May 27, 1941. E. KINSELLA 2,243,101

APPARATUS FOR WINDING YARN INTO CHEESES

Filed May 2, 1939 3 Sheets-Sheet 1

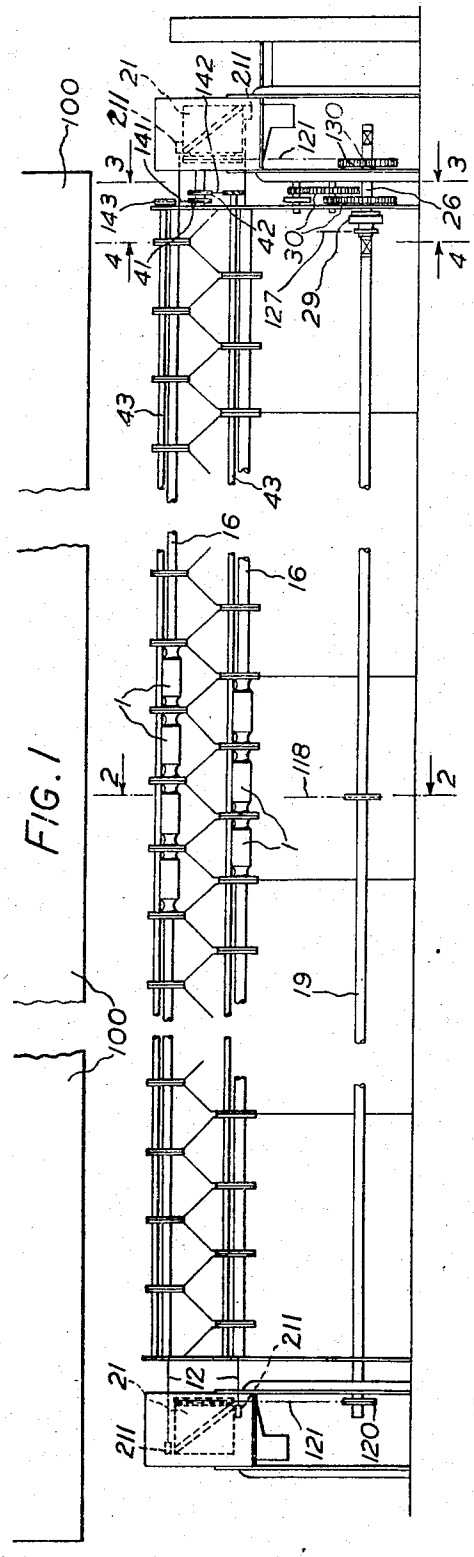


FIG. 1

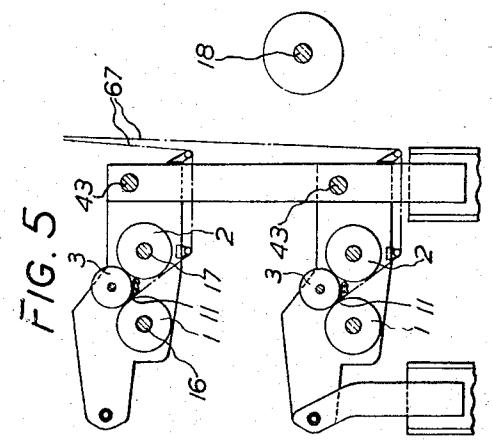


FIG. 5

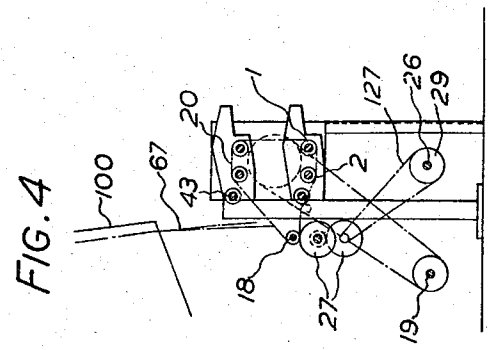


FIG. 4

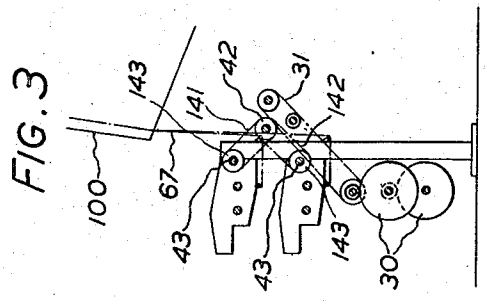


FIG. 3

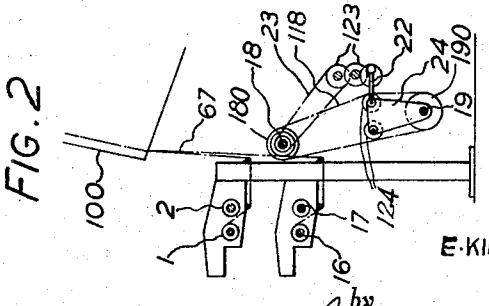


FIG. 2

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APPARATUS FOR WINDING YARN INTO CHEESES

