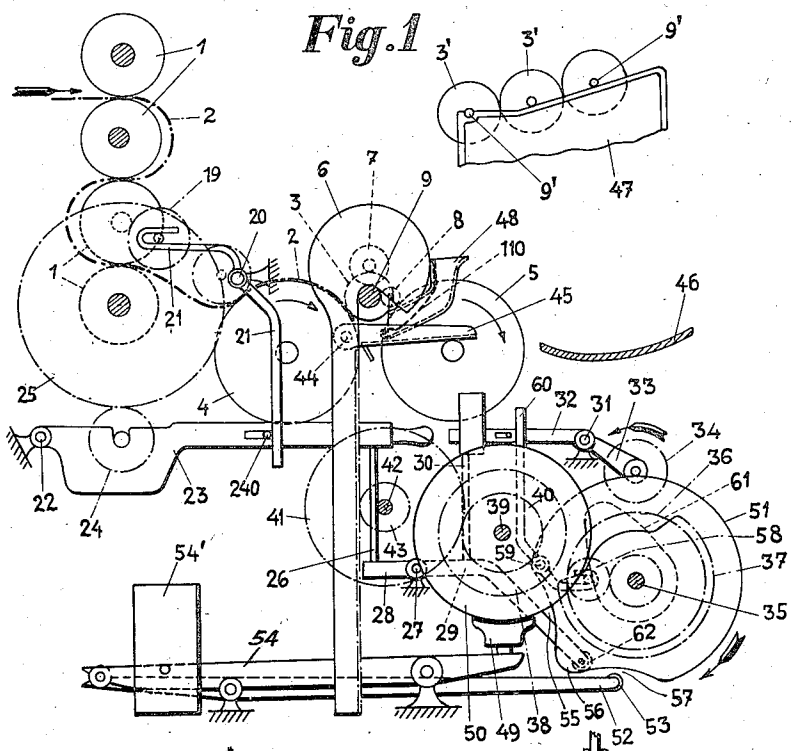
April 14, 1936. M. STEIN 2,037,348

AUTOMATIC LAP WINDING MACHINE

Filed Dec. 13, 1932 4 Sheets-Sheet 1

Fig. 1



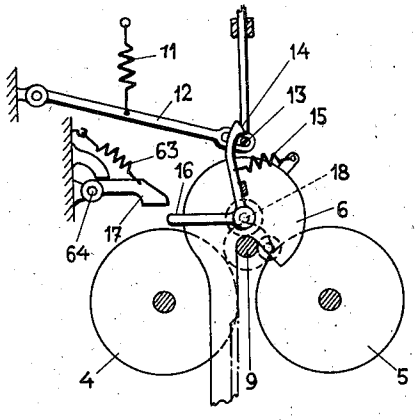


Fig. 2

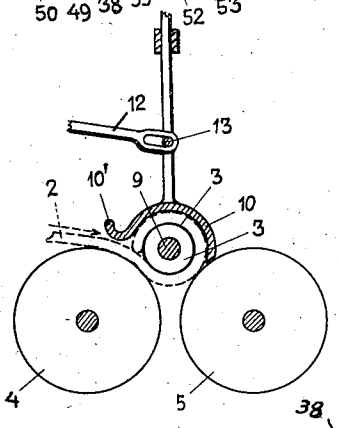


Fig. 3

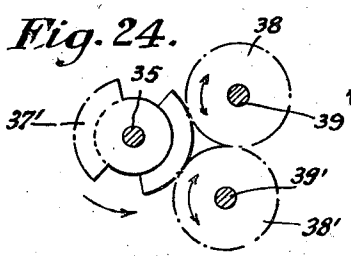


Fig. 24.

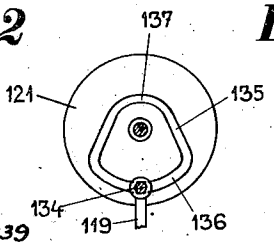


Fig. 19

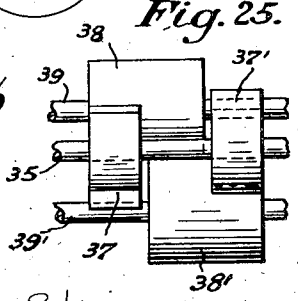


Fig. 25.

