention consists in the provision of a differential driving means for positively driving the usual feed or take-up roll

and the additional feed roll referred to, at a predetermined differential rate to secure a uniform and accurately measureable amount of stretch of the warp threads as they are passed through the machine.

The several features of the invention consist also in the devices, combinations and arrangement of parts hereinafter described and claimed, which together with the advantages to be obtained thereby will be readily understood by one skilled in the art from the following description when taken in connection with the accompanying drawings, in which Fig. 1 is a view in side elevation of a slashing machine embodying the several features of the invention; Fig. 2 is a somewhat diagrammatic plan view of the machine drive; Fig. 3 is a detail view on an enlarged scale of a portion of the machine as shown in Fig. 1, to illustrate particularly the differential drive to the sizing rolls and to the feed roll for drawing the threads from the creel; and Fig. 4 is a detail plan view of the adjustable differential drive shown in Fig. 3.

As illustrated in the drawings, the machine comprises a long frame 6 on which is supported a size containing tray or tank 8 and a single large steam heated drying drum 10 of usual description. The threads or ends as they are generally known, pass from a number of beams or rolls 12 on a creel support 14 through a reed 16 around idler rolls 18 and 20 and a positively driven feed roll 22, past an adjustable guide roll 24 to the cooperating size rolls 26. From this point the warp threads are guided past idler rolls 28 and 30 over the drying drum 10, and are then carried past a guide roll 32, a comb 34, guide rolls 36 and 38 to a take-up feed roll 40, from whence the threads pass over a guide roll 42 to a warp beam 44 onto which they are wound ready for use.

Power for driving the machine may be supplied from any convenient source such as the electric motor 46 shown in Figs. 1 and 2 of the drawings, which is arranged to drive one of two oppositely tapered parallel rollers 48 and 50 of a variable speed control device for the machine through connections which comprise an idler shaft 52, a belt 54 mounted on pulleys 56 and 58 secured respectively to the armature shaft of the motor and to the idler shaft 52, and a belt 60 mounted on pulleys 62 and 64 secured respectively to the shaft 52 and to the supporting shaft for the roller 48. The roller 50 is driven from the roller 48 by means of a belt 66 which may be shifted lengthwise of the rollers to adjust the rate of feed of the warp threads by means of a belt shifter of

ordinary description indicated at 68 conveniently controlled by a hand wheel 70 on the side of the machine. The tapered roller 50 is connected to drive the take-up feed roll 40 by means of two spur gears 71 and 72 secured respectively to the supporting shaft for the roller 50 and to a drive shaft 73 which carries the feed roll 40. The wind-up roll or warp beam 44 is conveniently driven at the varying speeds required to wind the warp threads evenly and tightly onto the beam through a friction drive which comprises a gear 74 mounted concentrically with the warp beam 40 to mesh with the gear 72, and friction disks 75 engaging therewith supported to turn with the warp beam 40. Inasmuch as this driving mechanism as thus far described is substantially that found in the prior art, no further description of this mechanism is believed necessary.

In carrying out the present invention, driving mechanism is also provided for positively driving the drum 10 at substantially the same peripheral rate as the take-up feed roll 40, and for driving the size roll 26 and the feed roll 22 at a substantially lower rate, so that a very accurate control may be had of the amount of stretch imparted to the threads in their moistened condition between the point where the sizing material is applied and some point on the periphery of the drying drum 10 when they have been completely dried. This mechanism comprises a horizontal drive shaft 76 extending lengthwise of the machine, and at its forward end provided with a bevel gear 78 which meshes with a corresponding bevel gear 80 secured to turn with the take-up feed roll 40. At its rear end the drive shaft 76 carries a bevel gear 82 which meshes with two corresponding bevel gears 84 and 86. The drying drum 10 is driven at the required peripheral speed from the bevel gear 84 through connections comprising a rotatable shaft 88 on which the bevel gear 84 is carried, a gear 90 also secured to the shaft, an idler gear 92, and a pinion 94 which meshes with an external gear 96 mounted on one face of the drying drum 10. In order to permit an adjustment in the peripheral rate of speed of the drum 10 with relation to the take-up feed roll 40, the gear 90 is illustrated in the form of a take-off gear which may be readily replaced by a gear having a different driving ratio. To facilitate this adjustment, the pivot bearing 98 for the gear 92 is adjustably mounted in a slot 100 formed in a bracket 102 pivotally secured at 104 to the frame 6.

The size rolls 26 and feed roll 22 are positively driven at a slower rate from the drive shaft 76 through connections which comprise a gear 106 secured to a shaft 108 which also carries the bevel gear 86, an idler gear 110, and a gear 112 secured to the other side of the machine. The shaft 114 is connected to drive the lower size roll 26 through a sprocket chain 116 which passes over a sprocket 118 on the shaft 114 and a second sprocket 120 secured to a pivot shaft 122 which carries the lower size roll 26. The connections for driving the feed roll 22 from the shaft 114 comprise a sprocket chain 124 which passes over a second sprocket 126 secured to the shaft 122, and over a sprocket 127 secured to a stub shaft 130 which also carries a gear 132 arranged to mesh with a gear 134 secured to turn with the feed roll 22. For adjusting the peripheral speed of the feed roll 22 and size rolls 26 with relation to the drying drum 10 and take-up feed roll 40, the gear 112 is illustrated as a take-off gear which may be

readily replaced by another to secure any desired driving ratio. The idler gear 110 is adjustably supported in a slot in a bracket 135 pivotally mounted on the frame 6 to permit an adjustment in the position of this gear with relation to the pick-off gear 112.