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FIG. 6

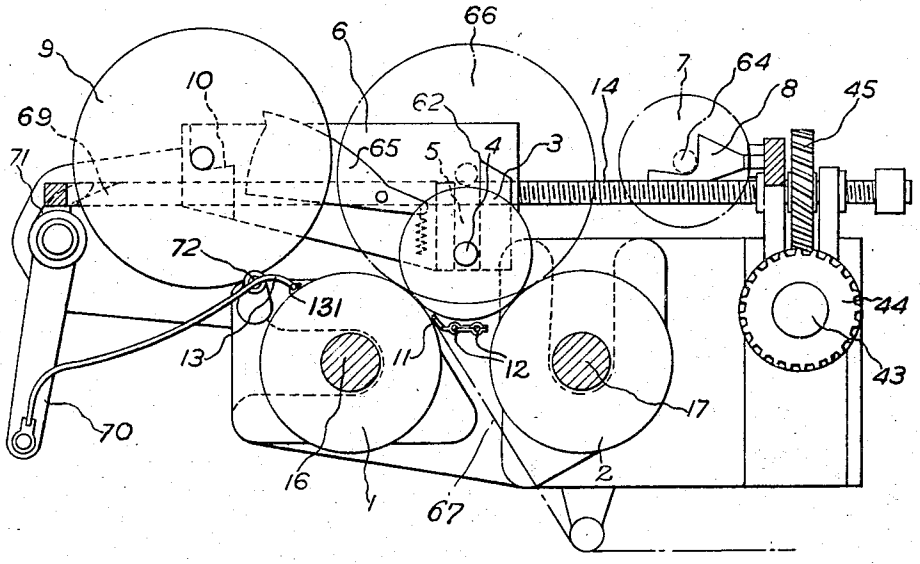
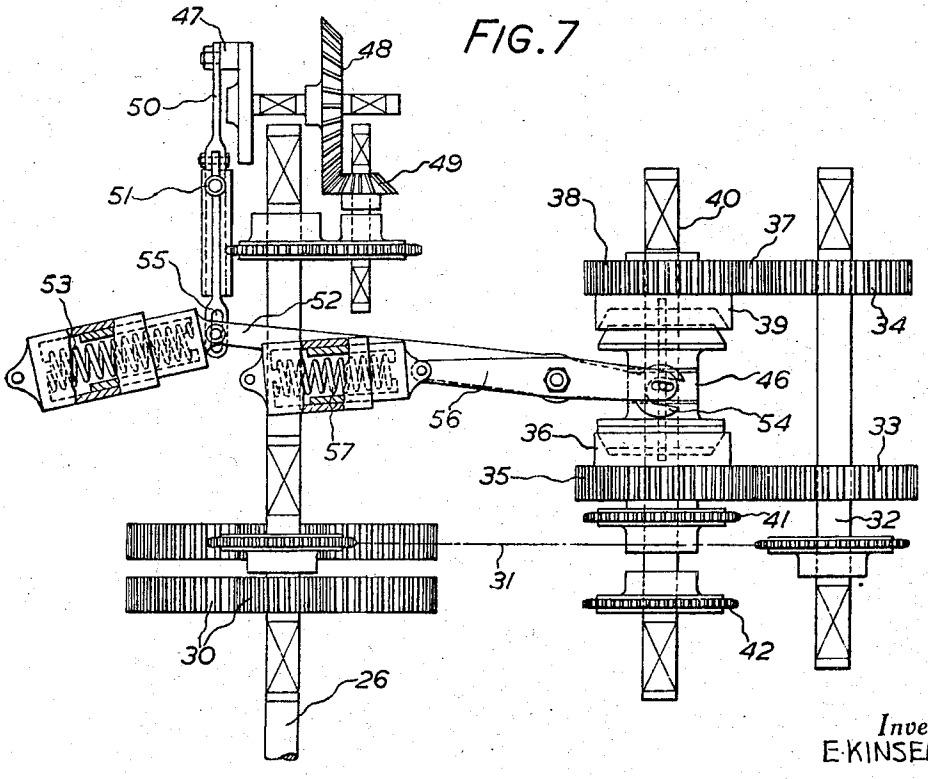


FIG. 7



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APPARATUS FOR WINDING YARN INTO CHEESES

