Aug. 21, 1951 M. COPP 2,564,803

MACHINE FOR WINDING SHOELACES INTO COILS

Filed May 13, 1949 4 Sheets-Sheet 1

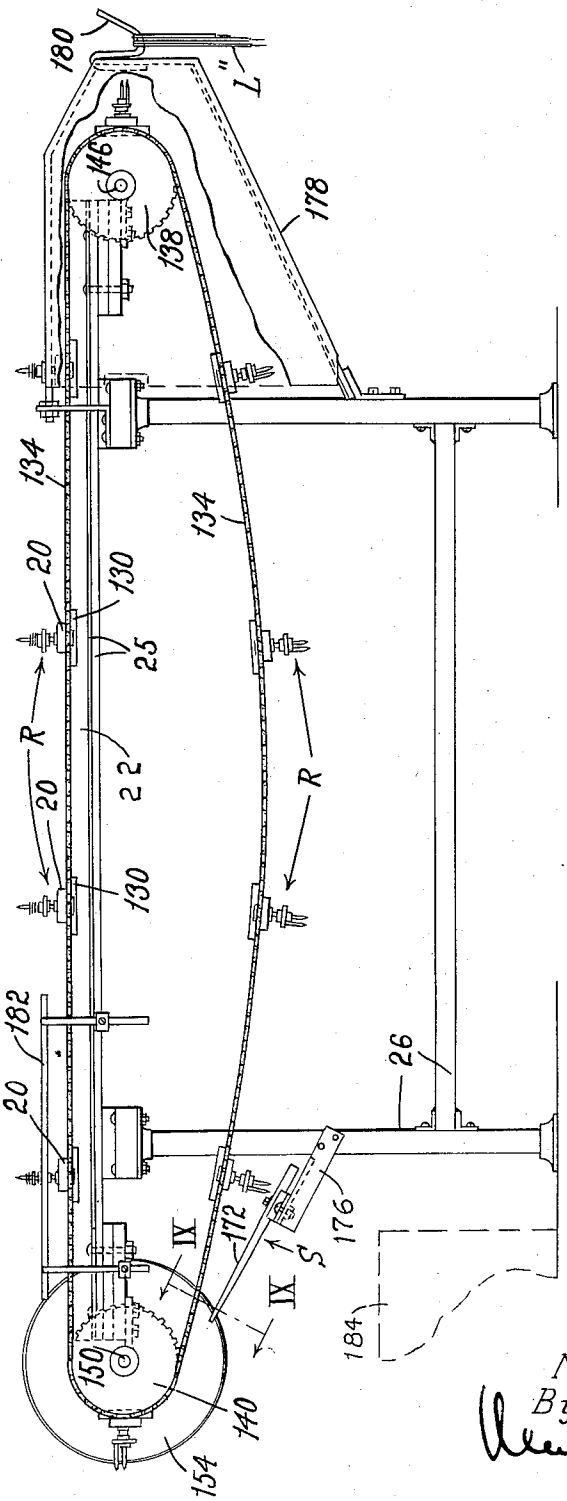


Fig. 1.

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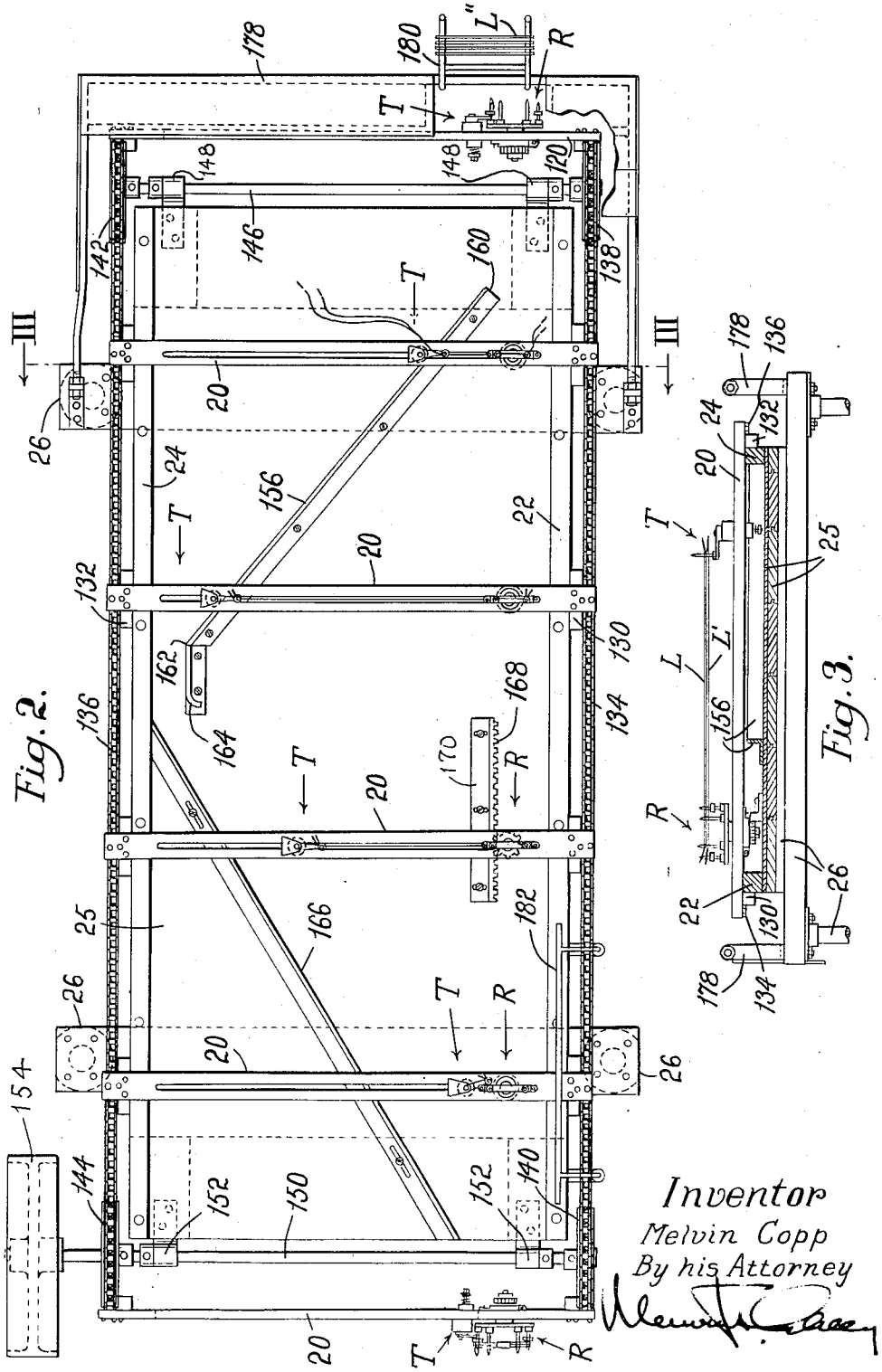


