

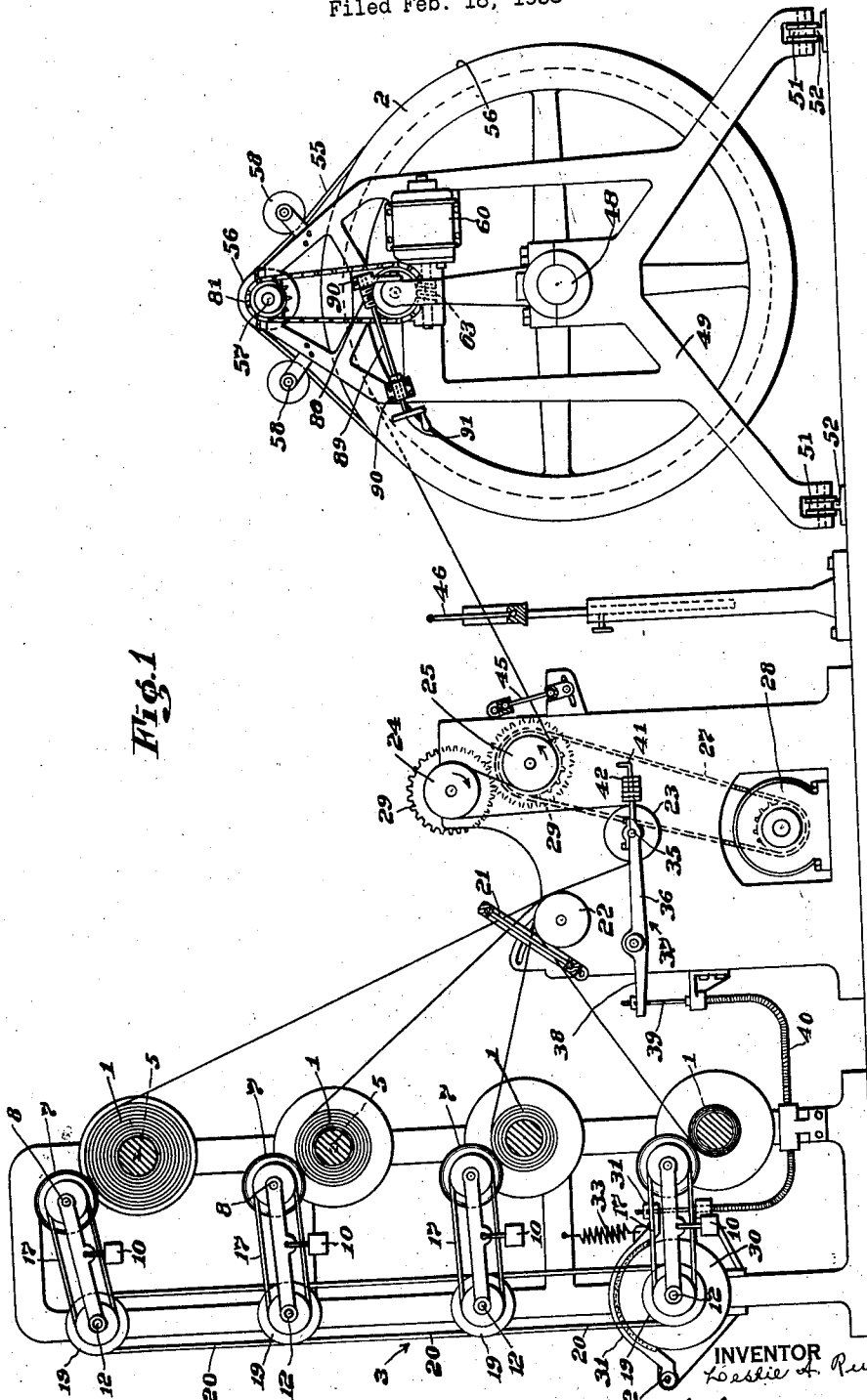
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L. A. RUNTON
MACHINE FOR WINDING TEXTILE STRANDS
Filed Feb. 18, 1938

2,160,910

3 Sheets-Sheet 1

Fig. 1



INVENTOR
Lester A. Runtow
BY *John E. P. Hagen*
ATTORNEY

June 6, 1939.

