April 10, 1956 W. DRAUDT 2,741,150

TAKE-UP MECHANISM FOR BRAIDING MACHINES

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Fig. 1.

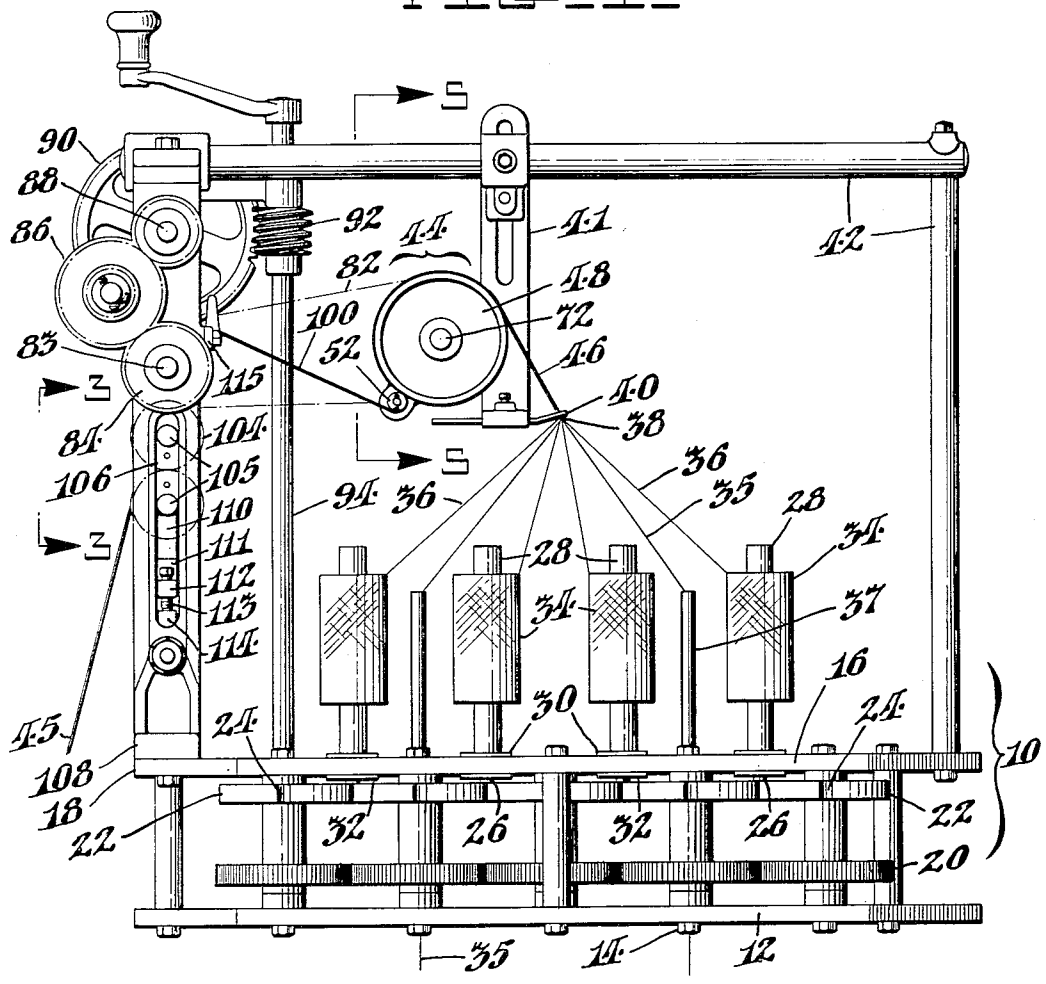


Fig. 2.