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FIG. 8

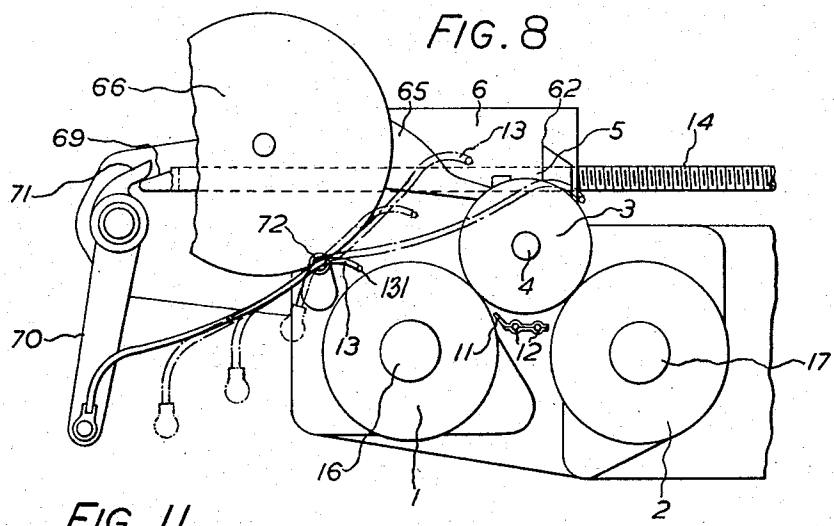


FIG. 11

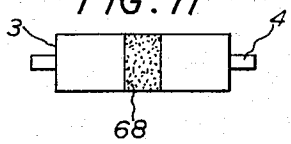
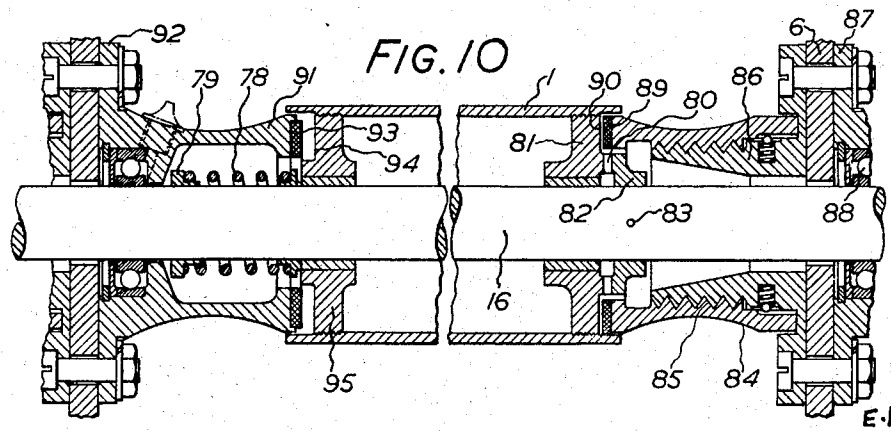


FIG. 9

FIG. 10



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UNITED STATES PATENT OFFICE

2,243,101

APPARATUS FOR WINDING YARN INTO CHEESES

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Application May 2, 1939, Serial No. 271,258
In Great Britain May 17, 1938

16 Claims. (Cl. 242—35.5)

This invention relates to apparatus for winding yarn into cheeses, the invention being especially concerned with apparatus in which the cheeses are surface-driven, whereby take up of the yarn may continue at constant linear speed as the diameter of the package builds up.

The object of the invention is to provide for automatic doffing and donning of the cheeses so that winding can continue as long as the supply of material to be wound is maintained.

The winding apparatus according to the invention comprises drum means adapted to drive a cheese occupying a winding position in contact with the surface of said drum means, means to withdraw a completed cheese from said winding position and to transfer a cheese carrier into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

Preferably, the movements of the completed cheese out of and of the replacement carrier into winding position are in a direction transverse to the axes of the cheese and the carrier and the movement of the relacement carrier into winding position is effected in such a way that before reaching the position the carrier comes into contact with the drum means so that it is rotating at yarn winding speed when it reaches winding position and the transfer of the yarn is effected. Further, provision is preferably made for maintaining the completed cheese in rotation while it is being moved from winding position so that winding proceeds without a break except for the transfer of the thread from the cheese to the replacement carrier.

The surface driving means for the cheese advantageously comprises a pair of drums arranged side by side so that the package can rest between them, both drums preferably being driven. The cheese rides steadily above and between the two drums and a smooth drive is transmitted to the cheese whatever its diameter as it builds up in size. During the doffing and donning operation the completed cheese is moved out of contact with one drum but retains its contact with the other, so that winding continues until the replacement carrier is in contact with both drums.

The setting into rotation of the replacement carrier is effected by bringing it into contact with the drum first left by the completed cheese and causing it to roll over this drum until it makes contact also with the other drum. In order to effect the transfer a carriage may be provided on which are provided means to engage the completed cheese and the replacement carrier; so that in one movement of the carriage the cheese is moved out of winding position and the replacement carrier brought into winding position. Supporting arms are provided to receive a further replacement carrier after one doffing operation, so that when the next operation is started a reverse movement of the carriage engages the new carrier.

