July 3, 1928. 1,675,916

J. R. STEWART

METHOD OF AND MACHINE FOR BLENDING FIBERS

Filed March 7, 1927 3 Sheets-Sheet 1

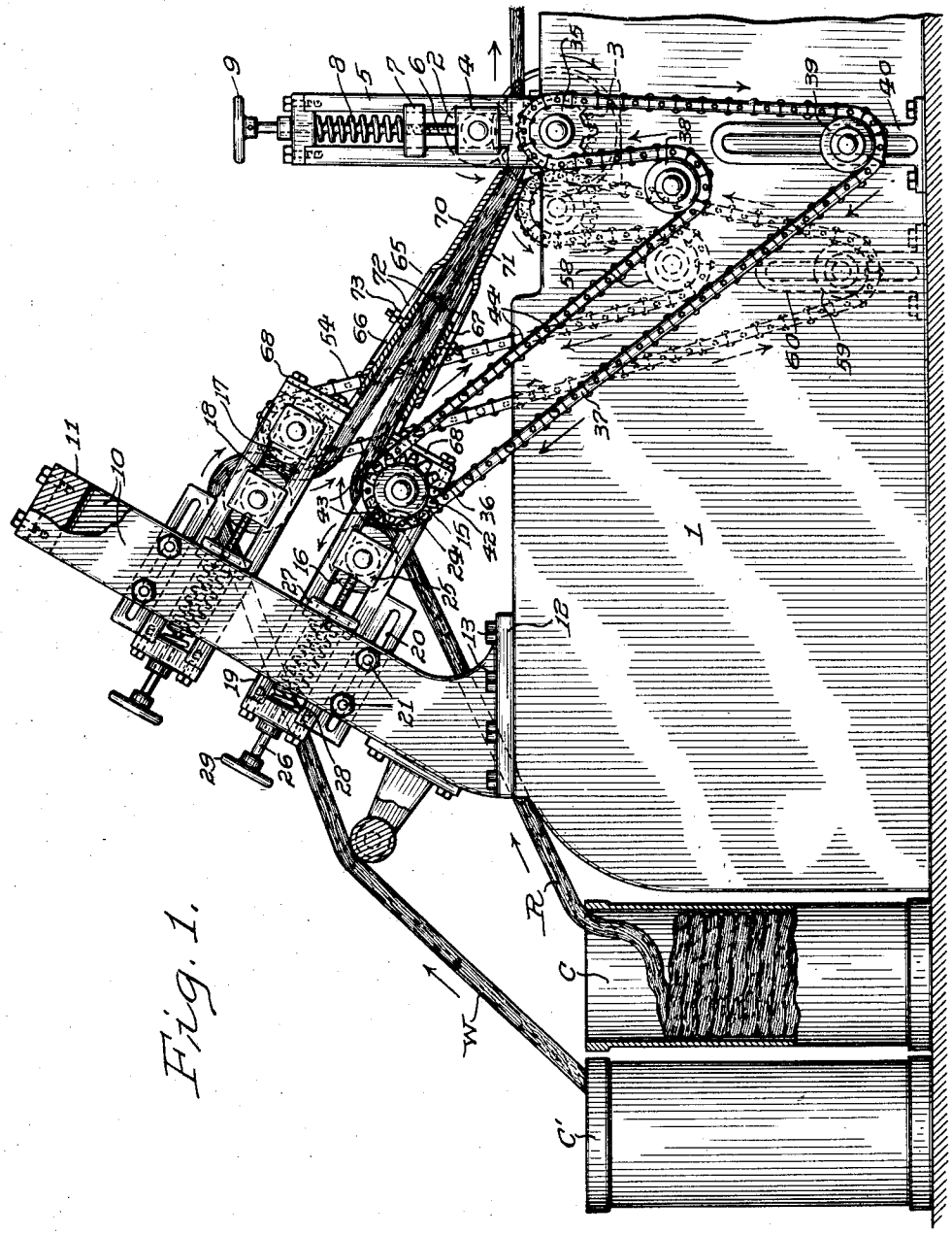


Fig. 1.

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Filed March 7, 1927 3 Sheets-Sheet 2