L. A. RUNTON

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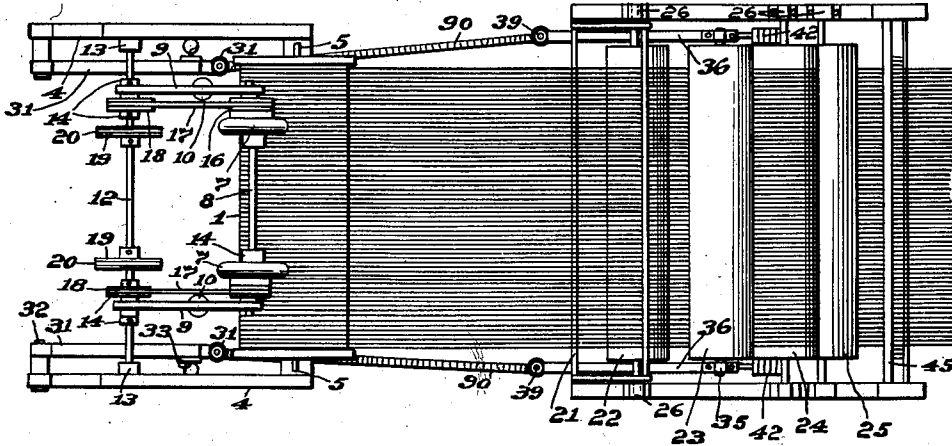


Fig. 2

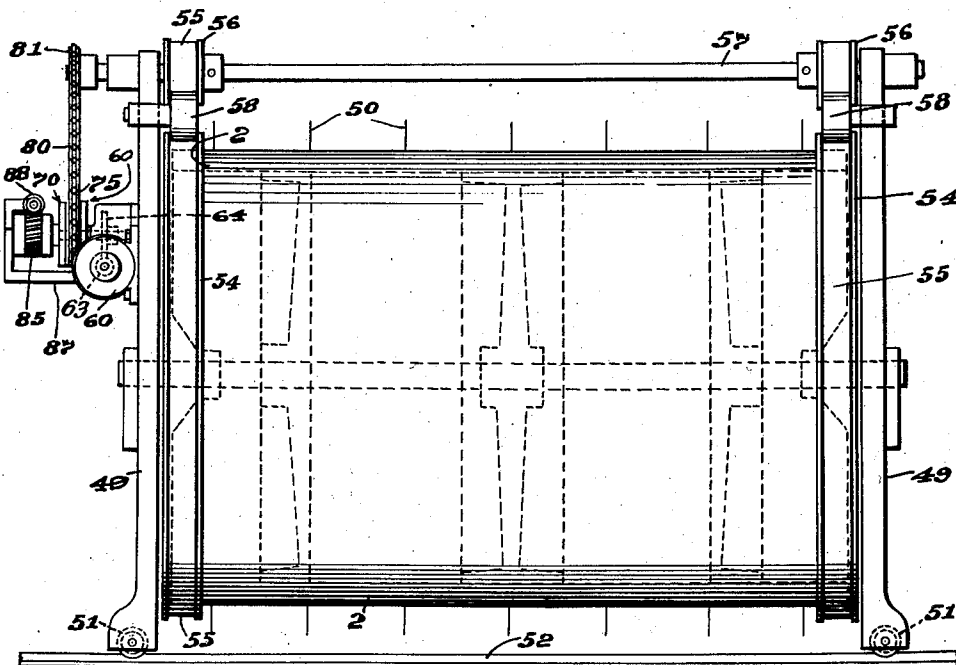


Fig. 3

INVENTOR
Leslie A. Runtow
BY John E. R. Hays
ATTORNEY

June 6, 1939.