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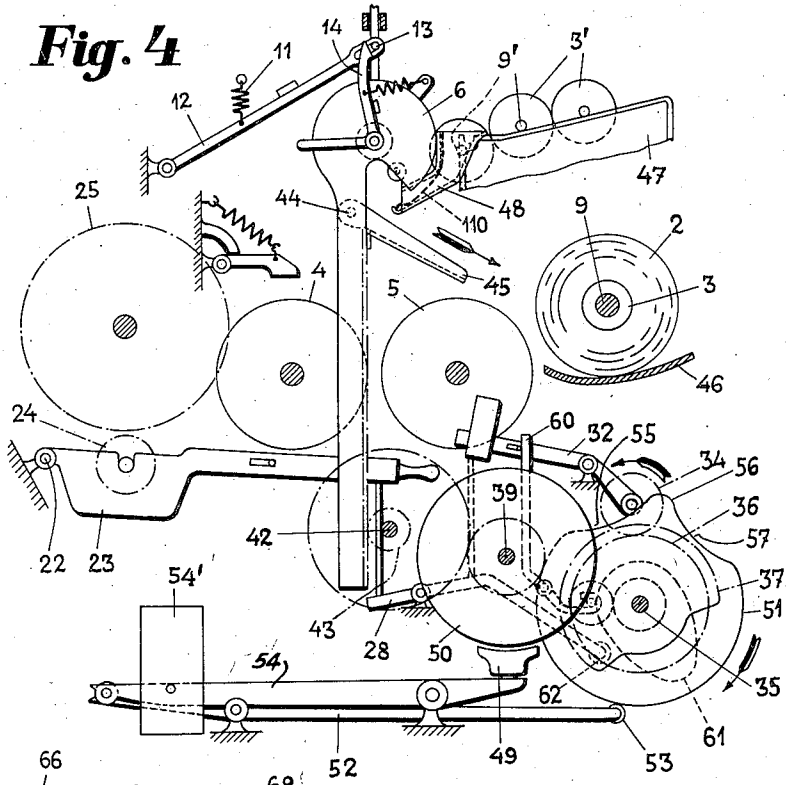
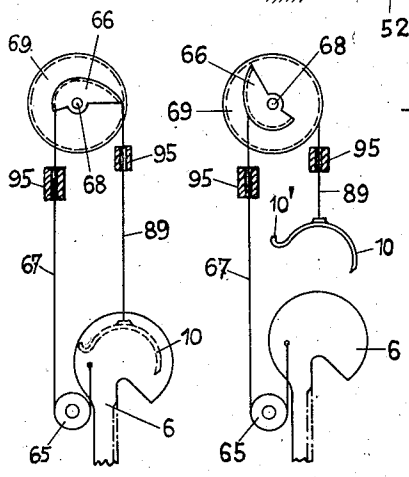
April 14, 1936. M. STEIN 2,037,348

AUTOMATIC LAP WINDING MACHINE

Filed Dec. 13, 1932 4 Sheets-Sheet 2

Fig. 4





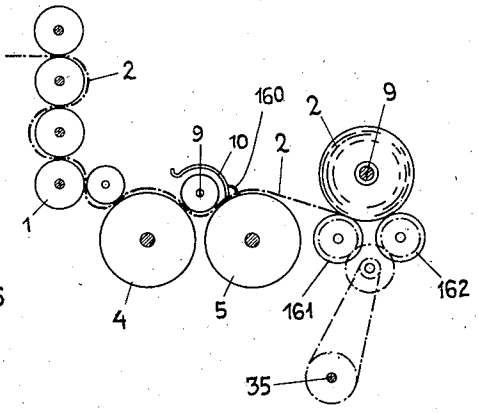


Fig. 5 Fig. 6 Fig. 7

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April 14, 1936. M. STEIN 2,037,348

AUTOMATIC LAP WINDING MACHINE

Filed Dec. 13, 1932 4 Sheets-Sheet 3

Fig. 8

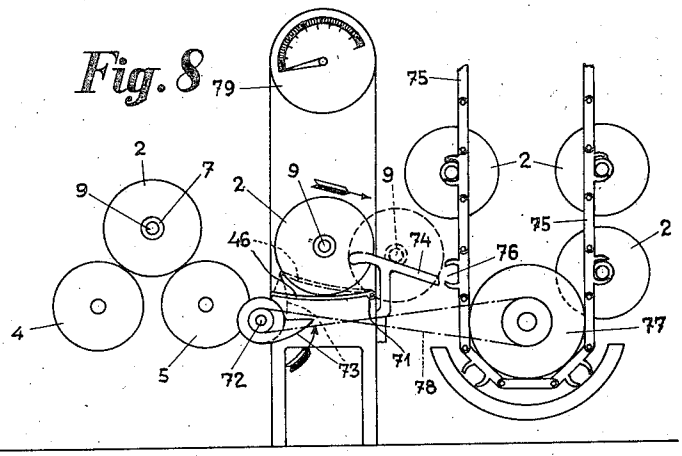


Fig. 9

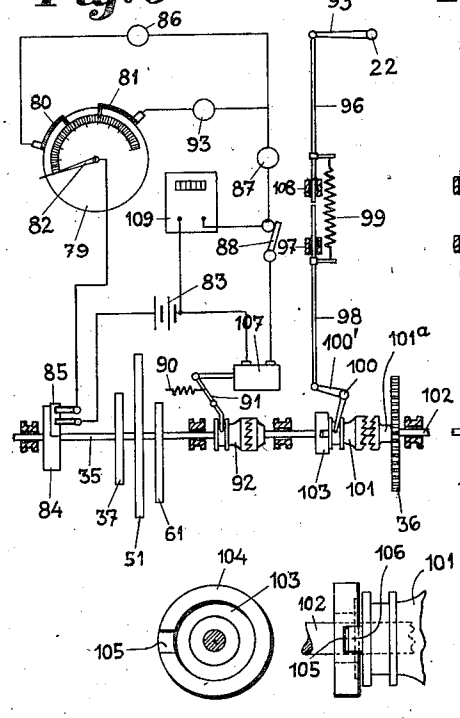
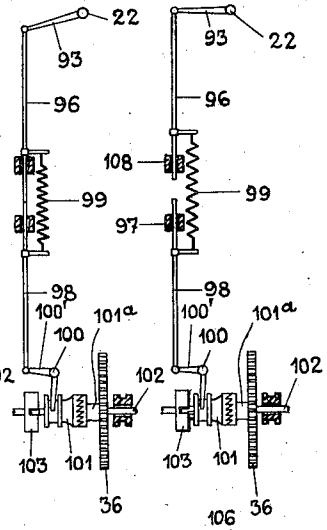