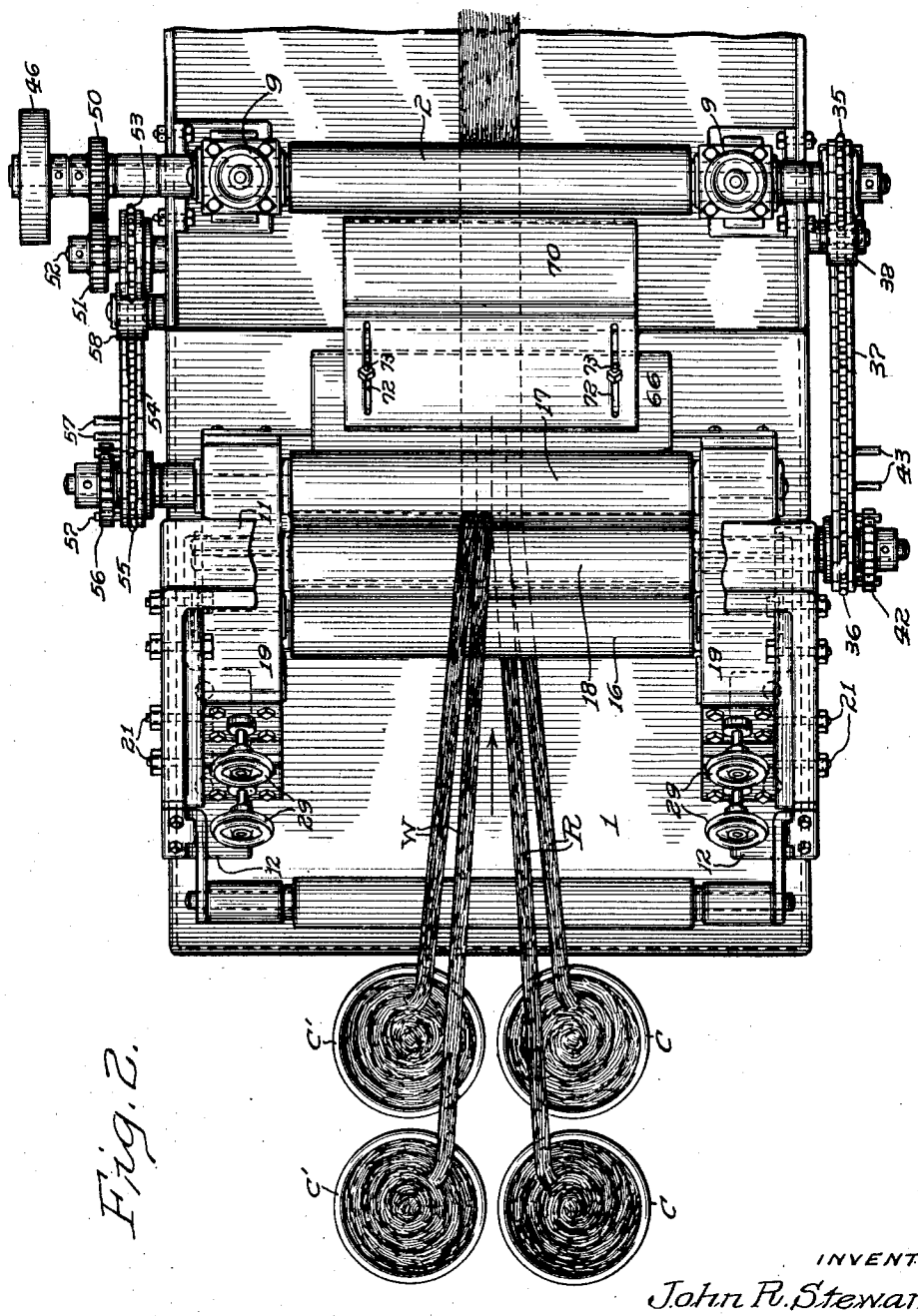


Fig. 2.

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Fig. 3.

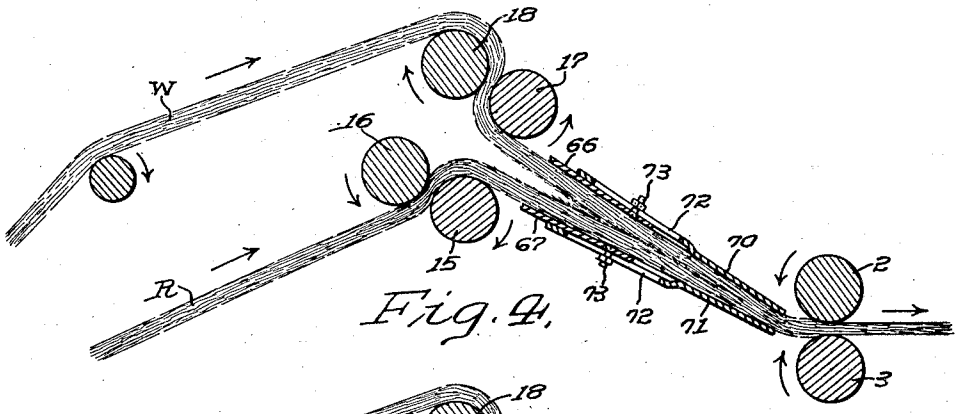


Fig. 4.

