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D. J. LAMB

3,093,344

TRAVERSING DEVICE

Filed Jan. 21, 1960

3 Sheets-Sheet 1

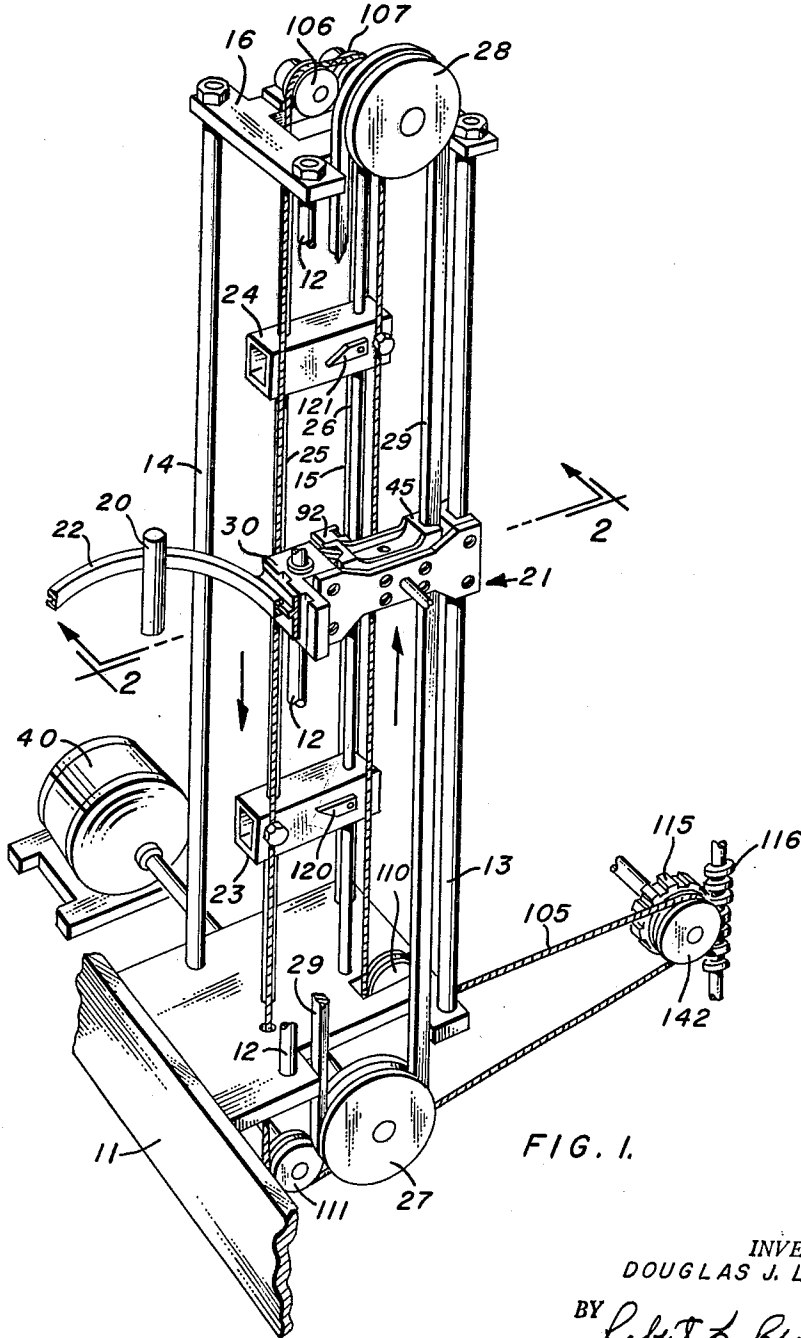


FIG. 1.

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3 Sheets-Sheet 3

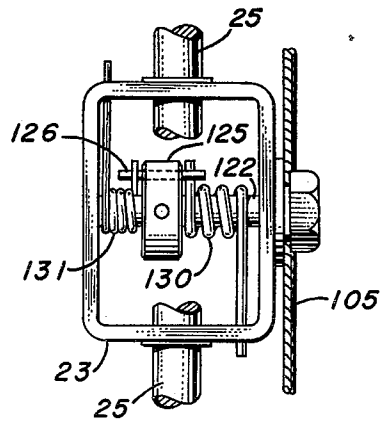


FIG. 4.

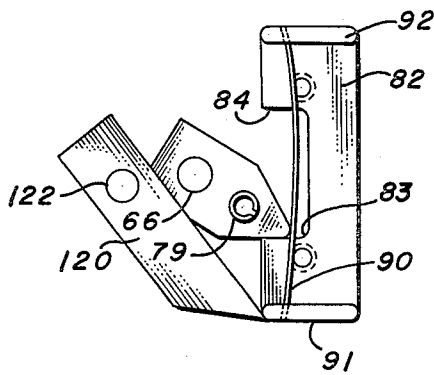


FIG. 5.