Fig. 10 Fig. 11



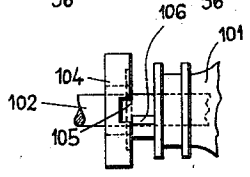


Fig. 12 Fig. 13 Fig. 14

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April 14, 1936. M. STEIN 2,037,348

AUTOMATIC LAP WINDING MACHINE

Filed Dec. 13, 1932 4 Sheets-Sheet 4

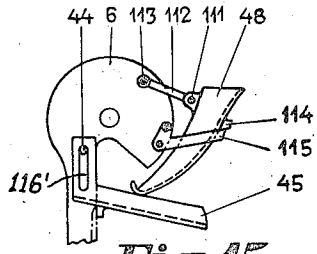

Fig. 15

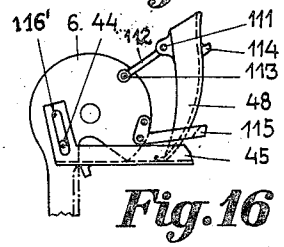

Fig. 16

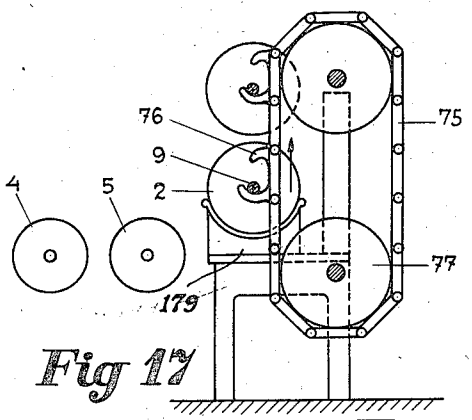

Fig 17

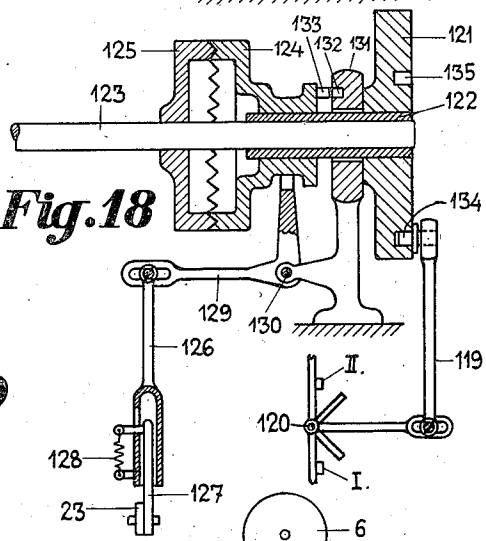

Fig. 18

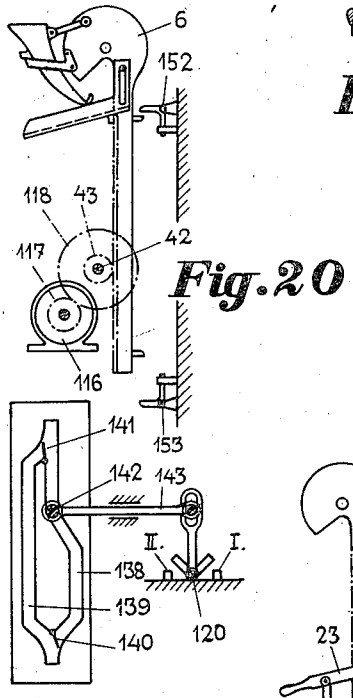

Fig. 20

Fig. 21

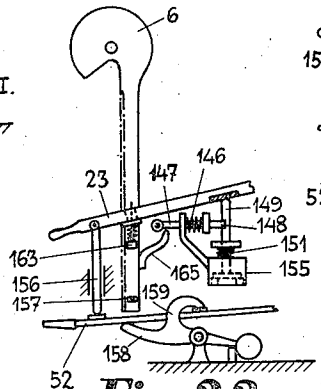

Fig. 22

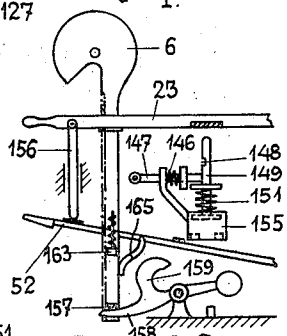

Fig. 23

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Patented Apr. 14, 1936 2,037,348

UNITED STATES PATENT OFFICE

2,037,348

AUTOMATIC LAP-WINDING MACHINE

Marcel Stein, Budapest, Hungary

Application December 13, 1932, Serial No. 647,037
In Hungary December 17, 1931

25 Claims. (Cl. 19—162)

This invention relates to automatic lap-winding machines for use in the preparatory operations of spinning, and more particularly to lap-winding machines having automatically raised racks and associated with cotton scutchers, said lap-winding machine being of the kind in which after the finished lap has attained a certain length an empty lap roller is automatically substituted therefor.

The invention substantially consists in connecting the racks to the lap ejecting and supplying device in such a manner that during the raising and lowering of the racks firstly the finished lap is thrown out by the ejector and then an empty lap roller being in a position in which it is ready for use is caught by the supplying device and guided to the driving rollers. The ejecting and supplying device is controlled by the racks or is arranged on the racks themselves.

One object of the invention is to render the ejecting and supplying device simple in construction and easy to handle, by leaving out the system of rods, eccentrics and the like, which in the known machines are connected to a cam shaft extending through the whole machine and thus being very long, as well as difficult to mount. A further advantage of the invention is that the cam shaft, if not entirely left out, may be considerably shortened.