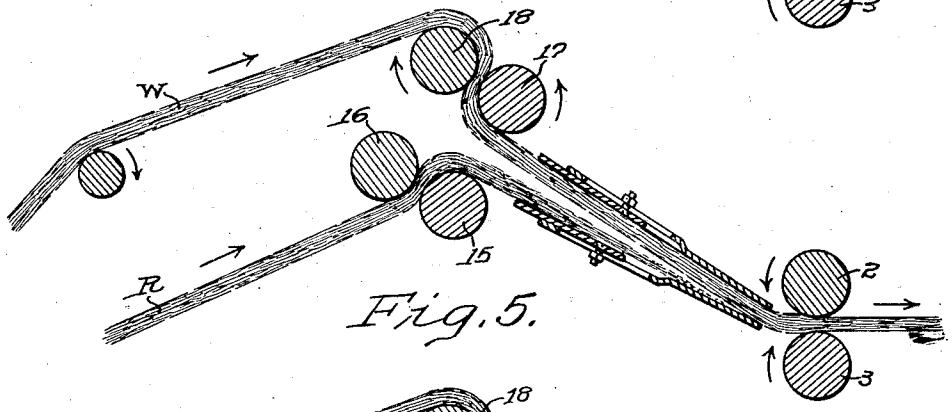
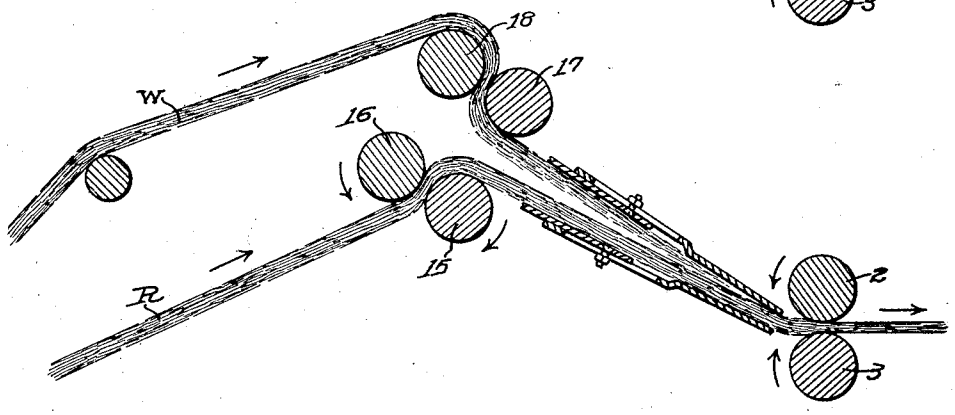


Fig. 5.



INVENTOR

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Patented July 3, 1928. 1,675,916

UNITED STATES PATENT OFFICE.

JOHN R. STEWART, OF RYDAL, PENNSYLVANIA.

METHOD OF AND MACHINE FOR BLENDING FIBERS.

Application filed March 7, 1927. Serial No. 173,227.

The ultimate object of the present invention is the production of a roving or a yarn composed of fibers of different characteristics or of different colors which can be successfully employed for weaving or like production of fabrics having a variegated or spotted effect. When the yarn so produced is composed of fibers having different characteristics and, in consequence, different affinities for dyes, the ultimate variegated or spotted effect on the fabric may be obtained by dyeing the fabric in a single dyeing operation where the dye used reacts differently on the different fibers, thus enabling the production of fabrics of the character aforesaid in fast colors; something which has not hitherto been commercially practicable as it has been only possible to obtain these variegated effects by applying the colors to the surface of the fabric, a method which does not produce fast colors. A somewhat similar variegated or spotted effect may also be produced in a fabric when yarn formed of different colored fibers blended in accordance with my improved method is employed, the fibers in such case being, of course, dyed prior to the blending operation as will hereinafter more fully appear.

In accordance with the usual practice in the manufacture of yarn the fibers from which yarn is to be made are first formed into continuous untwisted lengths known as "slivers"; a plurality of these slivers are then passed through a device known as a gill box or substantially similar apparatus by which they are combined into a single untwisted length known as a "top," which is thereafter spun into yarn.

Broadly considered, therefore, the present invention contemplates the mechanical blending in predetermined proportions or percentages of fibers of different characteristics or colors to form a top and more specifically, in accordance with the usual practice of the invention, the intermittent feeding of predetermined quantities of slivers of different characteristics or colors to the gill box so that the top as progressively formed thereby will consist of alternate lengths of fibers of different characteristics or colors blended longitudinally together at their meeting ends; thus when the top is thereafter spun into yarn the latter will similarly be composed of alternate or intermittent substantially predetermined lengths or zones of different characteristics or colors, and when woven into a fabric and dyed, will therefore produce a variegated or spotted effect through the different affinities of the different parts of the yarn for the dye or which will produce a somewhat similar effect without dyeing when the fibers themselves have been dyed in different colors prior to the blending operation.

A principal object of my invention, therefore, is to provide a novel method of mechanically blending a plurality of slivers having fibers of different characteristics or of different colors to thereby produce a top in which the fibers of each class are disposed in substantially predetermined lengths or zones whose ends are joined by the interlaced fibers of which they are composed.

A further object of the invention is to provide a machine for effecting the blending of the fibers in accordance with my improved method, said machine in its preferred embodiment being conveniently in the nature of an attachment which may be disposed in front of the feed rolls of the ordinary gill box or equivalent device by which the various slivers are formed into the top as they pass therethrough.