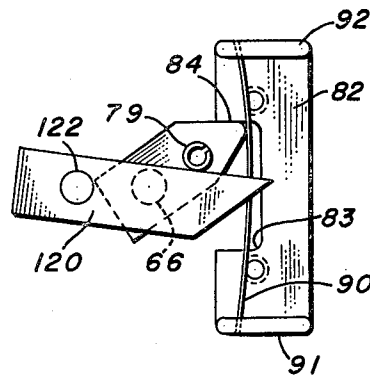


FIG. 6.

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3,093,344

TRAVERSING DEVICE

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6 Claims. (Cl. 242-158.4)

This invention relates to traversing devices and more particularly to apparatus for rapidly traversing yarn being wound onto a bobbin.

Synthetic yarn wound by conventional machines often undergoes changes in characteristics, especially near the ends of the yarn package. This is especially true where the yarn package has tapered ends. As a result of these changes in characteristics, a fabric made up from this yarn will have streaks which make it unusable. In order to eliminate these streaks, which are commonly referred to as "pirn taper barré," the user of the yarn must reprocess it before usage. This of course, is time-consuming and expensive. It has been found that pirn taper barré is eliminated when the yarn is traversed at a high speed during winding. In order that the high speed be maintained in the most critical area of the package, it is highly desirable that the traversing speed be maintained uniform near the ends of the traversing stroke. One of the disadvantages of machines used in the past for traversing yarn being wound onto a bobbin is that the traversing speed is decreased substantially near the ends of the traversing stroke. Conventional winding machines have also had the disadvantage of having the yarn traversing member lag or rest at the ends of the traversing stroke until the backlash present in the machine was taken up, resulting in an undesirable accumulation of yarn at the ends of the package. With this problem in mind, one of the objects of the invention is to provide a novel and improved yarn traversing mechanism.

Another object of this invention is to provide a mechanism for traversing a yarn at a high speed.

A further object of this invention is to provide a device for traversing a yarn at a uniform speed without a lag or period of rest at the ends of the traversing stroke.

Still another object of this invention is to provide a device wherein a traversing block is reciprocated by a moving belt.

A still further object of this invention is to provide a traversing mechanism having a traversing member which is alternately locked to opposite spans of a moving belt by opposed pistons operated by means of compressed air.

One of the embodiments of this invention contemplates a traversing mechanism wherein a traversing block carrying a ring traveler is provided with a gripper block which is adapted to cooperate with the traversing block in alternately gripping opposite spans of a moving belt in such a manner that the traversing block is reciprocated at a high and uniform speed. A pair of pistons mounted in the traversing block and controlled by a snap action valve operate the gripper block. The snap action valve is operated by a pair of spring-loaded levers mounted on a pair of stop members, to thereby reciprocate the traversing block.

Other objects and advantages of the invention will become apparent when the following detailed description is read in conjunction with the appended drawings, in which:

FIGURE 1 is a perspective view of one embodiment of the invention showing the general layout of the various elements;

FIGURE 2 is an enlarged cross-sectional view taken on line 2-2 of FIGURE 1 showing pistons which operate the gripper block;

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FIGURE 3 is a sectional view of the traversing mechanism taken on line 3-3 of FIGURE 2 showing the configuration of the air valve which controls the pistons;

FIGURE 4 is an enlarged end view of a lower stop member which serves to reverse the direction of the traversing member showing the structure of the reversing mechanism carried by the stop member;

FIGURE 5 is a fragmentary rear view showing the position of the lower air valve actuating lever just prior to actuation; and

FIGURE 6 is a view of the structure of FIGURE 5 just after the lower valve actuating lever has operated the valve to reverse the direction of the traversing mechanism.

Referring now in detail to the drawings, a base 11 is shown supporting a frame which includes guide rods 12, 13, 14 and 15 and a plate 16, the upper ends of the guide rods being secured to the plate 16 and the lower ends thereof being secured to the base 11. A traversing mechanism 21 slidably mounted on the guide rods 12 and 13 carries a traveler ring 22 (FIGURE 2) of a well-known type which is positioned concentrically with a rotating bobbin 20 for directing yarn onto the bobbin in a well-known manner. A lower stop member 23 and an upper stop member 24 slidably mounted on rods 25 and 26 control the reciprocation and length of stroke of the traversing mechanism 21. Pulleys 27 and 28 mounted on the base 11 and the plate 16, respectively, support a V-belt 29 which is adapted to reciprocate the traversing mechanism 21.