Fig. 2.

Fig. 3.

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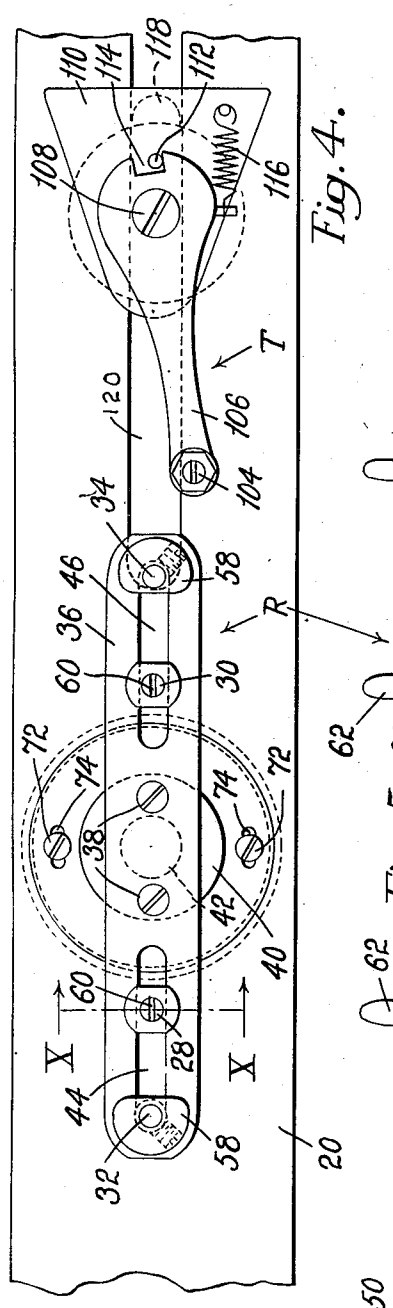


Fig. 4.