Further objects, advantages and novel features of construction and arrangement comprehended by my invention are hereinafter more fully set forth or will be apparent from the following description of one manner of performing my improved method of blending by means of a machine constructed in accordance with one embodiment of my invention and illustrated in the accompanying drawings in which Fig. 1 is a side elevation of the machine in operative association and combination with a gill box of ordinary construction, only so much of the latter, however, being shown as is requisite for an adequate understanding of the invention, and Fig. 2 is a top plan view thereof. Figs. 3, 4 and 5 are respectively diagrammatic views illustrating the operation of the machine as will hereinafter more fully appear.

The form of machine which I have chosen to illustrate is adapted for the feeding and blending of slivers composed of fibers of two different kinds or colors, for example, of undyed wool and rayon, and I shall therefore hereinafter refer to the slivers as being

composed of said materials, desiring it, however, to be distinctly understood that slivers of other materials or fibers of the same material which have been previously dyed in different colors may be used with equal facility, and further, that while for convenience I have merely shown four slivers, that is, two of wool and two of rayon in association with the machine, a greater or smaller number of slivers or, if desired, a different proportion of wool or rayon slivers in the total number utilized may be employed with equal facility.

Referring now more particularly to Figs. 1 and 2 of the drawings, the gill box 1 which provides a convenient point for the attachment of my machine, is provided with the usual transversely extending feed rolls 2 and 3, the latter being suitably held in fixed journals and driven in any convenient way. The upper feed roll 2 may be journaled at each end in a journal box 4 vertically slidable in a housing 5 and means provided for placing a yielding downward pressure on the roll, said means conveniently comprising a plunger 6 threaded through a sliding block 7 bearing at its lower extremity on the journal box and a coil spring 8 disposed about the plunger between the block and the upper end of the housing so that by rotating the hand wheel 9 the position of the block and in turn the extent of compression of the spring may be adjusted as desired so that the roll will be pressed downwardly with a predetermined pressure to thereby insure the proper feed of the slivers between the rolls. Further reference to the parts just described would be superfluous as they are commonly found in all gill boxes or equivalent devices.

In accordance with my invention I position in front of the gill box feed rolls and preferably somewhat above the plane of the same a plurality of pairs of transversely extending sliver feed rolls, each pair of which is operative to feed one or more slivers in the direction of the gill box feed rolls through a guide box interposed between the sliver feed rolls and the gill box feed rolls and I also provide means for driving one member of each pair of the sliver feed rolls when and as desired. To this end, therefore, I may provide a substantially U-shaped frame having side members 10, 10 and a transversely extending cross member 11, the side members being provided with bases 12, adapted to be secured to the gill box by bolts 13; preferably the side members of the frame are inclined forwardly and upwardly from their bases as best shown in Fig. 1 and are spaced apart sufficiently to span or substantially span the gill box feed rolls. The side members of the frame are respectively adapted to carry the housings and other parts associated with the feed rolls which are desirably substantially similar for each pair of rolls.

Thus for mounting the lower rolls 15, 16, I may secure to each of the side members of the frame an elongated housing 19 extending generally at right angles to the adjacent side member and thus directed downwardly and forwardly toward the gill box feed rolls. This housing is preferably arranged for longitudinal adjustment on the side frame member, conveniently by forming a longitudinally extending slot 20 in a suitable portion of the housing and securing the latter in position on the frame member by bolts 21 arranged to extend through the slot. Thus by loosening the bolts the housing may be moved bodily toward or away from the gill box feed rolls and thereafter secured in any desired position of adjustment by tightening up on the bolts.

The lower or forward feed roll 15 which is arranged to be positively driven as hereinafter described may have its shaft extended outwardly in opposite directions from its central or enlarged portion and supported in fixed journal boxes 24 adjacent the forward ends of the housings which latter, above the journal box, may be slotted and provided with sliding journal boxes 25 for the reception of the ends of the shaft of the rear or idler roll 16. Means are also provided for forcing the idler roll toward the driven roll with a yielding pressure, said means being conveniently substantially similar to that used for effecting a similar result with the idler gill box feed roll 2 and thus comprising in association with each housing a plunger 26 threaded through a slide block 27 and bearing at its forward end on the journal box 25 and a coil spring 28 surrounding the plunger between the rear end of the housing and the slide block, so that by rotating the hand wheel 29 at the outer end of the plunger the position of the slide block 27 may be changed to increase or decrease the compression of the spring and, in turn, the force with which the movable journal box is pressed toward the driven roll. The housings and associated parts supporting and controlling the upper pair of sliver feed rolls 17, 18 may, as stated, be of substantially similar construction, but disposed somewhat higher up on the frame.