The traversing mechanism 21 includes a traversing block 30 (FIGURES 2 and 3) having a bore 31 for receiving the guide rod 12 and a slot 32 for receiving the guide rod 13, the block 30 being slidably mounted on these guide rods. The pulleys 27 and 28 are so positioned that the belt 29 passes through openings in the block 30, with the left span of the belt 29 being adjacent to a surface 35 (FIGURE 2) on the block 30 and the right span of the belt 29 being adjacent to a surface 36 of the block 30. The pulley 27 is driven by a motor 40 (FIGURE 1) in such a direction that the left span of the belt 29 moves downward while the right span moves upward.

A gripper block 45 slidably mounted on a central portion 48 of the traversing block 30 between the spans of the belt 29 is provided with grooves 46 and 47 through which the left and right spans, respectively, of the belt 29 pass. When the gripper block 45 is moved to the right (FIGURE 2), the surface 36 and the groove 47 cooperate to grip the right span of the belt 29 for moving the traversing mechanism 21 upward along the guide rods 12 and 13, the traversing block being secured to the right span of the belt. When the gripper block 45 is moved to the left, the surface 35 cooperates with the groove 46 in the gripper block 45 to grip the left span of the belt 29 so that the traversing mechanism 21 is carried downward along the guide rods 12 and 13.

The central portion 48 of the traversing block 30 is provided with a pair of opposed bores 50 and 51 in which are positioned nylon disks 52 and 53 (FIGURE 2) and rubber cups 55 and 56 such as are used in wheel cylinders of automobile brakes. The disks 52 and 53 and the cups 55 and 56 serve as opposed pistons which engage and actuate the gripper block 45.

Compressed air from a source 60 is passed through an inlet tube 61 and an inlet port 62 in the central portion 48 of the traversing block 30 to a valve 65 which is a part of a pin 66 mounted in a sleeve 67 secured in the central portion 48 of the traversing block 30. The valve 65 is movable to direct compressed air through a port 70 (FIGURE 2) into the bore 50 or through a port 71 into the bore 51. The valve 65, while con-

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necting one of the bores 50 or 51 to the air source 60, simultaneously connects the other of these bores to an exhaust port 73.

The stop members 23 and 24, which serve to reverse the direction of travel of the traversing block 30, are attached to a left span and a right span, respectively, of a cable 105 passing over pulleys 106 and 107 mounted on the plate 16 and pulleys 110 and 111 mounted on the base 11. The cable 105 also passes over a pulley 142 secured to a gear 115 which is driven by a worm gear 116 in a well-known manner. The pulley 142 is rotated in such a direction that the left span of the cable 105 moves upward while the right span of the cable moves downward. This carries the stop members 23 and 24 slowly toward each other along the rods 25 and 26 to slowly decrease the length of the stroke of the traversing mechanism 21. This results in a yarn package having a cylindrical central portion and tapered ends.

A bar 78 secured to the pin 66 has attached thereto a pin 79. The pin 66 with the bar 78 and the pin 79 forms a crank which is rotatably mounted in the sleeve 67. A bracket 82 secured to the traversing block 30 is provided with a notch having stop surfaces 83 and 84 which limit the rotative movement of the bar 78 connected to the valve 65. It can be seen that movement of the bar 78 from one surface 83 or 84 to the other will change the position of the valve 65. A leaf spring 90 secured in slots in legs 91 and 92 of the bracket 82 serves to engage the end of the bar 78 to urge the bar against whichever stop surface 83 or 84 is nearer.

The stop members 23 and 24 are provided with reversing mechanisms which include air valve actuating levers 120 and 121, respectively. Since these reversing mechanisms are identical, only that carried by the lower stop member 23 will be described in detail.

The lower valve actuating lever 120 is secured to a shaft 122 rotatably mounted on the stop member 23. A collar 125 secured to the shaft 122 is provided with a pin 126 which extends on both sides of the collar. A heavy spring 130 having one end in engagement with the pin 126 and the other end attached to the stop member 23 urges the lever 120 in a clockwise direction (FIGURES 5 and 6). A lighter spring 131 having one end in engagement with the pin 126 and the other end attached to the stop member 23 urges the lever 120 counterclockwise (FIGURES 5 and 6). The action of the springs 130 and 131 is such that their forces are in equilibrium when the lever 120 is in the position shown in FIGURES 1 and 4.