In an appropriate form of the invention the ejector substantially consists of a guide extending underneath the lap and doffing the same if the rack is raised, the supplying device for the empty lap rollers substantially consisting of a guide fastened on and inclined towards the rack, and of a frame cooperating with the latter and adapted to receive several lap rollers simultaneously, one of which is led from time to time into the oblique guide at the raising and lowering of the racks. Although the device according to the invention operates continuously, there is sufficient time for weighing each lap after having been ejected, which is not the case with known machines.

In a preferred form of the new lap winding machine the finished laps are carried away by a conveyor which for a certain period stores these laps, thus affording a continuous operation.

A further object of the invention is to stop the machine automatically, if the weight of the produced lap is not within fixed limits, with the result that a reliable automatic control is attained. This stopping of the machine is effected by scales which electrically act upon the stopping device of the machine.

The accompanying drawings illustrate a few forms of the invention.

Fig. 1 is a side view of the lap machine in the braked position of the racks and during lapping.

Figs. 2 and 3 show details of this machine.

Fig. 4 shows the same view as Fig. 1, but after the finished lap has been ejected and an empty lap roller has been caught by the supplying device.

Figs. 5 and 6 show an alternative cover-lifting device in two different positions.

Fig. 7 shows a part of a further embodiment.

Fig. 8 shows a combined lap weighing and transporting device.

Fig. 9 illustrates a part of a further form provided with an automatic weighing device, Figs. 10 to 14 inclusive showing different parts in different positions of this form.

Figs. 15 and 16 show another form of the racks in two positions.

Fig. 17 shows a further form of the conveyor.

Fig. 18 shows a further form of the rack driving device, Fig. 19 showing a part of this device.

Fig. 20 is the side view of the racks and the driving electric motor.

Fig. 21 shows a device for controlling said electric motor, and

Figs. 22 and 23 illustrate two positions of another device for controlling the electric motor.

Figs. 24 and 25 show a modification of the device according to Figs. 1 or 4 in side view and front view respectively.

3 is an empty lap roller (Fig. 1) at the ends of which there are pivots 9, over which on either side a rack grips. The lap 2 approaches the lap roller 3 in the direction of the arrow, passing through the series of compression rollers 1 and over the two driving rollers 4 and 5 placed at a given distance from each other, against which, at the beginning, the lap roller 3 is pressed by the weight of the racks bearing on its pivots. In the rackheads are rollers 7 and 8 against which the pivots 9 bear. The wrapping on of the lap 2 on the roller 3 is effected in a well known manner by a half-cylindrical cover 10 (Fig. 3) whose edge facing the entering lap 2 is bent up.

This cover is suspended by a pivot 13 which may slide in a longitudinal slot of the arm 12 which swings under the control of a spring 11. A spring controlled lever 14 of the rack 6 pressing against the pivot 13, keeps the arm 12 in the position shown in Fig. 2. The cover 10 causes the lap 2 to lie against the circumference of lap roller 3. As the lap formation progresses, the roller 3 and the racks 6 are lifted in relation

to the rollers 4 and 5; thus, after a short movement, the arm 16 of lever 14 engages with a locking finger 17, so that the lever 14 swings away and frees the pivot 13, as well as the arm 12. Under the influence of spring 11, this arm swings upwards into the position shown in Fig. 4 taking with it the cover 10, which has already performed its function of laying the lap on the roller.

The formation of the lap progresses till the required thickness is attained; then the automatic stop motion 19 stops the compression rollers 1 in a well known manner and, according to the invention, starts simultaneously a device which automatically removes the finished lap from its situation under the racks 6, and conveys a fresh empty lap roller in place thereof.

This is performed in the embodiment shown, as follows:

The stop motion counter 19 (Fig. 1) swings the lever 21 around pin 20, which lever in turn swings in the usual way an arm 23 around pivot 22 from its engaged position by shifting the pin 240, so that the gear wheel 24 disengages from gear 25 fixed on the shaft of the undermost press roller 1. Thus the press rollers 1 stop, but driving rollers 4 and 5 continue to rotate the finished lap, breaking the layer 2 of the lap.

In consequence of its weight, lever 23 actuates by rod 26 the two armed lever 28, which can be a laminated spring swinging about pivot 27, lifting through its arm 29 the rod 30 so that the two armed lever 32 swings around pivot 31, and gear wheel 34 attached to arm 33 engages with gear wheel 36 on the cam shaft of the machine, thus causing it to rotate. Gear wheel 34 is constantly driven in the direction of the arrow. Cam shaft 35, by toothed segment 37 and gear wheel 38, rotates shaft 39, which by means of gear wheels 40 and 41 shaft 42 and gear 43 keyed thereon, lifts the racks 6.

Swingably mounted on pivot 44 of rack 6 is a lateral L-shaped guide 45 the downward movement thereof being limited by a stop, said guide following the upward motion of the racks, presses against pivots 9 and frees the finished lap, which rolls along guide 45 coming into the oblique position shown in Fig. 4. The lap rolls down into a trough 46, which may be a part of a weighing device, as set forth below.

In the meantime, the continually rising racks have reached the empty lap roller 3' resting on frame 47 in a position ready for use. The oblique guide 48 attached to rackheads 6 releases the empty lap roller (Fig. 4), whose pivots roll down in guide 48. The sinking of the fresh roller is damped by two laminated springs 110, so that when the pivots 9' reach the lowest part of guide 48, they are stopped and remain in the guide.

At this moment the toothed segment 37 ceases to mesh with gear 38, so that gear wheels 40, 41 and 43 become idle and the racks 6 fall under the action of gravity, carrying down the new lap roller. Just before the racks 6 reach their lowest position, the roller 3' strikes against the roller 5, or a certain part of the frame of the machine (not shown) and slides into its working position.