For driving the driven rolls 15 and 17 I provide any suitable means but preferably of such character that they may be arranged to drive the rolls continuously for a predetermined time and then maintain them stationary for another predetermined time, said means also being adapted to permit the longitudinal adjustment of the sliver feed roll housings when desired without affecting the efficiency of operation of the drive. Thus since the driven roll of the gill box

feed roll forms a convenient source from which the drive of the sliver feed rolls may be effected, I may, for driving the roll 15, dispose a sprocket 35 on the end of the shaft of the gill box feed roll 3 and a corresponding sprocket 36 on the end of the shaft of roll 15 and lead thereover chain 37 disposing idlers 38 and 39 at suitable points to guide the chain. Preferably one of the idlers, as for example 39, may be adjustably supported on a bracket 40 so that when the position of the roll 15 is varied by adjustment of its housing the position of the idler may be correspondingly varied on its bracket so as to keep the chain at proper tension. The sprocket 35 is secured to its shaft so that the drive of the chain will be continuous at all times, but the sprocket 36 may be loose on its shaft and any suitable means provided for communicating the motion of the chain to the roll 15 when desired, said means conveniently comprising a sprocket 42 fixed to the shaft outside of the sprocket 36 and adapted for engagement by pins 43 or equivalent means carried by the chain. These pins are adapted to be secured to the chain at any desired points, conveniently by providing each link of the chain with an interiorly threaded hole 44 into which the end of one of the pins may be screwed so that the pin will project laterally from the chain and be in a position to engage the teeth of the sprocket 42 when carried thereagainst. Thus when a pin is inserted in each of the links the sprocket 42 and in turn the feed roll 15 will be continuously driven through coaction of the pins and the sprocket but if a number of pins are omitted at different points on the chain an intermittent motion will be communicated to the roll; consequently by suitably arranging the pins on the chain it is possible to drive the roll for a predetermined number of revolutions or interval and then allow it to remain stationary for another interval and then again set it in motion.

While the pin and sprocket arrangement is a convenient and simple one for effecting the intermittent drive of the roll to which I have just referred and is frequently in one form or another employed in textile machinery and the like and therefore well understood by those familiar with the art, any other means suitable for effecting the desired result may be used if preferred.

In a substantially similar manner the driven roll 17 may be actuated from the opposite end of the shaft of the feed roll 3 to which power is continuously supplied through a pulley 46 or in any other convenient way, but as feed roll 17 must be rotated in the opposite direction from the roll 15, a gear 50 may be mounted on the gill box feed roll shaft and arranged to mesh with another gear 51 on a suitably positioned stub shaft 52 to which is, in turn, secured a sprocket 53 over which passes the chain 54 which leads to a loose sprocket 55 on the shaft of roll 17 adjacent which is disposed a fixed sprocket 56 corresponding to sprocket 42 and adapted for engagement by pins 57, carried by the chain 54, in the same way that sprocket 42 is engaged by pins 53. Chain 54 may also be led over idlers 58 and 59, which latter may be adjustably mounted on a bracket 60 so that the proper tension may be maintained upon the chain when the housings supporting roll 17 are longitudinally adjusted. It will thus be apparent that the feed rolls 15 and 17 will be driven in opposite directions at the same speed, the size of the several sprockets being suitably determined to effect this result, and by suitable arrangement of the pins or the equivalent devices carried by the chains either roll can be selectively caused to revolve or to remain stationary at predetermined intervals.

For guiding and to some extent forcing the several slivers into intimate engagement with each other as they emerge from their respective feed rolls in their passage to the gill box feed rolls, I interpose between the latter and the sliver feed rolls a device which I may term a guide box and which is generally designated as 65. This device may preferably comprise a pair of oppositely disposed transversely extending plates 66 and 67 provided at their rear ends with outwardly directed flanges 68 which are respectively bolted to the forward faces of the sliver feed roll housings in such manner that the plates are spaced apart for a suitable distance which ordinarily at the forward ends of the plates will be approximately equal to twice the thickness of the slivers which are to be fed through the machine. The plates are preferably inclined slightly toward each other so they are most nearly adjacent at their forward ends and preferably terminate about midway between the sliver feed rolls and the gill box feed rolls, and as it is desirable that the guiding and compressing action of the guide box upon the slivers be continued to a point closely adjacent the gill box feed rolls, I adjustably secure to the plate 66 a nose plate 70 and to plate 67 a corresponding nose plate 71 which form prolongations of the main plates and, by means of the inclination of the latter, approach quite closely together at their forward ends, the distance between them at this point ordinarily approximating the thickness of a single sliver. To facilitate adjustment of the nose plates on the main plates I may provide the former with slots 72 through which bolts 73 by which the nose plates are held in position on the main plates are extended so that by loosening the bolts the nose plates may be projected or retracted with relation to the

main plates and secured in any desired position thereon. This capacity for adjustment of the nose plates is of advantage since it is desirable, under most conditions of operation, that the forward end of the guide box be disposed quite closely adjacent the gill box feed rolls; hence when the sliver feed roll housings are adjusted longitudinally on the frame, corresponding adjustment of the nose plates of the guide box is ordinarily required to maintain this desired relation between the guide box and the gill box feed rolls.