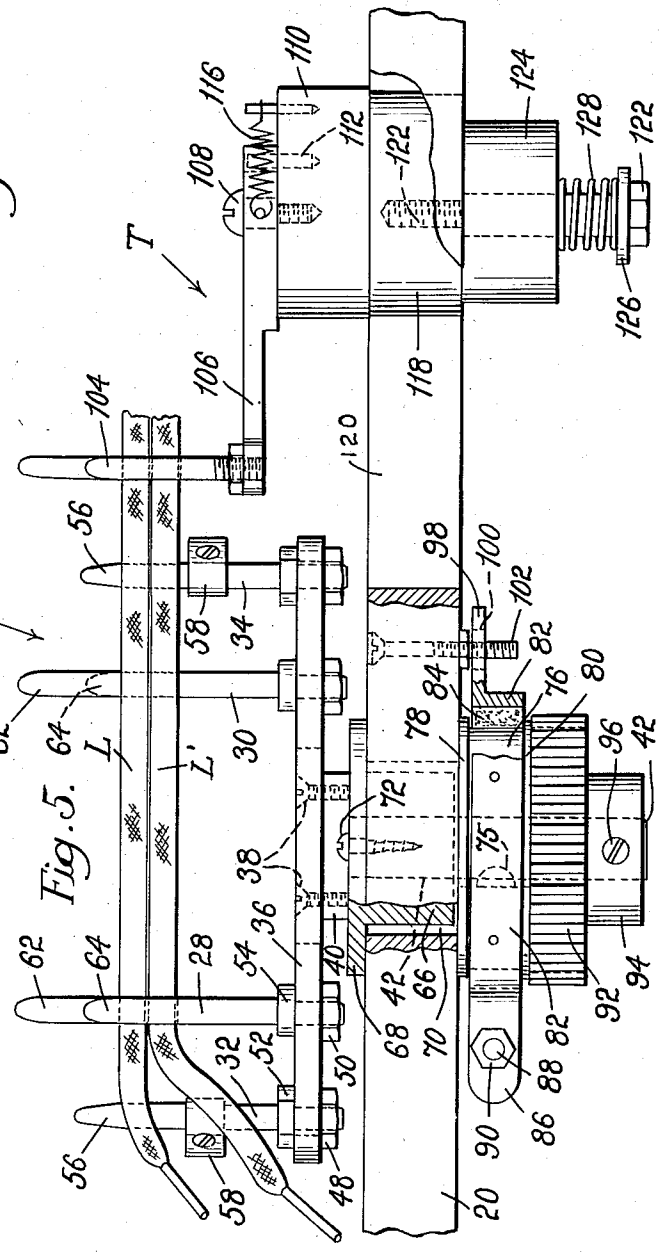


Fig. 5.

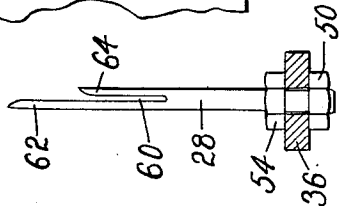


Fig. 10.

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MACHINE FOR WINDING SHOELACES INTO COILS

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Fig. 6.

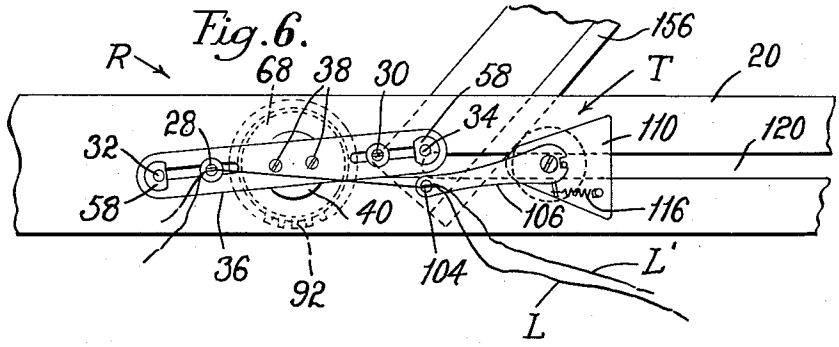


Fig. 7.

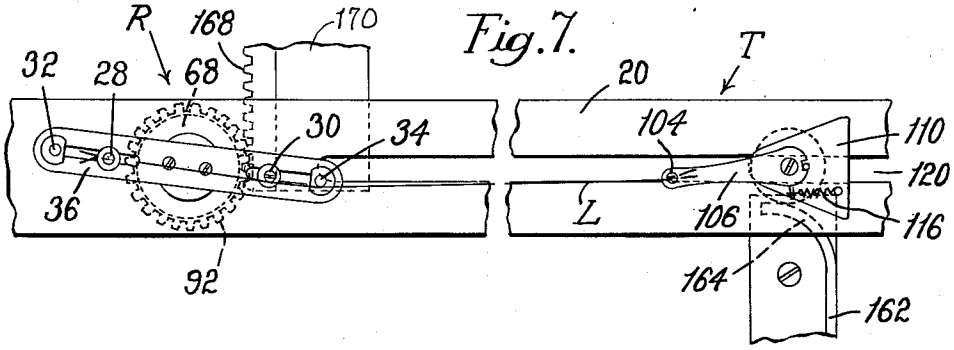
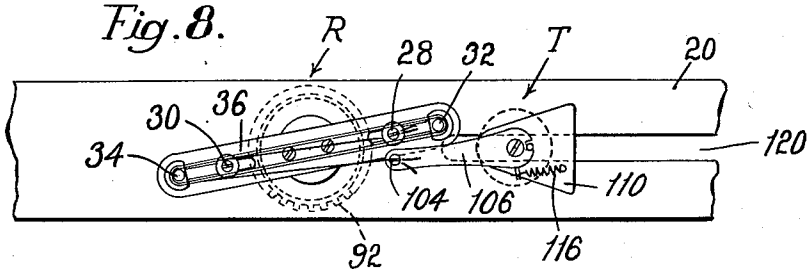


Fig. 8.



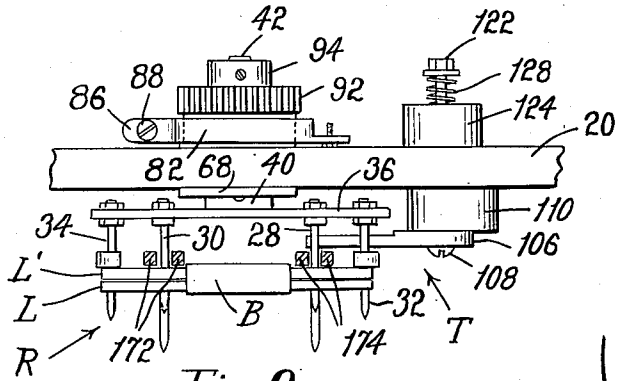


Fig. 9.