When the traversing member 30 moves downward near the end of its stroke, the leg 91 of the bracket 82 engages the lower actuating lever 120 and pivots it to the position shown in FIGURE 5, against the action of the spring 130. Upon further downward movement of the traversing block 30, the lever 120 clears the leg 91 and snaps counterclockwise, its inertia carrying it to the position shown in FIGURE 6. When the lever 120 undergoes this movement it engages the pin 79 secured to the bar 78 and pivots this bar to thereby change the position of the valve 65. This reverses the direction of the traversing block 30. The springs 130 and 131 return the lever 120 to its normal position. It can be seen that the sharp blow of the lever 120 will change the position of the valve 65 instantaneously, and thereby reverse the direction of the traversing block 30 instantaneously. The reversing mechanism carried by the upper stop member 24 operates in the same manner.

In operation of the device, the motor 40 drives the pulley 27 to move the belt 29 at a high speed, while the worm gear 116 drives the gear 115 to move the cable 105 at a low speed. As illustrated in the drawings, the gripper block 45 is moved to the right to grip the right span of the belt 29 so that the traversing mechanism 21 and the ring 22 are carried upward. As the traversing mechanism approaches the stop member 23, the leg 91 of the bracket 82 engages and pivots the lever 120 from its normal position to the position shown in FIGURE 5.

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The lever 120 then clears the leg 91 and snaps to the position shown in FIGURE 6 to operate the valve 65, thereby admitting compressed air from the source 60 through the port 62 and into the bore 50 while at the same time connecting the bore 51 to the exhaust port 73. This moves the disk 52 and the rubber cup 55 to the left relative to the central portion 48 of the block 30 to move the gripper block 45 to the left for gripping the left span of the belt 29. This causes the traversing mechanism 21 to move downward.

The traversing mechanism 21 with the ring 22 moves upward to traverse the yarn on the bobbin 20 until the leg 92 pivots and releases the lever 121, this lever then striking the pin 79 and moving the bar 78 back into the position shown in FIGURE 5. This reverses the valve 65 to start the traversing mechanism downward. In this manner, the traversing mechanism 21 and the ring 22 are reciprocated at a high speed without a decrease in traversing speed near the ends of the traversing stroke and without having the traversing mechanism lag or rest at the ends of the stroke. During the winding operation the cable 105 is moved to slowly elevate the stop member 23 and lower the stop member 24, thereby slowly decreasing the traversing stroke of the traversing mechanism 21.

It is to be understood that the embodiment disclosed herein may be altered or modified and many other embodiments of the invention may be contemplated without departing from the spirit and scope of the invention.

What is claimed is:

1. A device for winding yarn onto a rotating bobbin, comprising a frame, a belt movably mounted on the frame and having a pair of spans parallel to the axis of the bobbin, means on the frame for driving the belt in such a manner that one of said spans moves in one direction and the other span moves in the opposite direction, a traversing member mounted for reciprocation on the frame adjacent to the belt and having a guide for directing the yarn onto the bobbin, a gripper member movably mounted on the traversing member for cooperating with said traversing member to alternately grip one and then the other of said spans and thereby reciprocate the traversing member, a pair of fluid cylinders mounted on the traversing member and connected to the gripper member for actuating said gripper member, means on the traversing member for alternately controlling said cylinders, a pair of stop members mounted on the frame on opposite sides of the traversing member, said stop members having thereon spring-loaded elements, and means on the traversing member for engaging and deflecting said spring-loaded elements as the traversing member approaches the ends of the traversing stroke, said spring-loaded elements being adapted to clear said engaging and deflecting means and strike and actuate the controlling means.

2. A device for traversing yarn being wound onto a rotating bobbin, comprising a frame adjacent to the bobbin, a traversing member mounted for reciprocation on the frame, a guide carried by the traversing member for traversing the yarn along the rotating bobbin, a pair of pulleys mounted on the frame, a belt carried by the pulleys and having a pair of spans parallel to the axis of the bobbin, means on the frame for driving the belt in such a manner that one of the spans moves in one direction and the other span moves in the opposite direction, a gripper member movably mounted on the traversing member between the spans of the belt for cooperating with said traversing member to grip the belt, a pair of pistons mounted on the traversing member for engaging and actuating the gripper member, a valve mounted on the traversing member for controlling the pistons, a pair of stop members mounted on the frame on opposite sides of the traversing member, said stop members having thereon spring-loaded elements, and means on the traversing member for engaging and deflecting the spring-loaded elements as the traversing member approaches the ends of the traversing stroke, said spring-loaded elements being

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adapted to clear said engaging and deflecting means and strike and actuate the valve.