Replacement carriers may be put into position and completed cheeses removed by hand after each doffing and donning operation, or the carriers may be supplied from a magazine and the cheeses allowed to roll or slide away so that the operation is completely automatic.

The doffing and donning operation may be initiated by any suitable mechanism operating at predetermined intervals, e. g. by the winding mechanism itself, after the completion of a predetermined number of revolutions of the cheese-driving drums, or by a suitable clock mechanism operating at uniform time intervals. A number of winding units may be controlled by a single mechanism so as to doff their cheeses simultaneously.

The apparatus according to the invention is particularly useful for winding cheeses in apparatus for the manufacture of artificial silk which produces yarn without interruption over very long periods. The apparatus is suitable both for high speed winding, as is necessary in the case of dry-spinning apparatus such as is used for the manufacture of cellulose acetate artificial silk, or for the lower speed operation usual with wet-spinning apparatus such as is used for the production of viscose or cuprammonium artificial silk.

One form of winding apparatus according to the invention will now be described in greater detail with reference to the accompanying drawings in which

Fig. 1 is a diagrammatic front elevation of winding means according to the invention as applied to a machine for spinning a large number of threads of artificial silk;

Figs. 2 to 4 are sectional side elevations of the winding means shown in Fig. 1;

Fig. 5 is a sectional side elevation of part of the mechanism shown in Fig. 1 on a larger scale than Figs. 2 to 4;

Figs. 6, 7 and 8 show details of the mechanism on a still larger scale;

Fig. 9 is a diagrammatic representation of the electrical circuits employed in conjunction with the mechanism;

Fig. 10 is a cross-section through one of the driving rollers of the mechanism and

Fig. 11 is a diagrammatic view of a package support employed for the purposes of the invention.

As is shown in Fig. 1 the whole apparatus comprises a plurality of winding units for winding a large number of artificial yarns simultaneously produced by a spinning machine 100. The winding units are adapted for the simultaneous doffing and donning of the packages and package supports under the control of a common mechanism shown at the right-hand end of Fig. 1 and in Figs. 2 to 9.

Each of the winding units comprises a pair of driving rollers 1, 2 arranged parallel to each other so as to support between them a package being wound (shown at 3, Figs. 5, 6 and 8). The package being wound is provided with a spindle 4 which during the growth of the package can ride up vertical slots 5 in a pair of side plates 6, one on each side of each winding unit until, when the package is completed, it rises out of the slots. During the winding of a package, an empty replacement carrier 7 rests in stationary supporting arms 8 secured to the frame of the machine above and somewhat to the rear of the rear driving roller 2. On completion of winding the completed package (indicated at 66) is carried over the roller 1 until it rests at 9 in supporting stops 10. At the same time the replacement carrier 7 is removed from the supporting arms 8 and brought over the roller 2 until it rests on both rollers, 1 and 2, in the position 3. The yarn 67 (Figs. 2 to 5) is traversed along the package 3 by a guide 11, being led from the spinning machine 100 to the guide 11 in the manner shown in Fig. 5. The guide 11 is supported by guide wires 12 disposed between the rollers 1 and 2, and the thread 67 is transferred during the doffing and donning operation from the completed package 66 to the replacement carrier 7 by means of a throw-on arm 13 having a portion 131 at its end parallel to the axes of the rollers 1, 2, the arm 13 being cam operated by the movement of slide rods 14 by which the transfer is effected in a manner to be described hereafter with reference to Figs. 6 and 8, the slide rods being connected to, and adapted to move the side plates 6. The side plates 6 and associated parts, and the slide rods 14, together constitute a carriage by means of which donning and doffing are effected simultaneously in a single movement. The doffing and donning operation takes place after a predetermined length of yarn has been wound on the package in each winding unit, the control of the mechanism in this manner being effected by means of a master controller 15 (Figure 9) driven by gearing, to be described hereafter, in connection with the gearing for driving the rollers 1, 2.

As shown in Fig. 1 the several winding units are mounted in two rows one above the other, the units of one row being staggered with respect to those of the other so that each upper unit does not lie immediately above a lower unit. The rollers 1, 2 are mounted respectively on shafts 16, 17 which are common to half the units employed, one pair of shafts 16, 17 being provided for the upper units, and another for the lower units. The shafts 16, 17 are driven from a waste roller shaft 18 by means of a chain 20 (Fig. 4). A chain 115 and sprocket 116 (Fig. 9) drive the master controller 15 from the waste roller shaft 18. At the middle of the machine the waste roller shaft 18 also drives, by means of a chain 118 and sprockets 180, 190, a shaft 19 running the length of the machine. At the ends of the machine, driving connection is made by means of sprockets 120 and chains 121 between the shaft 19 and two transverse cams 21, by means of which the two sets of traverse wires 12 are driven, the traverse wires being secured at each end to cam followers 211 and stretched under tension from one cam to the other along the whole length of the machine. This arrangement of drive for the cams 21 ensures that there is no angular displacement or phase difference between the two cams.