Reference will now be made to the operation of forming, in accordance with my improved method and by means of a machine constructed substantially as hereinbefore described, a top comprising alternate longitudinally extending zones or regions of wool and rayon by the employment of two slivers of each of said materials, it being of course understood that a greater or less number could be utilized with equal facility or that the relative ratio between the total number of slivers of wool and of rayon could be varied if desired.

The rayon slivers R are ordinarily brought to the machine in suitable containers C—C and the wool slivers in other containers C′—C′ which are arranged in front of the gill box so that the slivers can be conveniently drawn from them. The leading ends of the wool slivers are now carried between one of the sets of sliver feed rolls, for example the upper set, and the leading ends of the rayon slivers through the other or lower set and from thence all of said leading ends carried forward through the guide box and inserted between the feed rolls 2, 3 of the gill box. This operation may be either initially carried out by hand or by setting the various driven rolls in motion and then feeding the ends of the slivers between them and properly guiding them into the guide box and through the gill box feed rolls as will be readily understood by reference to Fig. 3. Additionally, the pressure exerted by the various idler rolls 16, 18 and 2 which are ordinarily covered with rubber or like frictional and more or less resilient material, is suitably adjusted to properly feed the various slivers so that when all of the feed rolls are in motion the wool slivers will be fed through the rolls 17, 18 and the rayon slivers through the rolls 15, 16 to merge together in the substantially funnel shaped guide box and thence pass to the gill box feed rolls 2, 3 by which they are pressed together and projected forwardly for subjection to the other operations incident to their conversion into a top and which form no part of the present invention, said operations being performed by any suitable known means in the ordinary way.

So long as the feed of all of the slivers is continued as just described the finished top will, of course, be composed of the same percentages or proportions of wool and rayon as are contained in the slivers being drawn from the containers C, C′ or, in the present example, 50% wool and 50% rayon. When, however, it is desired to produce ultimately a yarn having first a zone or length of wool and then a zone or length of rayon and then another of wool and so on, the sliver feed rolls will be respectively operated intermittently so that for a predetermined interval only the wool slivers will be fed to the gill box feed rolls and thereafter for another predetermined interval only rayon will be fed to said rolls so that the finished top will be composed of alternate but united lengths or zones first of wool and then of rayon. As the top, or a plurality of the tops so formed are gradually drawn down into progressively thinner rovings in the usual way preparatory to being spun into yarn on the spinning frame, the wool and rayon or other distinctive materials originally employed are to some extent blended and mixed so that they will not appear in the finished yarn in distinct, equally spaced zones, but in zones of different lengths containing different proportions of said materials. However, in a given number of yards of the yarn a mean average of said materials corresponding generally to the percentages thereof originally used to form the top will occur, so that when the yarn is dyed, or if said materials were originally of different colors, a variegated effect will be produced with a corresponding mottled or variegated effect in the cloth into which the yarn is later woven.

It will, of course, be understood that the motion of each pair of sliver feed rolls and, in consequence, the feed of the slivers therethrough, is controlled by the positioning of the pins or other driving devices carried by the chain through which the drive of the driven roll of that pair is effected and that the said pins will therefore be arranged in accordance with the particular result which it is desired to produce in the top. Thus, for example, to produce a top having alternate but similar zones of equal length first of wool and then of rayon, the pins will be so arranged as to drive the upper feed rolls for a predetermined interval while the lower feed rolls are stationary and then to drive the lower rolls for a like interval while the upper rolls are stationary, while if unequal lengths or zones of the two materials are desired in the top, the pins will be so arranged as to keep one pair of the sliver feed rolls in motion for a longer time than the other pair.

So long as either pair of sliver feed rolls is in motion the slivers being fed by that particular pair of rolls continuously move the

guide box and between the gill box feed rolls as the latter draw the sliver ahead, but upon a stoppage of the sliver feed rolls the friction thereof upon the slivers prevents the latter from being drawn forward bodily by the continuously revolving gill box feed rolls with the result that the sliver is torn apart at some point between the sliver feed rolls and the gill box feed rolls, the fibers of which the sliver is composed gradually separating longitudinally somewhat as indicated in Figs. 4 and 5 of the drawing, so that after the break occurs the leading ends of some of the fibers still extend well into the guide box and lie adjacent the forwardly moving slivers coming from the other pair of sliver feed rolls which are still in motion. When the previously arrested set of sliver feed rolls are again thrown in motion so as to again urge the broken off slivers forwardly, the fibers of the leading ends of the latter readily unite and intertwine with and are carried along by the fibers of the slivers of the other material which are still passing forwardly from the other pair of rolls so that when, in turn, these latter rolls ars stopped, the flow of slivers through the guide box to the gill box feed rolls is uninterrupted. Under certain conditions of operation, however, and with particular kinds of slivers, more especially those whose fibers are relatively short, it may be found desirable to allow the motion of both pairs of sliver feed rolls to overlap a little instead of stopping one pair at exactly the same time that the other pair is started, thus definitely insuring a continuity of feed and avoiding any interruption of flow of the slivers to the gill box feed rolls or material thinning out or attenuation of the body of fibers which pass therefrom to form the top.