In order to provide a sufficient amount of tension on the threads or ends of the warp as they are drawn through the machine, each one of the rolls 12 of the creel 14 is provided with a brake as indicated in Fig. 1, comprising a brake band 136 extending over the periphery of a friction disk connected to turn with the roll 12, and at one end secured to the machine frame and at its other end provided with an adjustable weight 138. As the thread is gradually wound from the beams 12, and the leverage exerted on the beams consequently becomes less, it is customary from time to time to decrease the amount of the weight 138 to maintain a substantially even tension on the threads.

In the operation of the machine constructed and arranged as above described and illustrated in the drawings, the rayon threads of the warp are engaged by and drawn off from the beams 12 by the positively driven feed roll 22 while still in a dried condition and at their full tensile strength. The threads or ends of the warp are tensioned against the action of the feed roll 22 by means of the brakes 136. With the present construction, the only function of the brakes 136 is to maintain a sufficient amount of tension for a gripping engagement of the warp with the feed roll 22 which then acts to positively control the feeding of the warp to the sizing rolls 26. Inasmuch as this tension may be varied within considerable limits without affecting the operation of the machine, a single adjustment of the strength of the brakes can be utilized which will require no further attention by the operator during the entire sizing operation.

The warp is now passed between the sizing rolls 26 which are driven at the same or a slightly faster rate than the feed roll 22 to assist in maintaining the required tension on the threads during the application of the sizing material. The threads are now passed over the drying drum 10 and around the take-up feed roll 40, from whence they are wound onto the warp beam 44 ready for use. As previously pointed out, the drying drum 10 and take-up feed roll 40 are driven at a substantially faster rate than the feed roll 22 and size rolls 26, so that the required amount of stretch is imparted to the threads while in their moistened condition between the point of application of the sizing material and some point on the drum 10 when the threads will have been fully dried out. With the present construction which embodies a positive control of the feed of the warp to the size rolls 26 and an equally positive control of the take-up action of the drum 10 and the take-up roll 40, the stretch applied is entirely independent of any variations of brake tension applied by the creel brakes 136, and also of any variations in elasticity of the tensile strength of the threads in their moistened state. A uniform product is thus secured which will be of equal thickness and strength throughout its length, which will allow an even permeation of dyes in later dyeing operations to avoid the streaking which inevitably results from variations in the stretch applied to different portions of the warp.

It is well known that the amount of stretch to be taken out of the warp threads has consider-

able to do with the quality of the finished woven cloth. Increasing the total length of the warp threads by stretching is an item to be considered from the cost standpoint, but if the threads are stretched too much, the cloth will appear harsh and wiry and probably streaky. For best results with rayon of the viscose type, a stretch of approximately 6% has been found desirable, and for acetate type yarns approximately 3%. The take-off gear 112 illustrated in Figs. 3 and 4 has therefore been chosen to secure substantially a 6% increase in the feeding rate of the drum 10 and take-up feed roll 40 over that of the feed roll 22 and size rolls 26. To enable the operator conveniently to check up on the amount of stretch given to the warp, counters 140 have been attached to the roll 20 and to the idler roll 32 to measure the length of warp passed through the machine at points located before and after the sizing operation.

The nature and scope of the invention having been indicated and a preferred embodiment thereof described, what is claimed is:

1. In a slasher, the combination of a beam onto which the threads are wound, a take-up feed roll, a drying drum, a sizing device, a creel, a feed roll interposed between the creel and said sizing device to engage a dry portion of the threads for positively drawing the threads from the creel, and means for positively driving said drum and said feed roll at a predetermined differential rate to secure a corresponding stretch in the threads moistened by said sizing device substantially between said sizing device and the point of contact of said threads with the drying drum.

2. In a slasher, the combination of a beam onto which the threads are wound, a take-up feed roll, a drying drum, a sizing device, a creel, a feed roll interposed between the creel and said sizing device to engage a dry portion of the threads for positively drawing the threads from the creel, driving means for positively driving said take-up

roll and said drum at substantially the same peripheral rate, and means for positively driving said feed roll at a substantially slower peripheral rate to secure a corresponding stretch in the threads while moistened by the sizing device substantially between said sizing device and the point of contact of said threads with the drying drum.

3. In a slasher, the combination of a beam onto which the threads are wound, a take-up feed roll, a drying drum, a sizing device comprising a size roll, a creel, a feed roll interposed between the creel and said sizing device for positively drawing the threads from the creel, driving means for positively driving the take-up roll and the drum at substantially the same peripheral rate, and driving connections for positively driving the size roll and the feed roll at substantially the same slower peripheral rate to secure a corresponding stretch in the threads moistened by said size roll substantially between said size roll and the point of contact of said threads with the drying drum.

4. In a slasher, the combination of a beam onto which the threads are wound, a take-up feed roll, a drying drum, a sizing device, a creel, a feed roll interposed between the creel and said sizing device to engage a dry portion of the threads for positively drawing the threads from the creel, driving means for positively driving said take-up roll at a predetermined peripheral rate, means for positively driving said feed roll at a predetermined slower peripheral rate, and means for maintaining the rotation of the drum at substantially the same peripheral rate as the take-up roll to secure a predetermined amount of stretch in the threads while moistened by the sizing device substantially between said sizing device and the point of contact of said threads with the drying drum.

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