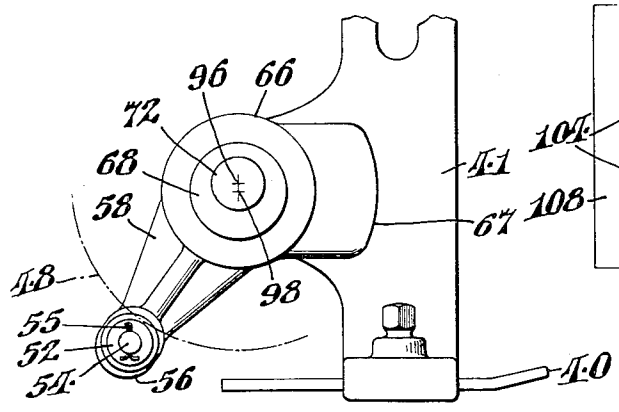
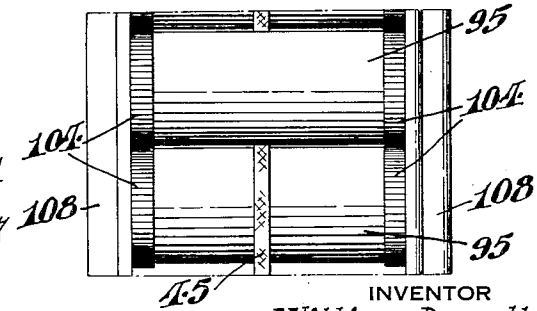


Fig. 3.