As the length of the fibers of which the slivers are composed varies with different materials, it is ordinarily desirable to adjust the position of the sliver feed rolls in accordance with the length of the fibers in the slivers which are being fed so that when the sliver feed rolls are stopped the fibers forming that part of the slivers then between them and the gill box feed rolls will be drawn apart or separated longitudinally by the operation of the latter without breaking or tearing apart the fibers themselves. Thus when a sliver whose fibers are relatively long is to be fed, the sliver feed rolls may be moved farther away from the gill box feed rolls than when a shorter fiber is being used as the distance between the sliver feed rolls and the gill box feed rolls should always preferably exceed or substantially exceed the length of the fibers. On the other hand, it is also desirable to keep the sliver feed rolls as near the gill box feed rolls as possible to insure the uniting and intertwining of the leading ends of the fibers of one set of slivers with the other and forwardly moving set when the forward feed of the first set is resumed so that the latter will be carried along to the gill box feed roll, and it will thus be apparent that under ordinary conditions of operation the sliver feed rolls should be kept as near the gill box feed rolls as they can conveniently be without causing the breaking or tearing apart of the fibers when the slivers are separated following a stoppage of their feed rolls. In passing it may be noted that in the accompanying drawings no attempt has been made to illustrate any particular setting of the pins 43 and 57 on the chains; instead I have merely shown enough of said pin, and these positioned more or less at random, to explain their function and operation, since in practice their precise number and arrangement will necessarily vary, as hitherto pointed out, in accordance with the result it is desired to produce.

While I have herein referred more particularly to a machine embodying but two pairs of sliver feed rolls it will be apparent that a greater number thereof may be readily embodied in the machine if desired so that three or more sorts of slivers may be fed either simultaneously or selectively so as to produce a top composed of a corresponding number of different kinds of fibers, and further, that irrespective of the particular number of different kinds of slivers employed the percentages or proportions of the various materials in the resultant top and the particular disposition of said materials therein will be determined and can be readily varied by the arrangement of the driving pins or equivalent devices through which the motion of the sliver feed rolls is controlled.

Moreover, while I have herein described and illustrated with considerable particularity one form of machine which is satisfactorily operative for the performance of my improved method of blending fibers, I do not thereby desire or intend to confine myself to the performance of the said method by the use of a machine of that particular form nor to any precise details of construction or arrangement of the various parts of said machine as the latter may be modified and varied in numerous particulars if desired without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described my invention, I claim and desire to protect by Letters Patent of the United States:

1. The method of blending fibers of different characteristics when formed in separate continuous slivers into a continuous composite sliver adapted to be formed into a top, which comprises the steps of mechanically feeding the different kinds of slivers separately but progressively in the same di-

rection, bringing the moving slivers into intimate contact with each other, and then selectively arresting and resuming the feed of predetermined slivers for definite periods while continuing the feed of the other slivers.

2. The method of blending fibers of different characteristics formed in separate continuous slivers into a continuous composite sliver adapted to be incorporated in a top, which comprises the steps of mechanically progressively feeding the different kinds of slivers separately but in the same general direction, bringing all of the slivers into intimate contact and directing them through a pair of draft rolls, then arresting the feed of all of the slivers of a given kind and allowing the draft of said rolls to effect a longitudinal separation of the fibers of said slivers, continuing the feed of other of the slivers for a predetermined interval, and then resuming the feed of the arrested slivers.

3. The method of blending fibers of different characteristics formed in separate continuous slivers into a continuous composite sliver adapted to be formed into a top, which comprises the steps of mechanically progressively feeding the different kinds of slivers separately but in the same general direction, bringing all of the slivers into intimate contact and directing them through a pair of draft rolls, then arresting the feed of all of the slivers of a given kind and allowing the drafts of said rolls to effect a longitudinal separation of the fibers of said slivers, continuing the feed of other of the slivers for a predetermined interval, then resuming the feed of the arrested slivers, and in like manner arresting the feed of other of the slivers.

4. The method of mechanically blending a plurality of slivers formed of fiber having different characteristics to form a continuous top having alternate longitudinally extending zones of fibers having correspondingly different characteristics, which consists of feeding the different slivers into the top forming machine in intimate relation with each other, and then selectively arresting the feed of all of the slivers having the same characteristics for a predetermined period while continuing the feed of the other slivers, then resuming the feed of said arrested slivers and substantially contemporaneously therewith arresting the feed of all of the slivers having a different characteristic with resulting production of a continuous sliver.

5. The method of blending fibers to form a top having longitudinally extending connected zones of different kinds of fiber, which consists in mechanically feeding to the top forming machine various kinds of fibers formed in continuous slivers and selectively arresting the feed for predetermined intervals of all of the slivers of a given kind while continuing the feed of the other slivers, thereby preventing passage to the top forming machine for predetermined intervals of the slivers of a given kind of fiber.