In certain cases it is difficult to arrange the guide 45 as low as shown in Fig. 1. In these cases the embodiment shown in Figs. 15 and 16 is preferable. In this form of the invention the pivot 44 is in the desired high position and is within a slot 116' of the guide 45. If the racks are in their lowest position, the guide 45 takes the high position shown in Fig. 16, leaving plenty of room for the constructional parts which are to be placed under this guide. In this form of the invention the guide 48 must, of course, also be able to come into a high position, which is made possible by connecting this guide to the rack by means of a link 112 pivoted to the rack by a pin 113 and to the guide by a pin 111. Thus if the guide 45 is lifted in the position shown in Fig. 16, it keeps also guide 48 in an elevated situation.

When the racks are raised, the guide 45 falls into the position according to Fig. 15, so that guide 48 is also lowered until its nose 114 bears on a buffer 115 rigidly secured on the rackhead. Thus, after a short upward movement of the racks, the guides come into their working position.

In the later period of downward movement of the racks 6, a brake shoe 49 (Fig. 1) lies against the friction pulley 50 fixed on shaft 39, thus braking the fall of the racks. This is effected by a cam disc 51 fastened on the cam shaft 35. This disc has two recesses 55, 57 between which there is a cam 56. The disc 51 engages with a roller 53 pivoted on the end of lever 52. While this roller is in contact with the cylindrical surface of the disc 51, the brake is released (Fig. 4), whilst a braking takes place when one of the recesses frees the roller. The brake shoe 49 is fixed on the shorter arm of a lever 54 the longer arm of which bears a weight 54', the free end of this arm being connected to the adjacent end of lever 52, which carries the roller 53. As soon as the recess 55 frees roller 53, weight 54' acts upon brake shoe 49, which takes place before the rack has attained its lowest position. The braking becomes momentarily interrupted by cam 56, after which, at the recess 57, the complete braking takes place. The interrupting of the non-cylindrical part of disc 51 by the cam 56 has the advantage that if the racks are stopped by braking in consequence of the action of recess 55 before attaining their lowest position, the releasing of the brake by cam 56 results in the racks finishing their sinking movement. Should the racks reach their lowermost position before the cam 56 engages roller 53, the momentary releasing of the brake has no effect.

The downward movement of the racks may be effected positively by cam shaft 35 as an alternative to the above embodiment. For this purpose the gear 43 meshing with the toothed part of the rack is to be driven by a known reversing device, which may be constituted according to Figs. 24 and 25 by fixing on cam shaft 35 a second toothed segment 37' displaced in a suitable axial distance from segment 37. When segment 37 ceases to mesh with gear 38, segment 37' engages an intermediate wheel 38' rotating gear 38 in the opposite direction and thus lowering the racks. In this case the braking is applied only when the racks have attained their lowest position.

As soon as the lap rack has attained its lowest position, counter 58 of known construction throws gear wheel 34 out of mesh with gear 36 by means of two armed lever 60 which turns about pivot 59, so that cam shaft 35 stops (see Figs. 1 and 4). In this last period cam 61 strikes against roller 62 fixed on the end of the lever arm 29, so that the displaced two armed lever 28, 29 lifts, by means of rod 26, lever arm 23 and throws gear wheels 24, 25 into mesh; thus the press rollers 1 start again and the broken off end of the lap runs again towards roller 3.

The cover 10 should be at this time already in its lowest position. For this purpose the lowering racks take the cover with themselves, as the upper end of lever 14 engages at the uppermost position of the racks the pin 13. During the lowering of the racks and cover 10, arm 16 strikes against the spring controlled finger 17, which escapes from the path of this arm.

Figs. 5 and 6 show another device for raising and lowering the cover 10. In this form a cord or wire rope 67 is attached to the rackhead and led around a roller 65 pivoted on the frame of the machine, then within a sleeve 95 to an eccentric disc 66, to which it is secured. Another cord 89 is fixed to a roller 69 keyed to the shaft 68 of disc 66, this cord being led through another sleeve 95 to the cover 10. Thus when the rack is raised, the cover rises quickly, but when a certain height is attained the speed of the cover is greatly decreased, as the cord 67 comes to a part of disc 66 having a longer radius (Fig. 6). This has the effect that the path of the cover is not too long.

According to the form shown in Fig. 7, the cover 10 is provided with means 160 adapted to cut the lap when the cover is lowered into its position shown in this figure. These means advantageously consist of sharp elongations or teeth pressing the lap to the driving roller 5 and thus separating the part of the lap which is to be rolled up on the empty lap roller, from the part belonging to the finished roller. In this embodiment the gear 24 is not pivoted in the lever arm 23 as shown in Figs. 1 and 4, but its bearings are fixed and mounted independently from this arm, so that when this arm is swung in a clockwise direction, gear 24 does not move and rollers 1 continue their rotation. Thus the layer of the lap 2 is not broken when the finished lap is ejected, as the supplying of the lap is continued by the rollers 1. This arrangement makes it necessary to continue the rotation of the lap after its ejection, so that instead of the trough 46 of the foregoing forms, the lap is doffed onto two rollers 161 and 162, constantly driven in one and the same direction for instance by cam shaft 35. Thus during the raising and lowering of the racks the lap is rotated by rollers 161 and 162, these rollers driving the lap advantageously somewhat faster than rollers 4 and 5, causing a slight tensioning of the lap 2.