INVENTOR
William Draudt
BY Carl S. Olson
ATTORNEY

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Fig. 4

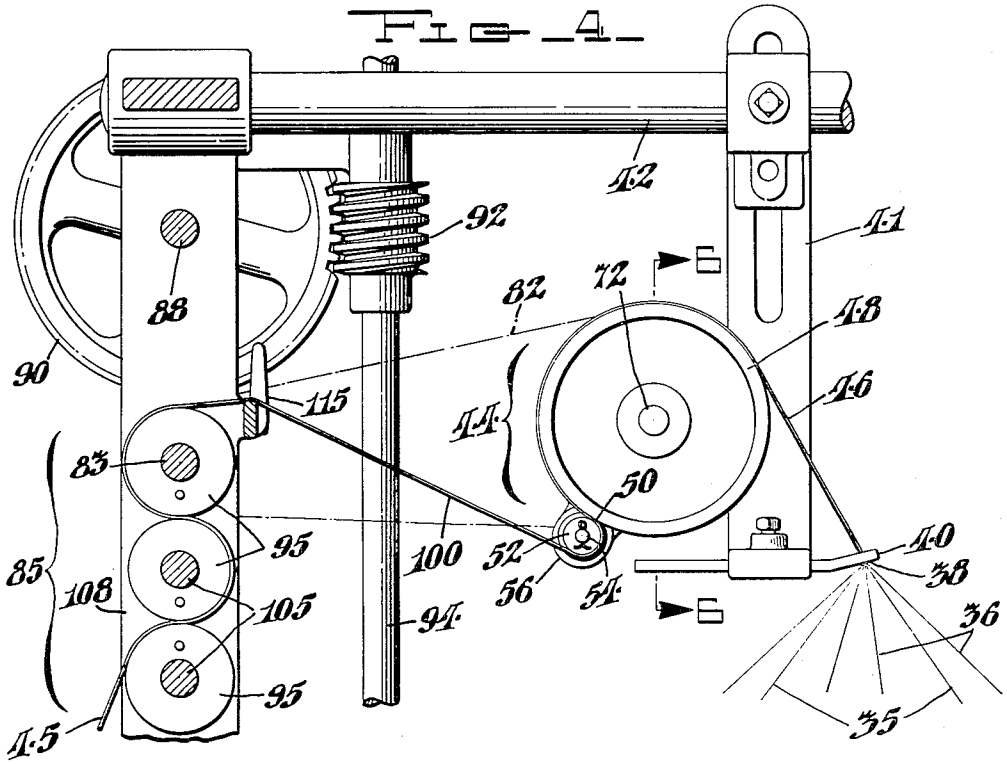


Fig. 5

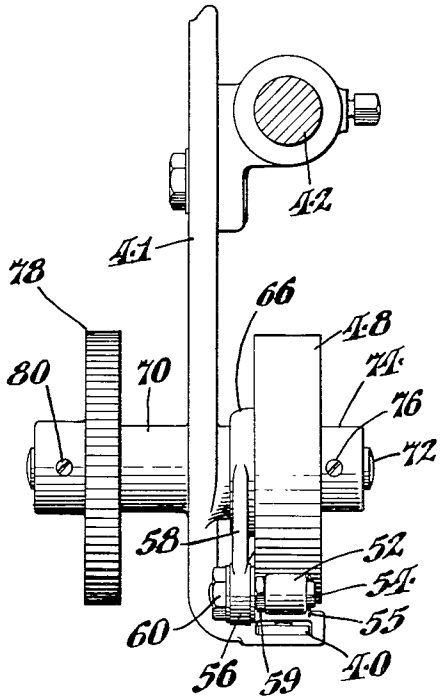
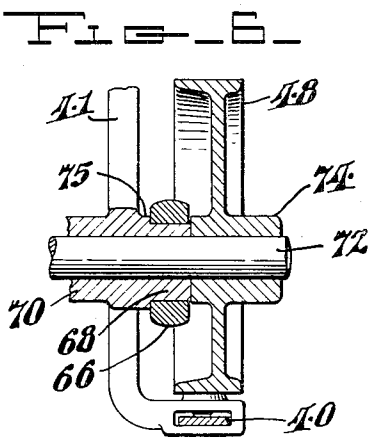


Fig. 6



INVENTOR
William Draudt
BY Earl V. Olson
ATTORNEY

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TAKE-UP MECHANISM FOR BRAIDING MACHINES

William Draudt, Reading, Pa., assignor to Textile Machine Works, Wyomissing, Pa., a corporation of Pennsylvania

Application May 22, 1951, Serial No. 227,648

6 Claims. (Cl. 87—31)

The present invention relates to braiding machines and more particularly to take-up means for braiding machines for making elastic braids.

Braiding machines used heretofore for making elastic fabric have employed a first take-up means comprising a roller having a serrated, pin studded or otherwise roughened surface which has sufficient frictional contact with the fabric or braid to draw it away from the braiding point and a second take-up means comprising rolls receiving the braid from the first take-up means and discharging the braid from the machine. Such prior take-up devices have the disadvantage that the required rough surface of the roller comprising the initial take-up means roughens the surface of the braid. The trade has tolerated the defective braids thus produced only because no way has been found to avoid the injurious action of the take-up.

It is an object of the present invention to provide take-up means for taking up elastic braids which avoids injuring the product and which is simple in construction and operation.

Another object of the invention is to provide a first take-up means for braiding machines comprising a pair of rollers between which the braid passes, the axes of revolution of the rollers being so mounted that tension in the braid moves the surfaces of the rollers relatively to each other to increase the gripping effect on the braid.

Still another object of the invention is to provide a take-up means for taking up elastic braids comprising two rollers having smooth outer surfaces and between which the braid passes, and a mounting for one of said rollers whereby tension in the braid which has passed between the rollers serves to move the axis of rotation of said one roller along a path intersecting the surface of the other roller to exert pressure on the braid between the two rollers approximately in proportion to the tension in the braid.

A further object of the invention is to provide a take-up for braiding machines comprising two rollers running substantially in contact and the axis of rotation of one of which is mounted to swing about a point spaced from the axis of rotation of the other whereby pressure on said one roller swings it toward the surface of the other roller.

With these and other objects in view which will become apparent from the following detailed description of the illustrative embodiment of the invention shown in the accompanying drawings, the invention resides in the novel method, elements, features of construction and arrangement of parts in cooperative relationship as hereinafter more particularly pointed out in the claims.

In the drawings:

Figure 1 is a partially diagrammatic elevational view of a braiding machine, generally of a well known type, for making elastic braid, the machine having the present invention applied thereto;

Fig. 2 is a fragmentary detail view showing the arrangement of the take-up means according to the invention illustrated by Fig. 1, a part being omitted and indicated by a dot-and-dash line for purposes of clarity of illustration;

Fig. 3 is a detail view of a portion of the take-up means shown in Fig. 1, taken on the line 3—3 of Fig. 1 looking in the direction of the direction of the arrows;

Fig. 4 is an elevational view similar to a portion of Fig. 1 on a much enlarged scale, certain parts being omitted and others shown in section for purposes of illustration;

Fig. 5 is an elevational view partially in section taken substantially on the line 5—5 of Fig. 1 looking in the direction of the arrows and enlarged relative to Fig. 1; and

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 4.