6. The method of blending fibers of different characteristics when formed in separate continuous slivers into a continuous composite sliver prior to its introduction to a top forming machine, which comprises the steps of initially feeding said slivers to a pair of rolls simultaneously, then arresting the feed of one of said slivers to cause longitudinal separation of the fibers thereof by the draft of said rolls while continuing the feed of the other slivers for a predetermined interval, and then resuming the feed of the first sliver in conjunction with the other slivers.

7. The method of blending fibers of different characteristics when formed in separate continuous slivers into a continuous composite sliver prior to its introduction to a top forming machine, which comprises the steps of initially simultaneously feeding a plurality of said slivers to a pair of rolls, then arresting the feed of one of said slivers of a given characteristic to cause longitudinal separation of the fibers thereof by the draft of said rolls while continuing the feed of the other slivers, maintaining the first mentioned sliver stationary for a predetermined interval, then resuming the feed thereof in conjunction with the other slivers, and then arresting the feed of another of said slivers while that of the first mentioned sliver is continued.

8. In a machine of the class described, the combination of a pair of feed rolls adapted for continuous rotation, a plurality of pairs of feed rolls disposed adjacent thereto, means for driving each of said last mentioned pairs of rolls independently, and means interposed between said feed rolls and the driven rolls for guiding material fed by said driven rolls to said feed rolls.

9. In a machine of the class described, the combination of a pair of feed rolls adapted to be continuously driven, a plurality of pairs of feed rolls disposed in front of said first mentioned rolls, independent driving means for each of said pairs of rolls, and means operable with each of said driving means to effect an intermittent drive of said pairs of rolls selectively.

10. In a machine of the class described, the combination of a gill box having a pair of feed rolls adapted for continuous rotation, a plurality of pairs of sliver feed rolls disposed in front of said gill box feed rolls, means for driving each of said pairs of sliver feed rolls independently, and a guide box interposed between said sliver feed rolls and said gill box feed rolls adapted to guide material to said gill box feed rolls as said

material is fed in the direction of the gill box rolls by said sliver feed rolls.

11. In a machine of the class described, the combination of a gill box having a pair of feed rolls adapted for continuous rotation, a plurality of pairs of sliver feed rools disposed in front of said gill box feed rolls, means for driving each of said pairs of sliver feed rolls independently, and a guide box interposed between said sliver feed rolls and said gill box feed rolls adapted to guide material to said gill box feed rolls as said material is fed in the direction of the gill box rolls by said sliver feed rolls, said guide box comprising upper and lower opposed members respectively inwardly inclined toward each other.

12. In a machine of the class described, the combination of a gill box having a pair of feed rolls adapted for continuous rotation, a frame disposed in front of said rolls, a plurality of pairs of sliver feed rolls supported from said frame, means for driving each pair of sliver feed rolls separately and operable to effect continuous or intermittent rotation of said rolls, and a guide box interposed between said sliver feed rolls and said gill box feed rolls operative to guide material to the gill box feed rolls as said material is progressively fed through said sliver feed rolls.

13. The combination with a gill box having a pair of feed rolls adapted for continuous rotation, of a frame disposed in front of said feed rolls, a plurality of pairs of sliver feed rolls disposed adjacent said frame and parallel to the gill box feed rolls, means for supporting said sliver feed rolls from the frame and adapted for adjustment with respect thereto to enable the distance between the sliver feed rolls and the gill box feed rolls to be varied, independent driving means for each of said pairs of rolls operable to drive said rolls intermittently, and a guide box carried by said supporting means and interposed between said sliver feed rolls and said gill box feed rolls operative to direct material progressively fed by said sliver feed rolls to said gill box feed rolls.

14. The combination with a gill box having a pair of feed rolls adapted for continuous rotation, of a frame disposed in front of said rolls, a plurality of pairs of sliver feed rolls disposed adjacent said frame, means for supporting each pair of said rolls independently on the frame and operable to adjust the distance between said rolls and the gill box feed rolls, a guide box interposed between said sliver feed rolls and said gill box rolls adapted to receive material as it is fed from said sliver feed rolls and direct it between said gill box feed rolls, and means for driving each of said pairs of rolls independently, said means being selectively adjustable to effect either continuous or intermittent revolution of each of said pairs of sliver feed rolls.

15. The combination with a gill box having a pair of feed rolls and means for positively driving one of said rolls, of a frame disposed in front of said rolls, a plurality of pairs of sliver feed rolls disposed adjacent the frame, means for adjustably supporting each pair of sliver feed rolls from the frame, guiding means interposed between the sliver feed rolls and the gill box rolls adapted to guide material to the latter as delivered by the former, chains respectively extending from said positively driven feed roll to one of each pair of sliver feed rolls, and means carried by each chain and cooperative with means carried by the sliver feed roll to which the chain extends operable to effect either continuous or intermittent rotation of said roll.

In witness whereof, I have hereunto set my hand this third day of March, 1927.

JOHN R. STEWART.