When the cover 10 reaches its lowest position, the lap 2 is cut in the manner set forth and the part of the lap which is outside the cover and under the teeth 160 is pulled back by the lap roller and the lapping goes on without trouble, as proved by experiments. The finished lap is carried away by hand or by a conveyor of any description.

Of course the teeth 160 may be built at the edge of the cover itself, i. e. the edge of the cover may be of such a form (for instance saw-toothed) that the desired effect is attained.

The invention relates further to devices for the automatic removal of the ejected lap from the trough or the weighing device, and further to the automatic stopping of the machine, if the weight of the finished lap does not fall within certain admissible limits. For the first mentioned purpose, according to Fig. 8 the trough 46 can swing around a pivot 71 under the influence of the cam 73 located on shaft 72, which lifts it from time to time. Thereby the pivots 9 of the lap roll down on the oblique guide 74 in the direction of the arrow and fall between claws or paws 76 of a well known conveyor 75 which carries the finished laps away and lays them down at any desired place. The laps, however, may also be taken out of the conveyor by hand. The conveyor 75 extends around two cylinders 77, only one of which is shown in Fig. 8. This conveyor enables the machine to operate continuously, as the doffed laps are raised up making place for the following one.

According to Fig. 8, the trough 46 forms part of a weighing device showing the weight of the finished laps on the scale provided on plate 79. But it is also possible to have the laps doffed directly into the claws of the conveyor, for which purpose for instance the guide 74 is made somewhat longer to take up the ejected lap and to lead it to the conveyor. According to Fig. 17 the laps doffed into the trough of the weighing device 179 are taken out of said trough directly by the claws of the conveyor 75, so that a swinging or raising of the trough is not necessary.

For stopping the machine if the weight of the lap does not fall within the admissible limits, in the embodiment shown in Fig. 9 a finger or pointer 82 of the weighing device moves in front of a plate 79 having a scale. On the plate 79 there are two separated contacts 80, 81 the ends of which facing each other lie on the limits of the admissible lap weight. These contacts are connected through signal lamps 86, 87, and 93, 87 respectively to a switch 88 and to an electromagnetic device 107 one pole of which is connected to the source of current 83 directly, while the other pole communicates with the respective pole of the source of current through short circuit segment 85, pointer 82 of the scale, the signal lamps and switch 88. The armature of the electromagnetic device 107 is in connection with lever 91, which is under the influence of spring 90 and engages in a recess of one half coupling 92 shiftable but unrotatable on cam shaft 35. The cooperating half coupling is keyed to driving shaft 102. As soon as the pointer of the scale records an inadmissible weight, said pointer touches contact 80 or 81 and thus the circuit is closed, by which lamps 86 and 87 or 93 and 87 light up and show the fault; at the same time coupling 92 under influence of the electromagnet of the device 107 becomes disengaged, by which means cam shaft 35 is stopped. It is, of course, possible, to stop in the same way another rotatable part of the machine, the stopping of which prevents the machine from functioning. Connected in parallel with the electromagnetic device 107 there is included in the circuit an electrical indicator 109, for recording the number of bad (that is, too heavy, or too light) laps. On the circuit being closed by the pointer 82, the current flows through this indicator, which advances with one numeral, thus affording a simple means for indicating the waste in the laps. The subtraction of the number of bad laps recorded by the electrical indicator 109 from the number of the total produced laps recorded by the hank indicator, gives the number of good laps In this way abuses are excluded, because every lap must fall in the trough of the balance and every bad lap is recorded by the indicator 109. A wage system can be built up in this way by making the workman responsible for the waste in laps.

The short circuit segment 85 is secured to a disc 84 keyed to shaft 35 in such a way that when the ejected lap falls into the trough of the weighing device, this segment does not yet touch its contacts and so the circuit cannot be closed. A few seconds later when the weighing device has

come in balance, segment 85 is turned to its contacts and allows the closing of the circuit. The machine is restarted by interrupting the circuit at switch 88 in consequence of which spring 90 engages the coupling again.

In the embodiment according to Fig. 1 or 4, the intermittent turning of cam shaft 35 is effected by way of a pinion 34 mounted in a lever 32. In the embodiment according to Fig. 9 this intermittent rotation is effected, as already mentioned, by means of the driving shaft 102, which may turn the shaft 35 by a coupling 101, 101a. This coupling is engaged by arm 93 fixed on pivot 22 (see also Fig. 1). To this arm is hinged a rod 96 sliding in guide 108. A second rod 98 is shiftable in guide 97.

These two rods 96, 98 are pulled, towards each other by a spiral spring 99. To the lower end of rod 98 is hinged a crank lever 100' turning about pivot 100, the forked end of which embraces the left half coupling 101 shiftable but not rotatable on shaft 102 while half coupling 101a secured to the constantly driven gear wheel 36 runs idle on shaft 102. Close to the half coupling 101 is an immovable disc 103 with a rim 104 (Fig. 12), which is interrupted by a recess 105. On the back of the half coupling 101 is a cam 106 which engages in a certain position the recess 105 of the rim (Fig. 13). When the lap is finished and arm 23 (Fig. 1) sinks, pivot 22 is also turned, so that arm 93 engages by means of rod 96, 98 and lever 100' the half coupling 101 with half coupling 101a, driving shaft 102 beginning thus to rotate the cam shaft 35. This position of the arrangement is shown in Fig. 10, in which it is to be seen, that the cam 106 has been pulled out from recess 105, enabling the coupling to turn. When the machine is started again that is to say arm 23 is raised, pivot 22 turns into the position according to Fig. 11 and pulls the rod 96 upwardly, tensioning the spring 99. At this moment the rod 98 cannot follow the movement of rod 96, as the cam shaft 35 has not yet finished its revolution and cam 106 rides on the outer surface of rim 104; but as soon as this cam snaps into the recess 105, rod 98 is pulled up by the spring 99 and the coupling 101, 101a is disengaged.