In the chain drive 118, 180, 190 between the waste roller shaft 18 and the longitudinal shaft 19 for driving the cams 21 is included a ribbon-breaking device comprising a crank lever gear 22 driven from the shaft 18 at a slow rate by means of a chain 23 and reduction gears 123. The crank lever gear 22 operates a chain wheel rocker bracket in the form of a plate 24 pivoted on the shaft 19, and carrying jockey sprockets 124 engaging with the chain 118 between the shafts 18, 19. The slight oscillation of the bracket 24 by the crank lever gear 22 pulls the slack of the chain 118 first to one side and then to the other of the shaft 19, 20 superimposing a slight backward and forward movement of the shaft 19 on the continuous drive of the chain 118. By these means the effective driving rate of the chain 118 on the longitudinal shaft 19 is slowly and very slightly increased and decreased alternately, imparting a corresponding variation to the rate of driving of the cams 21.

At one end of the machine (the right-hand end in Fig. 1) is a shaft 26 slowly driven through reduction gearing 27 and chain 127 (Fig. 4) from the waste roller shaft 18 at a rate such that a definite number of revolutions of the shaft 26 provides for the operation of the mechanism used to effect the doffing and donning operation. On the shaft 26 is a magnetic clutch 29 which is caused to engage with the shaft 26 by the master controller 15 and serves, when so engaged, to drive, through reduction gearing 30 secured to the shaft 26, (Figs. 1, 3 and 7) the doffing and donning control mechanism. From the gearing 30 (see Fig. 7) a chain drive 31 extends to a shaft 32 carrying spur gears 33, 34, the first of which meshes directly with a spur gear 35 on a clutch member 36 and the other through an idler pinion 37 with a spur gear 38 on a clutch member 39. The members 36 and 39 are carried by a common shaft 40 provided with sprockets 41, 42 connected (see Figs. 1 and 3) by chains 141, 142 to sprockets 143 on two shafts 43. The shafts 43 constitute the main drive of the doffing and donning mechanism and by the means described above they may be driven in one direction or the other according as the clutch 36 or the clutch 39 is in engagement.

On the operating shafts 43 are secured helical gears 44 (Fig. 6), two for each winding unit, meshing with corresponding gears 45 which are screwed internally and mounted on the screwed ends of the slide rods 14. An intermediate clutch member 46 is provided between the clutch members 36 and 39 and is adapted to engage with either of them alternatively, the intermediate clutch member 46 being splined to the shaft 40 so as to connect the clutch member 36 or 39 to said shaft. When the clutch member 36 is con-

nected to the shaft 40 the helical gears 44, 45 are driven in such a direction that the slide rods 14 are drawn rearwards of the doffing and donning unit (i. e. towards the right in Figs. 6 and 8). The return motion of the slide rods 14 is effected when the clutch 39 is connected to the shaft 40.

When the magnetic clutch 29 is first put into operation through the master controller 15 the clutch 36 is in engagement and the slide rods 14 are moved rearwardly. During the subsequent rotation of the shaft 26, however, a crank 47 (shown in Fig. 7) is slowly rotated, being driven through bevel gears 48, 49 chain driven from the shaft 26. The crank 47 acting through a connecting rod 50 and an adjustable slide rod 51 moves the operating lever 52 of the intermediate clutch member 46 against the action of a toggle spring 53. Until the central position of the lever 52 and the toggle spring 53 has been reached the member 46 is not affected, there being a suitable open fork connection 54 between the lever 52 and the member 46, to give lost motion. As the toggle spring 53 passes this central position, however, it rapidly continues the motion of the lever 52, the adjustable slide rod 51 being provided with a slot 55 at its connection with the lever 52 to allow this rapid movement to take place independently of the slide rod 51. The rapid movement of the lever 52 under the action of the toggle spring 53 suddenly disconnects the member 46 from the clutch member 36 and connects it to the clutch member 39. This reverses the direction of motion of the slide rods 14 so that they move forward again until the continued revolution of the crank 47 again changes the position of the intermediate clutch member 46. A lever 56 and a toggle spring 57 are provided to hold the clutch member 46 in one position or the other while the lost motion of the fork 54 is being taken up.