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UNITED STATES PATENT OFFICE

2,564,803

MACHINE FOR WINDING SHOELACES INTO COILS

Melvin Copp, Brentwood, N. H., assignor to Shoe Lace Company, Portland, Maine, a corporation of Maine

Application May 13, 1949, Serial No. 93,046

16 Claims. (Cl. 242—53)

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This invention relates to packaging machines and it is herein disclosed as embodied in a machine adapted to wind a pair of shoe laces into a skein preparatory to the forming of the skein into a permanent bundle by the application of a gummed label.

It is desirable for the sake of the appearance of the finished package to provide for matching the ends of the shoe laces, that is, for bringing the ends of one lace into close register with the ends of the other lace. In the use of prior shoe lace winding machines, such as those disclosed in United States Letters Patent Nos. 1,797,173 and 1,949,544, granted respectively March 17, 1931 and March 6, 1934 upon applications of Carl A. Matson, such matching of the ends of the laces was done by the operator as he supplied the laces to the machine.

It is an object of the present invention to provide a cheap and simple shoe lace winding machine capable of bringing the ends of one shoe lace of a pair into register with the ends of the other lace. The operator, being relieved of the need of matching the ends of the laces, can supply laces to this machine faster and with less effort than he could supply them to previous machines.

In accordance with a feature of the invention, the illustrated machine is provided with means for pulling a pair of shoe laces in side-by-side relation to bring the ends of one lace into register with the corresponding ends of the other lace, and also with means for winding the laces while they are thus held with their ends in register. As shown herein, the illustrated machine is provided with a pair of slotted holders, each holder being constructed and arranged to hold two tips of the respective laces against the tension of the laces and thereby to hold an end of one lace in register with the end of the other lace when the laces are tensioned. These holders are so constructed as to permit a lace to slide through them until the tip of the lace comes into contact with the holder, whereupon the holder holds the lace against further movement. The holders are first separated to tension both laces and bring their ends into register. The laces are then wound upon a reel while one holder is pulled toward the other by the laces. Tension is maintained in the laces by a frictional drag on the holder which is thus pulled. The forming of the skeins into bundles by the application of gummed labels is an operation not performed by the illustrated machine.

These and other features of the invention are

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illustrated in the accompanying drawings and hereafter described and claimed.

Referring to the drawings,

Fig. 1 is a side elevation of an illustrative machine embodying the invention;

Fig. 2 is a plan view of the machine shown in Fig. 1;

Fig. 3 is a cross sectional view taken on the line III—III of Fig. 2;

Fig. 4 is an enlarged detail showing, in plan, of a winding reel and its associated tensioning device;

Fig. 5 is a front elevation of the members shown in Fig. 4;

Fig. 6 is a plan view of the winding reel and its associated tensioning device at the beginning of the tensioning operation;

Fig. 7 is a plan view of the parts shown in Fig. 6 at the beginning of the winding operation;

Fig. 8 is a plan view of the parts shown in Figs. 6 and 7 just before the end of the winding operation;

Fig. 9 is a sectional view taken on the line IX—IX of Fig. 1; and

Fig. 10 is a sectional view taken on the line X—X of Fig. 4.

The machine illustrated herein is provided with a plurality of reels R for winding pairs of shoe laces L and L'. Each of the reels has associated with it a tensioning device T. The machine is provided also with a stripper S (Fig. 1) for removing from the reels R the shoe laces that have been wound thereupon. Each reel R and its tensioning device T are mounted upon a carriage 20 in the form of a cross bar which is guided for sliding movement longitudinally of the machine, from front to rear (i. e., from right to left as shown in Figs. 1 and 2), upon a pair of rails 22 and 24. A shelf or table 25 mounted upon a frame 26 consisting chiefly of tubular rods affords a rigid support for the rails 22 and 24.

Each reel R is provided with a pair of holding pins 28 and 30 (Figs. 4 and 5), only one of which is used at a time, and also with a pair of winding pins 32 and 34. These four pins are all parallel to each other and are mounted upon a bar 36 which is secured by screws 38 to a head 40 formed upon a shaft 42. The winding pins 32 and 34 are adjacent to the respective ends of the bar 36 and the holding pins 28 and 30 are positioned inwardly from the ends of the bar 36 and between the pins 32 and 34, the axes of all four pins being parallel to the axis of the shaft 42. To enable the distances of the

pins from the axis of the shaft 42 to be varied for purposes of adjustment, there is provided in the bar 36 a pair of longitudinal slots 44 and 46. The pins 32 and 28 extend down through the slot 44 and have threaded lower end portions which engage clamping nuts 48 and 50 respectively. A collar 52 on the pin 32 cooperates with the clamping nut 48 to hold the pin 32 securely in its adjusted position, and a collar 54 on the pin 28 cooperates with the nut 50 to hold the pin 28 in adjusted position. A similar provision is made for securing the pins 30 and 34 in their adjusted positions in the slot 46.