L. A. RUNTON

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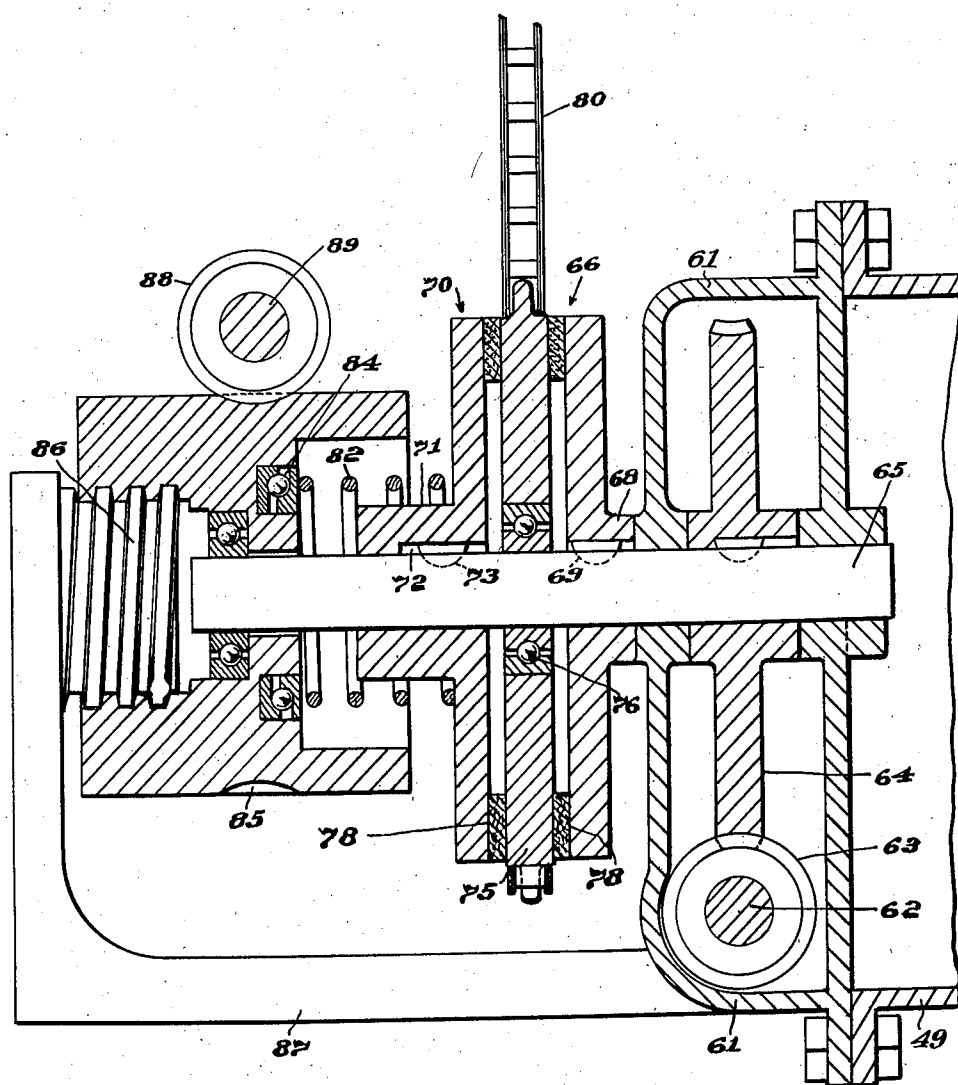


Fig. 4

INVENTOR
Leslie A. Runtow
BY *John E. R. Hay*
ATTORNEY

UNITED STATES PATENT OFFICE

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MACHINE FOR WINDING TEXTILE STRANDS

Leslie A. Runton, Andover, Mass.

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9 Claims. (Cl. 242-45)

The invention relates to a machine for winding onto a beam, or drum, yarns, or threads, drawn off a plurality of separate spools, or cops.

Among the objects of the invention are the following:

To provide a machine in which the spools off which the yarn is drawn may be of any desired size, or even different in size. The present tendency is to increase the size of the spools in order to save knot tying, and form larger wound masses.

To provide a machine which can be operated at high speed.

To provide a machine in which the spools from which the yarn is drawn may have different relative amounts of yarn thereon, whether the spool be full or not to be immaterial in the operation of the machine.