After one revolution of the crank 47, during which the position of the intermediate clutch member 46 is twice changed, the magnetic clutch 29 is disconnected so as to bring the mechanism to rest. This is done by means of a cam 58 shown in Fig. 9, carried on a shaft 158, and driven by means of gearing 130 from the shaft 26, at the same speed as the crank 47. The cam 58 after one revolution operates a switch 59 that short circuits a low tension solenoid switch 60, breaks the low tension circuit of a transformer 61 and opens the magnetic clutch 29. The mechanism driven through the magnetic clutch 29 and the shaft 26 (i. e. the mechanism shown in Fig. 7 and the doffing and donning mechanism shown in Figs. 6 and 8) thus remain inactive until the magnetic clutch 29 is again operated by the master controller 15.

The doffing and donning mechanism operates during the rearward and forward movements of the slide rods 14 as follows (Figs. 6 and 8). During the rearward movement of the slide rods 14 and side plates 6 (i. e. the movement, in Figs. 6 and 8, from left to right) upstanding points 62 at the rear of the vertical slide slots 5 on the side plates 6 are carried under and behind the projecting ends of the spindle 64 of the replacement carrier 7, which spindle 64 rests in the arms 8. At the same time pivoted spring catches 65 carried by the side plates 6 are drawn under and behind (i. e. in Fig. 6, to the right of) the projecting ends of the spindle 4 of the nearly completed package shown at 66. The motion of the slide rods 14 is then reversed, and during their forward motion the completed package is drawn by the catches 65 out of contact with the rear driving roller 2, and is rolled over the forward roller 1, the winding of the yarn 67 on the completed package 66 continuing while contact is maintained between the roller 1 and the completed package. As the completed package 66 is moved forward the points 62 engage the spindle 64 and lift the replacement carrier 7 from the arms 8, allowing it to fall on to the rear roller 2 so that the carrier 7 begins to rotate. By the time the carrier 7 falls into contact with both rollers 1 and 2 its periphery is moved at full yarn speed. As the slide rods 14 approach their foremost position the completed package 66 leaves the roller 1 and occupies the position 3. At this point the portion 131 of the throw-on arm 13 is caused to pass through the space between the package at 3 and the roller 1, the portion 131 engaging the yarn 67 proceeding from the guide 11 to the package now at 3 and carrying it over the top of the replacement carrier 7 now in the position of the package 3. The yarn is thus brought into arc contact with the replacement carrier 7, the surface of which may be suitably roughened, say over a centre portion as shown in Fig. 11 at 68. In this manner the yarn is secured to the replacement carrier 7 and broken from the completed package at 9. Winding thus continues on the replacement carrier 7. The operation of the throw-on arm 13 through the successive positions shown in dotted lines in Fig. 8 is effected by means of a cam 69 on the side of one of the slide rods 14, the cam 69 operating a lever 70 provided with a nose 71 for the engagement of the cam 69. The lever 70 carries the throw-on arm 13 which is also supported by means of a pivoted guide 72, the proportions of the lever 70 and throw-on arm 13 and the position of the guide 72 being such as to cause the throw-on arm 13 to follow the desired movements as indicated in dotted lines in Fig. 8.

The master controller 15 shown in Fig. 9 contains a low tension switch and a gear driven mechanism serving to close said switch when the requisite length of yarn has been wound on each package. i. e. after the master controller has been driven for a predetermined number of revolutions. The switch inside the master controller 15 is arranged in series with a solenoid 74 connected to the low tension side of the transformer 61 the high tension side of which is connected to a source 96 of alternating current. When the master controller 15 operates to close its internal switch the completion of the circuit through the solenoid 74 causes the solenoid to attract the arm 75 of a switch 60 which makes the circuit self-sustaining. This enables the master controller to be reset, the drive for this purpose being from the shaft 158 through sprockets 159, 160, and chain 161. A second solenoid 76 is arranged in circuit with the first solenoid 74 and this serves to close a high tension switch 77 in the circuit of the magnetic clutch 29 whereby the magnetic clutch 29 is operated and doffing and donning is effected as previously described. Near the end of the doffing and donning cycle a cam 58 opens the trip switch 59 and short circuits the solenoid 74, so allowing the switch 60 to open, breaking the circuit of the solenoid 76 and allowing the switch 77 to open. In this manner the magnetic clutch 29 is disconnected after doffing and donning have taken place.