In the drawings and description, only the means and method necessary to a complete understanding of the invention are specifically set forth, conventional parts of the braiding machine being only briefly mentioned as such parts are familiar to those skilled in the art.

The machine shown in the drawings is of a generally known type equipped with a first or primary take-up means receiving an elastic braid from a braiding point and exerting a maximum tension on the run of braid between said point and the take-up means. From the first take-up means the braid passes to a secondary take-up means which moves the braid at a somewhat lower rate of speed than the first take-up to somewhat relax the tension in the run of braid between the first take-up means and the second but without reducing it below a very material tension.

The first take-up means shown in the drawings and presently to be described is, in accordance with the invention, of a novel character whereby it maintains the desired tension at the braiding point without roughening the surface of the braid. To this end it comprises two rollers which pass the braid between them and one of which is urged toward the other by the tension in the run or bight of the braid between the first and second take-up means.

Referring to Fig. 1 of the drawings, 10 designates as a whole a braiding machine of generally conventional design having a base plate 12 in which are fixed the one ends of bolts 14, the other ends of which are fixed to quoits or tellers not shown individually but lying within an outer member 16 and an inner member (not shown), the quoits, member 16 and the inner member together forming intersecting raceways (not shown) in a race plate 18. The bolts 14 serve as axles for a set or train of intermeshed spur gears 20 driven by a gear forming part of the drive mechanism of the machine, (not shown). Gears 20 are provided with portions 22 having horn slots 24 adapted to engage with the lower ends 26 of yarn bobbin carriers 28 which are supported and retained on plate 18 by upper and lower foot plates 30 and 32, respectively. The carriers 28 are provided with heart pieces (not shown) joining the plates 30 and 32, the heart pieces being adapted to travel in the raceways to guide the bobbin carriers 28 as they are propelled by the horn slots 24, some in one direction and some in the other. The carriers 28 each have a usual bobbin or package 34 of inelastic yarn thereon, a strand 36 of which is unwound from the bobbin as the carrier travels in the raceways about a braiding point 38 in a plate 40. As the machine shown is intended to make an elastic braid, rubber yarns 35 are fed to the braiding point 38 through fixed guides 37 from supplies beneath the machine in the usual manner, the elastic and inelastic yarns being interbraided to form the elastic braid. The plate 40 is shown as being adjustably supported by a hanger 41 on a frame 42 forming part of the machine 10. It is to be understood that the carriers 28 and guides 37 are diagrammatically shown both as

to number and structure and form no part of the present invention.

A primary take-up means 44 embodying the instant invention is shown adjacent the braiding point 38, the braid 45 passing directly from the braiding point to the take-up means. Take-up 44 is designed to place a maximum tension on a bight 46 of the braid 45 extending between the braiding point 38 and the take-up 44. Take-up 44 comprises a relatively large smooth surfaced revolving wheel or roller 48 around which the bight 46 of the braid extends in close contact, preferably for approximately 180°, as shown in Figs. 1 and 4. At a point such as 50, the braid passes between roller 48 and a cooperating smooth surfaced roller 52 which serves to press the braid 45 against the surface of roller 48 to ensure that the braid shall not slip with reference to roller 48.