3. A device for traversing yarn being wound onto a rotating bobbin, comprising a frame adjacent to the bobbin, a traversing member mounted for reciprocation on the frame and having a member for guiding yarn onto said rotating bobbin, a pair of pulleys mounted on the frame, a belt carried by the pulleys and having a pair of spans parallel to the axis of the bobbin, means on the frame for driving one of the pulleys in such a manner that one of said spans moves in one direction and the other span of said pair moves in the opposite direction, a gripper member movably mounted on the traversing member for cooperating with said traversing member to grip the belt, a pair of pistons movably mounted on the traversing member and adapted to engage and actuate the gripper member, valve means on the traversing member for actuating the pistons to operate the gripper member, a pair of stop members mounted on the frame on opposite sides of the traversing member, each of said stop members having thereon a spring-loaded element, and means on the traversing member for engaging and deflecting the spring-loaded elements as said traversing member approaches the ends of the traversing stroke, said spring-loaded elements being adapted to clear said engaging and deflecting means and strike and actuate said valve means.

4. A device for traversing a yarn being wound onto a rotating bobbin, comprising a frame adjacent to said rotating bobbin, a traversing member mounted for reciprocation on the frame, a guide carried by the traversing member for directing yarn onto the bobbin, a pair of pulleys mounted on the frame, a belt carried by the pulleys and having a pair of spans parallel to the axis of the rotating bobbin, means on the frame for driving one of the pulleys in such a manner that one of said spans travels in one direction and the other span travels in the opposite direction, a gripper block movably mounted on the traversing member between the spans of the belt for cooperating with the traversing member to alternately grip one and then the other of the spans of the belt and thereby alternately secure the traversing member to said spans, said traversing member having therein a pair of opposed bores, a pair of pistons mounted in the bores and engaging the gripper block for actuating said block, a valve mounted on the traversing member for controlling the operation of the pistons, a fluid source connected to the valve, a bar attached to the valve in such a manner that movement of the bar actuates the valve to admit fluid to one of said bores and to exhaust the other bore, a pair of stop members mounted on the frame on opposite sides of the traversing member, each of said stop members having thereon a spring loaded element, and means on the traversing member for engaging and deflecting the spring loaded elements as said traversing member approaches the end of the traversing stroke, said spring loaded elements being adapted to clear said engaging and deflecting means and strike the bar for moving said bar to operate the valve.

5. A device for traversing a yarn being wound onto a bobbin, comprising a frame adjacent to the bobbin, a

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traversing block mounted for reciprocation on the frame, a guide carried by the traversing block for directing the yarn onto the bobbin, a pair of pulleys mounted on the frame, a belt carried by the pulleys and having a pair of spans parallel to the axis of the bobbin, a gripper block slidably mounted on the traversing block between the spans of the belt for cooperating with said traversing block to grip the belt and thereby secure the traversing block to the belt, one of said spans being gripped when the gripper block is moved in one direction and the other span being gripped when the gripper block is moved in the opposite direction, said traversing block having therein a pair of opposed bores, a pair of pistons movably mounted in the bores and engaging the gripper block, one of said pistons being adapted to move the gripper block in one direction and the other piston being adapted to move the gripper block in the opposite direction, a valve mounted on the traversing block for controlling the pistons, a fluid source connected to the valve, a bar connected to the valve for actuating said valve, a pair of stop members mounted on the frame on opposite sides of the traversing block, each of said stop members having a lever spring-loaded to a predetermined position, a bracket secured to the traversing block for engaging and pivoting the spring-loaded levers as the traversing block approaches the ends of the traversing stroke, said pivoted levers being so positioned to strike and move the bar for actuating the valve, said bracket having stop surfaces for limiting the movement of the bar, and means on the bracket for retaining the bar against the stop surfaces.

6. A device for traversing a yarn, comprising a frame, a pair of guide rods mounted on the frame, a traversing block slidably mounted on the guide rods and having an opening extending therethrough, a pair of pulleys mounted on the frame, a belt carried by the pulleys and having its spans parallel to the guide rods and extending through the opening in the traversing block, a gripper block movably mounted between said spans in the opening in the traversing block for cooperating with said traversing block to grip first one and then the other of said spans to thereby secure the traversing block to the belt, a pair of pistons movably mounted on the traversing block for actuating the gripper block, a valve mounted on the traversing block and connected to operate the pistons, an air source connected to the valve, a pair of stop members mounted on the frame on opposite sides of the traversing member, each of said stop members having thereon a spring-loaded element, and means on the traversing member for engaging and deflecting the spring-loaded elements as said traversing member approaches the ends of the traversing stroke, said spring-loaded elements being adapted to clear said engaging and deflecting means for striking and actuating said valve.

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