Each of the winding pins 32 and 34 has a tapered upper end portion 56, and it has also a collar 58 secured to its midportion. Each of the holding pins 28 and 30 is cleft somewhat in the manner of a clothes pin by a slot or kerf 60 (Fig. 10) which divides it into two branches 62 and 64. The laces L and L', as will later be explained, are inserted by hand into the kerf 60 of one or the other of the pins 28 or 30. To facilitate such insertion, the branch 62 is extended beyond the branch 64. The kerf 60 is just wide enough to receive the laces L and L' and permit them to slide freely when they are presented flat; and it is narrow enough to hold the hardened or celluloid-encased tips of the laces against passing through it when the laces are pulled.

The shaft 42 (Fig. 5) extends down through a bearing 66 in which the shaft is journaled for rotation, with the shoulder of the head 40 engaging the top surface of the bearing. The upper portion of the bearing 66 has a flange 68 which extends over the edge of an opening 70 formed in the carriage 20. The bearing 66 extends down into the opening 70 and it is secured to the carriage 20 by a pair of screws 72 threaded into the carriage 20 and passing through holes 74 in the flange 68, said holes being elongated to enable the position of the bearing 66 to be adjusted. Secured upon the shaft 42 by a key 75 below the carriage 20 is a brake drum 76 having a pair of side flanges 78 and 80. Surrounding the drum 76 is a brake band 82 having its inner surface faced with lining material 84. The brake band 82 has a pair of spaced radial end portions 86 through which extends a bolt 88 upon which is threaded a nut 90. The pressure of the brake lining 84 against the drum 76 can be adjusted by tightening or loosening the nut 90. Secured to the shaft 42 below the brake drum 76 is a pinion 92 for a purpose which will later be explained. A hub 94 of the pinion 92 is secured on the shaft 42 by a set screw 96. The brake band 82 has also a radial lug 98 with an opening 100 through which extends a screw 102 secured in the carriage 20 to prevent turning of the brake band.

The tensioning device T (Figs. 4 and 5) has a cleft holding pin 104 which is similar to the holding pins 28 and 30 already described. The lower end portion of the pin 104 is secured upon an arm 106 which is pivoted for swinging movement about a shoulder screw 108 threaded into a slide block 110 having an upper surface against which the arm 106 is loosely held by the screw 108. The amplitude of swinging movement of the arm 106 is limited by a stop pin 112 secured in the block 110 and extending into a notch 114 formed in the arm 106. A tension spring 116, anchored at one end to the block 110 and at its other end to the arm 106, tends to swing the arm in a counterclockwise direction, as shown in Fig. 4, as far as permitted by the stop pin 112. The block 110 slidably engages the upper

surface of the carriage 20 and it has a narrow lower portion 118 which slidably fits within a guide sheet 120 formed in the carriage 20 and extending lengthwise of the carriage, or crosswise of the machine. Threaded into the guide portion 118 of the block 110 is a screw 122. This screw passes freely through a hole in a friction block 124 which engages the under surface of the carriage 20. Interposed between the lower surface of the block 124 and a washer 126, which is retained by the head of the screw 122, is a compression spring 128, the purpose of which is to clamp the blocks 110 and 124 with yielding pressure on the carriage 20. This pressure can be adjusted by turning the screw 122 thereby increasing or diminishing the force required to slide the tensioning device along the carriage 20.

Each of the carriages 20 (Figs. 2 and 3), as has already been pointed out, is slidable along the rails 22 and 24. To hold the carriage from lateral movement with respect to the machine, each carriage has secured upon it, adjacent to its left-hand end, a guide block 130 (Figs. 1, 2, and 3) which slidably engages the outer surface of the rail 22 and also, adjacent to its right-hand end, a guide block 132 which slidably engages the outer surface of the rail 24. The guide blocks 130 and 132 not only prevent lateral movement of the carriage but they also assist in maintaining it at right angles to the rails 22 and 24. All the carriages 20 are secured at their respective left- and right-hand ends to a pair of endless chains 134 and 136 positioned at opposite sides of the machine and extending lengthwise thereof. The chain 134 extends over a sprocket wheel 138 at the forward end of the machine and over a sprocket wheel 140 at the rear end of the machine. The chain 136 extends over a sprocket wheel 142 at the forward end of the machine and over a sprocket wheel 144 at the rear end of the machine. The sprocket wheels 138 and 142 are mounted upon the opposite end portions of a transverse shaft 146 which is journaled in bearings 148 carried by the shelf 25. The sprocket wheels 140 and 144 are secured upon the opposite end portions of a shaft 150 which is journaled in bearings 152 carried by the machine frame. The shaft 150 has an extended end portion upon which is secured a pulley 154 which may be driven from any suitable source of power to cause the carriages 20 to travel along the rails 22 and 24 from front to rear of the machine.

For tensioning the laces L and L', there is provided a stationary cam 156 (Fig. 2) secured upon the shelf 25. This cam 156, which may conveniently consist of an angle iron having an upstanding flange, extends diagonally of the machine in such a direction as to cause the tensioning device T of any one of the carriages 20 to be urged toward the right as the carriage travels from the forward end of the machine toward the rear end. The cam 156 has a forward end 160 which is positioned, laterally of the machine, to clear the brake band 82 and pinion 92 of the reel R but to engage the depending block 124 of the tensioning device T. The friction block 124 thus functions also as a cam follower. The cam 156 slants rearwardly and to the right to a point 162 beyond which it extends a short distance rearwardly without inclination and terminates in a short curved portion 164.