To obtain this result, the roller 52, which may be quite small relatively to roller 48, is shown as mounted to rotate on an axle 54, best shown in Figs. 2 and 5, roller 52 being held on axle 54 by a cotter pin 55 or other convenient means. Axle 54 is threaded for a portion of its length extending through a hub 56 at the end of an arm 58. The axle carries a nut 59 abutting the inner face of hub 56 and a nut 60 abutting the outer face, the nuts serving to hold the axle 54 firmly in place and parallel to the axis of roller 48. The arm 58 is shown integral with a strap 66 which has a portion 67 projecting therefrom (Fig. 2) to counterbalance the arm and roller 52. Strap 66 is mounted to turn on a portion 68 of a bearing 70 (Fig. 6) in which a shaft 72 supporting roller 48 is rotatively carried. Bearing 70 is supported on the hanger 41. Said portion 68 is of a circular outline eccentric to the axis of shaft 72, as shown in Figs. 2 and 6. Strap 66 is maintained in a given position axially of bearing 70 by a hub 74 of roller 48 and a shoulder 75 on bearing 70. Hub 74 is fastened on the end of shaft 72 by a set screw 76 (Fig. 5) so that the roller will rotate with the shaft. At its other end, shaft 72 has a sprocket wheel 78 fixed thereto by a set screw 80. Wheel 78 is driven by a sprocket chain 82, shown in dot-and-dash outline in Figs. 1 and 4, to turn shaft 72 and thereby roller 48. Chain 82 is driven by a sprocket wheel (not shown) mounted on a shaft 83 coaxially with a gear 84 (Fig. 1). The latter forms part of a gear train 86 which receives torque from the shaft 88 of a gear 90 driven in turn by a worm 92 on shaft 94. Shaft 94 is actuated by a gear (not shown) meshing with and driving the gear train 20. Gear 84 drives a second take-up means 85 comprising rolls 95 and which will be presently described.

As shown in Figs. 1 and 4, during the braiding operation the fabric 45 moves counterclockwise with roller 48 to the point 50 and there it changes its direction to move clockwise with roller 52. As is clear from Figs. 1, 2 and 4, the arm 58 lies, as viewed in these figures, on the left side of a line joining the center of rotation 96 of roller 48 and the center 98 of the circular portion 68 of bearing 70 and on which strap 66 is free to turn. Also, the surface of roller 52 lies close to the surface of roller 48 so that the braid extending between the two is firmly gripped between the rollers.

In order to swing arm 58 and, therefore, roller 52 into and to maintain them in the positions shown, the bight 100 of the braid leading away from the roller 52 is maintained under tension although this tension is somewhat relaxed as compared to that in bight 46. The means for maintaining the bight 100 under tension comprises the second take-up means 85 which includes the rolls 95 driven by the gear train 86. Three rolls 95 are shown each of which has gears 104 (Fig. 3) fixed to the ends of the rolls to turn therewith. The upper roll of the train is carried on the shaft 83 with the gear 84 of train 86. The gears 104 of the upper roll mesh with those of the middle roll and those of the middle roll with those of the bottom roll. The shafts 105 of the middle and bottom rolls extend through and are vertically movable in slots

106 in posts 108 forming part of frame 42. The shaft 105 of the lowest roll 95 is held up by bearing members 110 which rest upon blocks of rubber or other resilient material 111 which in turn rest upon members 112 having set screws 113 adjustably carried therein. The screws 113 engage blocks 114 resting against the bottoms of the slots 106 in the posts 108. By turning the screws 113, the level of the lower shaft 105, and hence also of the upper shaft 105, may be adjusted to define bights between the rolls 95 which exert sufficient pressure on the braid 45 to prevent slippage without injury to the braid. As the tension should be relaxed somewhat beyond point 50 but should still remain material, rolls 95 are driven at a somewhat lower surface speed than that of the roller 48. From the lowest roll 95, the braid 45 is discharged from the machine into a container or the like (not shown) or other receiving means. To facilitate accurate positioning of the braid on the rolls 95 a comb guide device 115 is provided on the posts 108, as shown in Fig. 4.

The operation of my improved take-up means will be evident to those skilled in the art from the foregoing description. For purposes of convenience, however, it will be summarized as follows:

As the braid comes from the braiding point, it passes directly onto the face of the rotating wheel or roller 48 around which it passes until it has reversed, or substantially reversed, its direction. The braid then passes between roller 48 and the second wheel or roller 52, conveninently of much smaller diameter than roller 48.