Means are provided for bringing the driving rollers 1 and 2 to rest individually for the removal of any waste that may have been caught on them. These means are shown in Fig. 10 in which it may be seen that each roller is freely mounted on its driving shaft 16 or 17 (16 in Fig. 10) and is urged endwise by means of a spring 78 engaging with a collar 79 pinned to the shaft 16. The endwise pressure of the spring 78 upon the roller 1 causes dog clutch teeth 80 carried on a spider 81 at one end of the roller 1 to engage with corresponding teeth on a disc 82 pinned at 83 to the driving shaft 16. Adjacent to the driven end of the roller 1 is a sleeve 84 internally threaded with a quick start thread 85 and screwed on a corresponding member 86 secured to a frame member 87 carrying a bearing 88 for the shaft 16. An end of the sleeve 84 is overlapped by the end of the roller 1 and carries a friction disc 89 for engagement with the surface 90 of the roller spider 81. When the sleeve 84 is rotated by hand the quick start screw 85 causes it to engage the roller 1 and to push it endwise against the action of the spring 78 until the teeth 80 on the roller 1 disengage the teeth on the disc 82 secured to the shaft 16. At the other end of the roller 1 another sleeve 91 fixed to a shaft bearing frame 92 is overlapped by the barrel of the roller 1 and is fitted with a friction ring 93 that comes into contact with the surface 94 of a spider 95 at that end of the roller when the roller is pushed endwise. In this manner by rotation of the sleeve 84 the roller 1 is freed from its drive through the teeth 80 and by the engagement of the friction surfaces 89, 90, 93, 94 is brought to rest. Release of the screwed sleeve 84 allows the spring 78 to return the roller 1 to driving position. The screwed sleeve 84 is normally held out of engagement with the roller 1 by means of spring pressed balls 97 in the member 86, which engage with grooves 98 inside the sleeve 84. The sleeves 84, 91 may be cut concavely so that waste collected on the roller 1 can be slid on to them for final removal.

Having described my invention, what I desire to secure by Letters Patent is:

1. Automatic cheese winding apparatus, comprising drum means adapted to drive a cheese occupying a winding position in contact with the surface of said drum means, means to withdraw a completed cheese from said winding position and to transfer a cheese carrier into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

2. Automatic cheese winding apparatus, comprising drum means adapted to drive a cheese occupying a winding position in contact with the surface of said drum means, means to withdraw a completed cheese from said winding position, means to move a cheese carrier in a direction transverse to the axis of rotation of the drum means first into driving contact with said drum means and subsequently into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

3. Automatic cheese winding apparatus, comprising drum means adapted to drive a cheese occupying a winding position in contact with the surface of said drum means, withdrawing means adapted to move a completed cheese, in a direction transverse to the axis of rotation of said drum means and while maintaining said cheese in contact with said drum means, from said winding position, means to transfer a cheese carrier into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

4. Automatic cheese winding apparatus, comprising drum means adapted to drive a cheese occupying a winding position in contact with the surface of said drum means, withdrawing means adapted to move a completed cheese, in a direction transverse to the axis of rotation of said drum means and while maintaining said cheese in contact with said drum means, from said winding position, means to move a cheese carrier in a direction transverse to the axis of rotation of the drum means first into driving contact with said drum means and subsequently into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

5. Automatic cheese winding apparatus, comprising a pair of drums adapted to support a cheese being wound in a winding position between said drums and to drive said cheese, means to withdraw a completed cheese from said winding position and to transfer a cheese carrier into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

6. Automatic cheese winding apparatus, comprising a pair of drums adapted to support a cheese being wound in a winding position between said drums and to drive said cheese, withdrawing means adapted to move a completed cheese in a direction transverse to the axes of rotation of said drums and while maintaining said cheese in contact with one of said drums, from said winding position, means to move a cheese carrier in a direction transverse to the axes of rotation of said drums first into driving contact with the other of said drums and subsequently into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

7. Automatic cheese winding apparatus, comprising drum means adapted to drive a cheese occupying a winding position in contact with the surface of said drum means, means to withdraw a completed cheese from said winding position and to transfer a cheese carrier into said wind-

ing position, means for traversing a thread lengthwise of the cheese in said winding position and thread-engaging means in the form of an arm adapted to pass between a completed cheese and the drum means immediately after said cheese has been withdrawn from said drum means, and to engage the thread and bring it into arc contact with the cheese carrier entering the winding position.

8. Automatic cheese winding apparatus, comprising a pair of drums adapted to support a cheese being wound in a winding position between said drums and to drive said cheese, withdrawing means adapted to move a completed cheese, in a direction transverse to the axes of rotation of said drums and while maintaining said cheese in contact with one of said drums, from said winding position, means to move a cheese carrier in a direction transverse to the axes of rotation of said drums first into driving contact with the other of said drums and subsequently into said winding position, means for traversing a thread lengthwise of the cheese in said winding position and thread-engaging means in the form of an arm adapted to pass between a completed cheese and the drum means immediately after said cheese has been withdrawn from said drum means, and to engage the thread and bring it into arc contact with the cheese carrier entering the winding position.