For insuring the return of the tensioning devices T to their normal positions adjacent to the reels R when the machine is running idly, without laces in the holders, there is provided a sec-

ond stationary cam 166 formed of angle iron with an upstanding flange. This cam 166 is mounted on the shelf 25 and it slants rearwardly and toward the left. The forward end of the cam 166 is so positioned as to engage the block 124, providing no other force such as a tension in the laces L and L' is acting upon the block, and urge it toward the left as the carriage 20 moves rearwardly.

For rotating the reels R to wind the laces, there is provided a rack 168 having a flange 170 by which it is secured to the shelf 25. The rack 168 extends rearwardly and parallel to the rail 22, being spaced therefrom at a suitable distance to enable it to be engaged by the pinion 92 as the carriage 20 travels rearwardly. The forward end of the rack 168 is positioned, forwardly and rearwardly of the machine, at a point whereat the pinion 92 will engage the rack at the same instant, or immediately thereafter, that the block 124 passes the curved end 164 of the cam 156. As the carriage 20 travels rearwardly, the stationary rack 168 causes the pinion 92 to turn against the resistance of the brake lining 84 and to wind the laces in a clockwise direction, as seen from above. A rack having seventy-nine teeth, and a pinion having thirty-two teeth will operate satisfactorily to wind the laces through two and one-half turns.

The stripper S, as shown in Figs. 1 and 9, consists, in effect, of a pair of double tined forks 172 and 174 which slope upwardly and rearwardly to their tips. As each reel R, with a pair of laces L and L' wound upon it, passes down under the sprocket wheels 140 and 144 and begins its lower run, the fork 172 embraces the holding pin 30 and the fork 174 embraces the holding pin 28 to strip the laces from the pins. These forks are adjustably secured upon a bracket 176 mounted on the rear portion of the frame 26. The tines of each fork are actually separate members mounted for independent adjustment.

Secured upon a guard 178 (Figs. 1 and 2), extending forwardly from the front of the machine, is a rack 180 formed of bent wire. The function of this rack is to hold a supply of shoe laces L'' to be operated upon. Toward the rear of the machine on the left-hand side is another guard 182, only the skeleton framework of which is shown.

The operation of the machine will now be described. An operator standing in front of the machine selects two laces L and L' from the supply on the rack 180 and inserts these laces, holding them parallel and without twist, into the kerf 60 of the holding pin 28 of one of the reels R and then into the kerf of the holding pin 104 of the associated tensioning device T. As shown in Figs. 5 and 6, the laces pass in front of the holding pin 30 and the winding pin 34. It is possible for the operator, with very little practice, to thus insert the laces L and L' without stopping the drive of the machine. As the carriage 20 advances, the block 124 will come into contact with the cam 156 (Fig. 6) and the tensioning device T will move to the right, that is, away from the reel R. The brake band 82 holds the reel R against turning as the laces L and L' are pulled toward the right through the kerf 60. It is unnecessary for the operator to match the ends of the laces L and L' when he inserts the laces into the kerfs of the pins 28 and 104 because, as the tensioning device T is moved away from the reel R, each lace will slip through the kerf of one of the holding pins 28 or 104 until the hardened or Celluloid-encased tip of that lace will engage the holding pin, whereupon the lace will slip through the kerf of the other holding pin until its tip comes into engagement with that holding pin. The length and inclination of the cam 156 are so chosen as to move the tensioning device T just far enough to the right to accomplish this result and to pull the laces taut for the particular length of the shoe laces being operated upon. It is evident that the two ends of the lace L will thus be evenly matched with the two ends of the lace L' automatically by the operation of the machine and without requiring attention on the part of the operator.

At just about the time that the block 124 is traveling over the curved end 164 of the cam 156 (Fig. 7), the pinion 92 will engage the forward end of the rack 168. The reel R thereupon begins to turn in a clockwise direction, winding the laces L and L' about the winding pins 32 and 34 and thus forming them into skeins. The upper surface of each of the collars 58 is a little below the level of the bottoms of the kerfs 60 to provide clearance for the laces as the reel R turns. These collars serve to hold the loops of the laces wound around the winding pins 32 and 34 from sagging. As the laces are thus wound, their right-hand ends, being caught in the pin 104, will draw the tensioning device T to the left against the frictional drag of the blocks 110 and 124 on the upper and lower surfaces of the carriage 20. This frictional drag and the resulting tension in the laces can be adjusted by turning the screw 122 to tighten or loosen the spring 128. The rearward travel of the carriage 20 will cause the reel R to rotate through the position shown in Fig. 8 until the reel has made substantially two and one-half complete turns. As the rearward movement of the carriage continues, the reel is frictionally held, by the brake 82, in the position shown in Fig. 8 and as the carriage passes the guard 182 a second operator wraps an adhesive-coated band B (Fig. 9) around the midportion of the skeins to form them into a permanent bundle. This operation also can be performed without stopping the machine.

The spring 116 is weak enough to yield readily as the operator squeezes the band around the laces. Such yielding of the spring allows the ends of the laces that are held by the pin 104 to be brought close to those portions of the laces that have been wound on the reel and thereby insures a neat appearance to the laces when they have been banded to form a package.