In this embodiment the counter 58 provided on lever 60 (Figs. 1 and 4) is superfluous, as it is replaced by rim 104, recess 105 and cam 106.

In the following a further embodiment will be described, in which the cam shaft 35 is superfluous, as the racks are moved upwardly and downwardly by an electric motor 116 (Fig. 20) through gear wheels 117, 118 and 43. The latter is fixed on shaft 42. The arm 119 (Fig. 18) of switch 120 controlling said motor is governed by a plate 121 having an eccentric groove 135. Said plate is fastened on a sleeve 122 rotating freely on shaft 123 which is constantly driven for instance by the roller 5. On the same sleeve one half 124 of a clutch coupling is shiftably but unrotatably mounted. The other part 125 of the coupling is fixed on the shaft 123. At the fall of arm 23 the coupling 124, 125 is engaged by means of two rods 126, 127 connected to this arm and pulled against each other by a spring 128, and by means of a crank lever 129 turning around a pivot 130 as the vertical, forked arm of this lever embraces the half coupling 124. Thus on the arm 23 falling, sleeve 122 and together with this sleeve, the plate 121 begin to turn, at which moment the roller 134 guided in the recess 135 is at the right extremity of this recess (Fig. 19) and begins to move downwards, so that the rod 119 on which the roller 134 is pivoted, closes the circuit at contact I of switch 120 and thus the motor 116 is started, said motor lifting the racks.

On the plate 121 continuing to rotate the rod 119 is lifted and the switch 120 is changed over, causing a reversed motion of the motor. This is effected at the part 137 of the recess. For preventing excess upward or downward movement of the racks, end-switches 152, 153 may be provided (see Fig. 20). The plate or disc 121 may be made also as an electrical controller with sliding contacts governing the motor in the described way. When the lap ejecting and supply operations are finished and arm 23 is lifted, spring 128 is tensioned and the clutch 124, 125 is disengaged in a similar manner to the disengagement of clutch 101, 101a of the embodiment according to Figs. 9 to 14. For this purpose the spring 128 pulls up rod 126 as soon as cam 133 snaps into a recess 132 on the fixed ring 131.

The switch controlling the upward and downward movement of the racks can be governed by a suitably shaped slot situated on the rack itself, as shown in Fig. 21. When the rack is raised in consequence of the growth of the lap, roller 142 of a rod 143 controlling switch 120 is guided in a straight part of this slot. When the rack has attained a certain height, the curved or oblique part of this slot shifts rod 143 to the right so that contact I of switch 120 is closed and the motor 116 is set running. The racks are then raised by said motor, and the roller 142 is guided in part 138 of the slot. At the lower part of this slot the roller strikes against a spring 140 and snaps behind the latter, pulling back the rod 143 so that the motor stops. Then the racks begin to sink under gravity and roller 142 is led by spring 140 into part 139 of the slot, so that contacts II are closed and the motor is set into a reversed motion. At the lowermost position of the racks, the roller snaps behind a spring 141, leading it into part 136 at the next lifting of the racks.

A further and very simple embodiment of the electrical control is shown in Figs. 22 and 23. The fall of arm 23 presses down a rod 149 and thus closes the circuit at switch 155 and the electric motor raises the racks 6. The switch is locked in this position by means of spring 146 and pin 147 snapping in the recess 148 of rod 149. The sinking arm 23 presses down also the brake lever 52 by means of a rod 156, thus releasing the brake of the racks, which can be raised freely. At the raising of the racks the nose 157 fixed at the lower part of the racks frees a lever 158 pivoted to the frame of the machine, so that this lever is turned under the action of a weight fixed to its right arm, into the position shown in Fig. 22. In this position the curved arm 159 of this lever bears on the brake lever 52 preventing it from rising. When the racks have attained their high position, an elastic buffer 163 strikes against rod 23 and raises it together with rod 156, thereupon a curved guide 165 fixed also to one of the racks pulls pin 147 out of the recess 148. Thus the spring 151 lifts rod 149, so that the circuit is opened and the motor is stopped, the racks beginning to lower under gravity.

On the racks rising the rod 156 leaves lever 52, so that the brake remains released. When the racks are near to their lowermost position the brake is, however, applied, as the nose 157 turns lever 158 in counter-clockwise direction, so that lever 52 is released and lifted, causing the brake shoe to press against the friction pulley.

I claim:—

1. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap automatically raised and lowered racks adapted to press the lap to said driving rollers, means connected to the racks and adapted to eject the finished lap and means connected to the racks and adapted to supply an empty lap roller to said driving rollers by the moving of said racks.

2. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap automatically raised and lowered racks adapted to press the lap to said driving rollers, means arranged on the racks and adapted to eject the finished lap and means arranged on the racks and adapted to supply an empty lap roller to said driving rollers by the moving of said racks.

3. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap racks adapted to press the lap to said driving rollers, means for raising the racks if a predetermined length of the lap is attained, a guide connected to the racks and adapted to eject the finished lap at the raising of said racks, means for lowering the racks, and an oblique guide connected to said racks and adapted to supply an empty lap roller to the driving rollers by the moving of said racks.

4. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap automatically raised and lowered racks adapted to press the lap to said driving rollers, a frame adapted to store the empty lap rollers, a guide pivotally mounted on said racks and adapted to eject the finished lap at the raising of the racks, an oblique guide adapted to engage with an empty lap roller stored on said frame as well as to lead said roller towards the rack, and means leading said lap roller to the driving rollers.

5. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap automatically raised and lowered racks adapted to press the lap to said driving rollers, a guide rotatable and shiftable on said racks and adapted to eject the finished lap at the raising of the racks, and another guide rotatably mounted on said racks for supplying an empty lap roller by the moving of said racks.

6. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap racks adapted to press the lap to said driving rollers, a cam shaft for controlling the function of the machine, a toothed segment on said cam shaft for automatically raising and lowering said racks, means connected to said racks and adapted to eject the finished lap and means connected to the racks and adapted to supply an empty lap roller to said driving rollers by the moving of said racks.

7. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap racks adapted to press the lap to said driving rollers, means for automatically raising said racks, said racks being adapted to sink under the action of gravity, a braking device adapted to decrease the speed of the sinking racks, a rotatably mounted eccentric disc adapted to control the function of said braking device, means connected to said racks and adapted to eject the finished lap and means connected to the racks and adapted to supply an empty lap roller to the driving rollers by the moving of the racks.

8. In an automatic lap winding machine as claimed in claim 1, a conveyor adapted to receive the finished laps and to carry them away from said machine.

9. In an automatic lap winding machine as claimed in claim 2, a conveyor adapted to receive the finished laps and to carry them away from said machine.

10. In an automatic lap winding machine as claimed in claim 1, a weighing device for the finished laps, and a conveyor adapted to receive said finished laps and to carry them away from said weighing device.

11. In an automatic lap winding machine as claimed in claim 2, a weighing device for the finished laps, and a conveyor adapted to receive said finished laps and to carry them away from said weighing device.

12. In an automatic lap winding machine as claimed in claim 3, a weighing device for the finished laps, and a conveyor adapted to receive said finished laps and to carry them away from said weighing device.

13. In an automatic lap winding machine as claimed in claim 1, a weighing device for the finished laps, and means for stopping the machine if the weight of the lap is not within certain limits.

14. In an automatic lap winding machine as claimed in claim 1, a weighing device for the finished laps, a conveyor adapted to receive said laps and to carry them away from said weighing device, and electrical means for stopping the machine if the weight of the lap is not within certain limits.

15. In an automatic lap winding machine as claimed in claim 1, a weighing device for the finished laps, a pointer on said weighing device showing the weight of the lap, electrical means for stopping the machine, a source of current for said electrical means, and contacts cooperating with said pointer and adapted to close the circuit of said source of current if the weight of the lap is not within certain limits.

16. In an automatic lap winding machine as claimed in claim 1, a weighing device for the finished laps, and an electrical indicator for showing the number of produced laps the weight of which is not within certain limits.

17. In an automatic lap winding machine as claimed in claim 1, a weighing device for the finished laps, electrical means for stopping the machine if the weight of the lap is not within certain limits, and an electrical indicator for showing the number of said bad laps, said indicator being electrically connected to said means for stopping the machine.

18. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap racks adapted to press the lap to said driving rollers, an electric motor for driving the racks, means connected to said racks and adapted to eject the finished lap and means connected to said racks and adapted to supply an empty lap roller to said driving rollers by the moving of the racks.

19. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap, racks adapted to press the lap to said driving rollers, an electric motor adapted to raise and lower the racks, a switch controlling said motor and adapted to be changed over when the racks are at the upper

part of their path, means connected to said racks and adapted to eject the finished lap and means connected to said racks and adapted to supply an empty lap roller to said driving rollers by the moving of the racks.

20. In an automatic lap winding machine as claimed in claim 18, a switch controlling the electric motor, and a constantly driven part having a cam surface for governing said switch.

21. In an automatic lap winding machine as claimed in claim 18, a switch controlling the electric motor, and an intermittently driven part having a cam surface for governing said switch.

22. In an automatic lap winding machine for use in the preparatory operations of spinning, driving rollers for rotating the lap racks adapted to press the lap to said driving rollers, an electric motor for raising said racks, means for closing the circuit of said motor if a predetermined length of the lap is attained, means connected to the racks and adapted to open said circuit at a certain high point of path of the racks, said racks being adapted to sink under gravity, means connected to the racks and adapted to eject the finished lap and means connected to the racks and adapted to supply an empty lap roller to said driving rollers by the moving of said racks.

23. In an automatic lap winding machine for use in the preparatory operations of spinning, and adapted to wind the lap on to a lap roller, driving rollers for rotating the lap automatically raised and lowered racks adapted to press the lap to said driving rollers, a cover adapted to lead the layer of the lap towards the lap roller, and cutting means on said cover adapted to separate the part of the lap to be rolled up from the part belonging to the finished lap.

24. In an automatic lap winding machine as claimed in claim 23, cutting means consisting of sharp teeth secured to the cover.

25. In an automatic lap winding machine for use in the preparatory operations of spinning, and adapted to wind the lap on to a lap roller constantly driven press rollers for leading the lap to said lap roller, driving rollers for rotating the lap automatically raised and lowered racks adapted to press the lap to said driving rollers, means connected to the racks and adapted to eject the finished lap and means connected to the racks and adapted to supply an empty lap roller to said driving rollers by the moving of said racks, a cover adapted to lead the lap towards the lap roller, cutting means on said cover to separate the part of the lap to be rolled up from the part belonging to the finished lap, and rollers driven in the same direction and adapted to receive the ejected lap.

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