The braid travels around the surface of roller 52 until it has again reversed its direction and then through guide 115 to the rolls 95 of the second take-up means. The braid 45 is maintained under tension both in the run 46 between the braiding point and the surface of roll 48 and in the run 100 between roller 52 and the second take-up means. This is accomplished as follows:

Roller 48 is driven at that surface speed which the braid should have to maintain the required high degree of tension in the run 46 between the braiding point and the first take-up means. Rolls 95 comprising the second take-up means are driven at a lower surface speed than roller 48 their speed however being such as to insure a relatively high tension in the run 100. As previously pointed out, roller 52 is mounted at the end of the arm 58 fixed to the strap 66 whose center of rotation is eccentric to that of roller 48. The tension in run 100 tends to swing roller 52 and its supporting arm 58 upwardly, and, due to the eccentric mounting of arm 58, roller 52 is pressed toward roller 48 whereby the braid is gripped between the rollers and caused to travel at the surface speed of roller 48.

The instant invention provides a positively acting primary take-up which maintains the required tension without the injury to the braids heretofore occurring on conventional machines. At the same time the apparatus is relatively simple. Also, it promotes easy reeving of the braid fabric through the machine.

Of course, the improvements specifically shown and described by which the above results are obtained, can be changed and modified in various ways without departing from the invention herein disclosed and hereinafter claimed.

I claim:

1. In a braiding machine for making elastic braid and having braiding means including a braiding point, a fabric take-up comprising a roller onto which the braid passes from said point and about which the braid passes for somewhat less than the circumference of the roller, a second roller between which and the first roller the fabric passes, tensioning rolls to which the fabric passes from said rollers and between which the fabric passes for delivery, a fixed eccentric surrounding the axis of said first roller, a strap rotatable on said eccentric, an arm fixed to said strap and at the outer end of which said second roller is rotatably mounted and so set

with respect to the center of said eccentric that pressure of the fabric on the second roller moves it toward the first roller to press the fabric firmly between the two, and means for turning said rollers and rolls at desired speeds.

2. In a braiding machine having a braiding means including a braiding point for forming a braid, a take-up means comprising two rollers, one much larger than the other and which rotates on a fixed axis and, therefore, in a circular path, a second and smaller roller, a pivotal mounting for said second roller, said mounting having a center of rotation within the perimeter of said first roller and slightly eccentric thereto to cause the edge of the smaller roller facing the larger roller to approach the perimeter of the larger roller to develop a wedging action between the two rollers, and a second take-up means, the braid passing from the braiding point to and around the larger roller, between it and the smaller roller, around the smaller roller and then to the second take-up means.

3. In a machine for making elastic fabric, a primary take-up and a secondary take-up to which the primary take-up delivers the fabric under tension, said primary take-up comprising a pair of rollers, means supporting one of said rollers on a fixed axis, a member supporting said other roller for rotation, and means pivotally mounting said member on an axis eccentric to said first axis whereby the movement of said other roller is constrained to a fixed path intersecting the surface of the one roller at an acute angle to provide a wedging contact between said rollers in response to the tension in the fabric delivered to said secondary take-up.

4. In a machine for making elastic fabric, a primary take-up and a secondary take-up to which the primary take-up delivers the fabric under tension, said primary take-up comprising a pair of rollers, means supporting one of said rollers on a fixed axis, a member supporting said other roller for rotation, and means comprising an element surrounding but eccentric to the axis of said first roller and rigidly connected to said member for

mounting said member whereby said other roller is urged toward said first roller by the tension in the fabric delivered to said secondary take-up.

5. In a machine for making elastic fabric, a primary take-up and a secondary take-up to which the primary take-up delivers the fabric, said primary take-up comprising a pair of rollers, means supporting one of said rollers for rotation on a fixed axis, a member supporting said other roller for rotation, means pivotally mounting said member including a fixed eccentric surrounding said fixed axis whereby said other roller is urged toward said first roller by tension of the fabric delivered to said secondary take-up, said secondary take-up comprising positively driven rolls, and adjustable means urging said rolls toward each other, the rollers and rolls of the primary and secondary take-ups having smooth surfaces in contact with the fabric.

6. A take-up means for braiding machines adapted to take up elastic braid and comprising a pair of rollers rotated in opposite directions, the braid passing between the rollers and around a portion only of their perimeters, a fixed axis for one of said rollers, and a mounting for said other roller eccentric to the axis of rotation of said one roller and constraining the movement of said other roller to a fixed path intersecting the perimeter of the one roller at an acute angle whereby said other roller will be moved into wedging contact with the one roller to exert pressure on the fabric.

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