As the carriage 20 continues to move, it travels down under the sprocket wheels 140 and 144 (Fig. 1), whereupon the stationary stripper forks 172 and 174 remove the banded skeins from the holding pins and permit the bundles to drop into a suitable receptacle 184 (Fig 1). The same carriage 20 is now carried along the lower run of the chains to the forward end of the machine. Since the reel has been turned through two and one-half complete turns, the holding pin 30 will now occupy the position formerly occupied by the holding pin 28. In supplying laces to the reel R, therefore, the operator will now insert the laces into the kerfs of the pins 30 and 104.

Inasmuch as some of the carriages 20 will be in motion at various times (such as just after the power drive is started and just before it is stopped) without laces being supplied to their reels R and tensioning devices T, it is desirable to provide some means for returning the tensioning devices to their initial positions adjacent to the reels R. This is accomplished by the cam

166. Thus, even if there are no laces to pull the tensioning devices to the left, after the carriage has been moved to the right by the cam 156, the cam 166 will force the tensioning device to the left into their initial positions adjacent to their associated reels. The operator at the front of the machine is thus relieved of the need of manually moving the tensioning devices into suitable loading position. Furthermore, only a small clearance opening 186 need be made in the guard 178 to permit passage of the tensioning device T.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a machine for winding shoe laces in pairs, means for bringing an end of one shoe lace of a pair into register with an end of the other lace, and means for winding the laces while said ends are in register to form the laces into a skein in preparation for forming them into a permanent bundle.

2. In a machine for winding shoe laces in pairs, means for holding a pair of shoe laces with an end of one lace in register with an end of the other lace, means for drawing the laces taut in side-by-side relation with the ends of one lace in register with the ends of the other lace, and means for winding the laces while they are thus held taut into a skein in preparation for forming them into a permanent bundle.

3. In a machine for winding shoe laces in pairs, means for pulling a pair of shoe laces in side-by-side relation to bring the ends of one lace into register with the corresponding ends of the other lace, means for winding the laces in preparation for forming them into a bundle, and means for maintaining the laces taut while they are being wound.

4. In a machine for winding shoes laces in pairs, means for holding a pair of shoe laces with an end of one lace in register with an end of the other lace, means for pulling the laces taut with their opposite ends in longitudinal register, and means operable while the two pairs of lace ends are thus maintained in register to wind the laces in preparation for forming them into a bundle.

5. In a machine for winding shoe laces in pairs, a holder through which a pair of tipped laces can slide until the tips of the laces engage the holder, the holder being constructed and arranged to hold the tips against tension of the laces and thereby to hold an end of one lace in register with an end of the other lace when the laces are tensioned, a second holder like the first-mentioned holder and similarly capable of holding the opposite ends of the laces in register when the laces are tensioned, means for moving one of the holders away from the other until the ends of one lace are in register with the ends of the other lace, a reel for winding the laces in preparation for forming them into a bundle, and means for maintaining tension in the laces while they are being wound.

6. In a machine for winding shoe laces in pairs, a holder through which a pair of tipped laces can slide until the tips of the laces engage the holder, the holder being constructed and arranged to hold the tips against the tension of the laces and thereby to hold an end of one lace in register with an end of the other lace when the laces are pulled, a real having two winding pins parallel to its axis, said holder being mounted on said reel between said winding pins, a second holder like the first-mentioned holder and similarly capable of holding the opposite ends of the laces in register when the laces are pulled, means for moving the second-mentioned holder away from the reel until the ends of one lace are in register with the ends of the other lace, means for turning the reel to wind the laces in preparation for forming them into a bundle, the second-mentioned holder being movable to approach the reel as the laces are wound, and means for controlling the approach of the second-mentioned holder toward the reel to maintain tension in the laces during the winding operation.

7. In a machine for winding shoe laces in pairs, a holder through which a pair of tipped laces can slide until the tips of the laces engage the holder, the holder being constructed and arranged to hold the tips against tension of the laces and thereby to hold an end of one lace in register with an end of the other lace when the laces are pulled, a second holder like the first-mentioned holder and similarly capable of holding the opposite ends of the laces in longitudinal register when the laces are tensioned, means for effecting a relative separation of the holders until the ends of one lace are in register with the ends of the other lace, a reel for winding the laces in preparation for forming them into a bundle, means for operating said reel, and a friction device opposing the approach of one holder toward the other to maintain tension in the laces as they are being wound.

8. In a machine for winding shoe laces in pairs, a carriage, a stationary frame having a guideway along which said carriage is movable, a reel journaled on said carriage, a holder through which a pair of tipped laces can slide until the tips of the laces engage the holder, said holder being mounted on said reel and being constructed and arranged to hold the tips against the tension of the laces and thereby to hold an end of one lace in register with an end of the other lace when the laces are pulled, a second holder like the first-mentioned holder and similarly capable of holding the ends of the laces in register when the laces are pulled, said carriage having a guideway along which the second-mentioned holder is movable toward and from the reel, a cam mechanism constructed and arranged to move the second-mentioned holder away from the reel as the carriage travels along its guideway, thereby bringing the ends of one lace into register with the ends of the other lace, a pinion on the reel, a rack on the stationary frame, said pinion and rack being constructed and arranged to rotate the reel after the ends of the laces have been brought into register, thereby winding the laces in preparation for making them into a bundle, and a friction device opposing the approach of the second-mentioned holder toward the reel to keep the laces taut while they are being wound.