9. Automatic cheese winding apparatus, comprising drum means adapted to drive a cheese occupying a winding position in contact with the surface of said drum means, a carriage, means for driving said carriage to and fro and in a direction transverse to the axes of rotation of said drum means, withdrawing and transferring means mounted on said carriage and simultaneously actuated by the motion thereof to withdraw a completed cheese from said winding position and to transfer a cheese carrier into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

10. Automatic cheese winding apparatus, comprising a pair of drums adapted to support a cheese being wound in a winding position between said drums and to drive said cheese, a carriage, means for driving said carriage to and fro and in a direction transverse to the axes of rotation of said drums, withdrawing means mounted on said carriage and actuated by the motion thereof to move a completed cheese from said winding position while maintaining said cheese in contact with one of said drums, means mounted on said carriage and actuated by the motion thereof simultaneously with said withdrawing means to move a cheese carrier first into driving contact with the other of said drums and subsequently into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

11. Automatic cheese winding apparatus, comprising drum means adapted to drive a cheese occupying a winding position in contact with the surface of said drum means, a carriage, means for driving said carriage to and fro and in a direction transverse to the axis of rotation of said drum means, withdrawing and transferring means mounted on said carriage and simultaneously actuated by the motion thereof to withdraw a completed cheese from said winding position and to transfer a cheese carrier into said winding position, means for traversing a thread lengthwise of a cheese in said winding position, means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position and control means for said thread-engaging means mounted on said carriage and actuated thereby in timed relationship with said transferring and withdrawing means.

12. Automatic cheese winding apparatus, comprising a pair of drums adapted to support a cheese being wound in a winding position between said drums and to drive said cheese, a carriage, means for driving said carriage to and fro and in a direction transverse to the axes of rotation of said drums, withdrawing means mounted on said carriage and actuated by the motion thereof to move a completed cheese from said winding position while maintaining said cheese in contact with one of said drums, means mounted on said carriage and actuated by the motion thereof simultaneously with said withdrawing means to move a cheese carrier first into driving contact with the other of said drums and subsequently into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position and control means for said thread-engaging means mounted on said carriage and actuated thereby in timed relationship with the transferring and withdrawing means.

13. Automatic cheese winding apparatus, comprising drum means adapted to drive a cheese occupying a winding position in contact with the surface of said drum means, means to withdraw a completed cheese from said winding position and to transfer a cheese carrier into said winding position, control means adapted to actuate said withdrawing and transferring means at predetermined intervals, means for traversing a thread lengthwise of the cheese in said winding position, and means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position.

14. Automatic cheese winding apparatus, comprising a plurality of drum means adapted to drive simultaneously a corresponding plurality of cheeses, each occupying a winding position in contact with the surface of one of said drum means, means in connection with each drum means to withdraw a completed cheese from said winding position and to transfer a cheese carrier into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, means in connection with each drum means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position and control means common to all of said drum means adapted to actuate simultaneously the several withdrawing,

transferring and thread-engaging means at predetermined intervals.

15. Automatic cheese winding apparatus, comprising a plurality of drum means adapted to drive simultaneously a corresponding plurality of cheeses, each occupying a winding position in contact with the surface of one of said drum means, common driving means for said drum means, said driving means including clutch means for each of said drum means adapted to enable said drum means to be brought to rest individually, means in connection with each drum means to withdraw a completed cheese from said winding position and to transfer a cheese carrier into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, means in connection with each drum means for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position and control means common to all of said drum means adapted to actuate simultaneously the several withdrawing, transferring and thread-engaging means at predetermined intervals.

16. Automatic cheese winding apparatus, comprising a plurality of pairs of drums, each pair adapted to support a cheese being wound in a winding position between said pairs of drums, and to drive said cheese, common driving means for said plurality of pairs of drums, said driving means including clutch means for each of said drums adapted to enable said drums to be brought to rest individually, a carriage in connection with each pair of drums, means for driving each of said carriages to and fro in a direction transverse to the axes of rotation of said drums, withdrawing means mounted on each of said carriages and actuated by the motion thereof to move a completed cheese from said winding position while maintaining said cheese in contact with one drum of said pair of drums, means mounted on each of said carriages and actuated by the motion thereof simultaneously with said withdrawing means to move a cheese carrier first into contact with the other drum of said pair of drums and subsequently into said winding position, means for traversing a thread lengthwise of the cheese in said winding position, means in connection with each pair of drums for engaging the thread between said traversing means and a completed cheese and for carrying said thread into engagement with the cheese carrier being transferred into said winding position, control means for said thread-engaging means mounted on each of said carriages and actuated thereby in timed relationship with said transferring and withdrawing means and control means common to said carriage driving means adapted to effect the simultaneous actuation of the several carriages at predetermined intervals.

EDWARD KINSELLA.

CERTIFICATE OF CORRECTION.

Patent No. 2,243,101. May 27, 1941.

EDWARD KINSELLA.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, second column, line 17, for the reference numeral "3" read --9--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of July, A. D. 1941.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)