9. In a machine for winding shoe laces in pairs, a holder through which a pair of tipped laces can slide until the tips of the laces engage the holder, the holder being constructed and arranged to hold the tips against the tension of the laces and thereby to hold an end of one lace in register with an end of the other lace when the laces are pulled, a reel on which said holder is mounted, a second holder like the first-mentioned holder and similarly capable of holding the opposite ends of the laces in register when the laces are pulled, means for moving the second-mentioned holder away from the reel until the ends of one lace are in register with the ends

of the other lace, means for turning the reel to wind the laces in preparation for forming them into a bundle, the second-mentioned holder being movable to permit it to be pulled toward the reel by the tension of the laces as the laces are being wound, and means for moving the second-mentioned holder to an initial position adjacent to the reel after it has been moved away from the reel in the absence of laces which would restore it to initial position.

10. In a machine for winding shoe laces in pairs, a reel, a pin on the reel having a cleft through which a pair of tipped laces can slide until the tips of the laces engage the pin, the cleft being constructed and arranged to prevent passage of the tips, a second pin similar to the first-mentioned pin, means for separating the reel and the second-mentioned pin as far as may be necessary to bring the tips of one lace into register with the tips of the other lace, and means for winding the laces on the reel while permitting relative approach between the reel and the second-mentioned pin.

11. In a machine for winding shoe laces in pairs, a reel, a pin on the reel having a cleft through which a pair of tipped laces can slide until the tips of the laces engage the pin, the cleft being constructed and arranged to prevent passage of the tips, a second pin similar to the first-mentioned pin, a carriage on which the reel and the second-mentioned pin are mounted, said carriage having a guideway along which the second-mentioned pin can move toward and from the reel, means for moving said carriage, a stationary cam, means engageable with the stationary cam as the carriage moves to move the second-mentioned pin as far away from the reel as may be necessary to bring the tips of one lace into register with the tips of the other lace, and means for winding the laces on the reel while permitting the second-mentioned pin to move toward the reel.

12. In a machine for winding shoe laces in pairs, a reel, a pin on the reel having a cleft through which a pair of tipped laces can slide until the tips of the laces engage the pin, the cleft being constructed and arranged to prevent passage of the tips, a second pin similar to the first-mentioned pin, a carriage on which the reel and the second-mentioned pin are mounted, means for moving the second-mentioned pin along the carriage away from the first-mentioned pin as far as may be necessary to bring the tips of one lace into register with the tips of the other lace, means for moving said carriage, a stationary rack, and a pinion on said reel engageable with said rack as the carriage moves to rotate the reel and thereby to wind the laces while the second-mentioned pin is moved toward the reel by the pull of the laces.

13. In a machine for winding shoe laces in pairs, a reel, a pin on the reel having a cleft through which a pair of tipped laces can slide until the tips of the laces engage the pin, the cleft being constructed and arranged to prevent passage of the tips, a second pin similar to the first-mentioned pin, means for moving the second-mentioned pin away from the first-mentioned pin as far as may be necessary to bring the tips of one lace into register with the tips of the other lace, means for turning the reel to wind the laces thereon while permitting the second-mentioned pin to approach the reel as it is pulled by the laces, and means independent of the laces for moving the second-mentioned pin toward the reel after the second-mentioned pin has been moved away from the reel, the purpose of the last-mentioned means being to restore the second-mentioned pin to its initial position while the machine is operating without laces being supplied to it.

14. In a machine for winding shoe laces in pairs, a carriage, means for driving the carriage, a reel on the carriage, means for winding a pair of shoe laces on the reel to form the laces into a skein, a pair of cleft pins on the reel for alternative use in holding simultaneously one end of each lace of a pair while the laces are being wound, said cleft pins extending within the skein, and a stationary stripper comprising a pair of two-tined forks, one fork being arranged to embrace one cleft pin and the other fork being arranged to embrace the other cleft pin as the carriage moves past the stripper, said forks extending into the path of travel of the skein to remove the skein from the reel.

15. In a machine for winding shoe laces in pairs, a plurality of carriages, means for driving said carriages in a closed path, a reel on each of said carriages, means on each carriage for holding a pair of shoe laces in position to be wound upon the reel on that carriage when the reel is turned, a pinion on each reel, and a stationary rack which is engaged by the pinions to turn the reels and thereby wind the laces as the carriages move past the rack.

16. In a machine for winding shoe laces in pairs, a plurality of carriages, means for driving said carriages in a closed path, a reel on each of said carriages, a cleft holding pin on each reel constructed and arranged to permit a pair of laces to slide therethrough as far as the tips of the laces and to prevent passage of the tips, a similar cleft holding pin guided on each carriage for movement toward and from the reel on that carriage, the second-mentioned holding pin being adapted for similar engagement with said pair of laces, a cam follower on each of the second-mentioned pins, a stationary cam engageable by the cam followers as the carriages move past it to move each of the second-mentioned pins away from its associated reel to tension the laces and bring their ends into register, and means for turning the reels to wind the laces.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,927,708	Pieczentkowski	Sept. 19, 1933
1,934,471	Kerr	Nov. 7, 1933