To provide a machine in which the spools from which the yarn is drawn shall be rotated by pull or draw of the yarn, be subject to no braking effect during the draw of the yarn, and shall only offer such resistance to rotation as attends certain work performed by the rotating spools that will cause all to be rotated at the same peripheral speed, and cause those rolls having more yarn thereon, and which are rotated more easily by draw of the yarn, to assist in facilitating the rotation of other of said spools having less yarn and which are rotated less easily by draw of the yarn, with the effect that the yarn may be drawn from all the spools with substantially uniform and comparatively light tension upon the yarn, so insuring against breakage.

To provide a machine in which the yarn shall be drawn from the separate spools with a direct and positive feed independent of the drum, or beam, onto which the yarn is ultimately wound.

To provide a machine in which the rotation of the spools from which the yarn is drawn shall be stopped when the yarn feed stops, and this automatically in order to prevent continued rotation of the spools by reason of their momentum which would cause disarrangement and tangling of the yarn; and

To provide a machine in which the yarn may be uniformly wound upon the drum, or beam, onto which it is ultimately wound, at a determinate tension irrespective of the speed of the machine, or the amount of yarn on the drum.

The invention can best be seen and understood by reference to the drawings in which

Fig. 1 is a side elevation of the machine.

Fig. 2 is a plan of some of the parts shown in Fig. 1.

Fig. 3 is a front elevation of the winding drum forming a part of the machine.

Fig. 4 is a cross section of various parts pertaining to the drive of the winding drum.

Referring to the drawings: 1 represents the spools off which the yarn is drawn to be wound upon a drum 2.

The spools 1 are mounted upon a creel 3 having upright side frames 4, 4, within and between which the shafts 5 of the spools are mounted to turn.

Mounted to have traction bearing against the yarn on each of the spools 3 is a set of rollers 7. These rollers are preferably made of rubber in order to have good frictional contact with the yarn. They are, also, preferably pneumatic rollers in the nature of small pneumatic tires. Each set of rollers is mounted to turn upon a shaft 8. The shaft bearing each set of rollers lies parallel to the axis of the spool which the rollers are engaging, and is fixedly borne by side bars 9, 9, on which are hung pendant weights 10. Each set of side bars 9, 9, is pivotally arranged to turn upon a shaft 12. All the shafts 12, lie parallel with the shafts 8. They are arranged to turn on the side frames 4, 4 of the creel 3 between which the shafts are interposed and the ends of the shafts 12 are preferably mounted to turn in ball bearings, 13 on the side frames in order that the shafts may turn freely. Lateral displacement of the rollers 7 on the shafts 8 on which they are mounted to rotate, as well as lateral displacement of the pivoted side bars 9, 9 on the shafts 12 is prevented by suitable collars 14 on the respective shafts.

Fixed to the side of each of the rollers to turn therewith, and with axis the same as that of the roller, is a grooved wheel or pulley 16. These pulleys carried by the respective rollers are connected by belts 17 to pulleys 18 keyed to the rotary shafts 12. Borne also by the rotary shafts 12 keyed thereto are sets of pulleys 19, 19. Adjacent sets of these pulleys 19, 19 are connected to rotate in unison by belted connections 20.

As will later be explained yarn deposited upon the drum 2 is drawn from off the spools 1, and the spools 1 are rotated by pull of the yarn as the yarn is drawn off these spools. The amount of yarn on the spools may vary. Some of the spools may be full of yarn and others of the spools have much less, or even little, yarn thereon. Those spools having the more yarn thereon will be turned more freely by pull of the yarn than will the spools bearing a lesser amount of yarn. It is necessary that the spools all turn with the same peripheral speed in order that the yarn may un-

wind uniformly therefrom, and it is also desirable that the yarn unwind from the spools with a uniform and comparatively light tension to insure against breakage. All this is compensated for by the mechanism described which accompanies the spools. In the first place, it will be observed that each spool irrespective of the amount of yarn upon it is provided with a set of traction rollers which bear constantly against the yarn package on the roll, resting thereon by gravity, and held to have a determinate friction contact with the yarn on the roll by the weighted pivoted frames which bear these rollers. With the rollers thus engaging the yarn the rollers will be turned as the spools are rotated by unwinding of yarn from them. By reason of their belted connections all the rollers will turn in unison and with the same peripheral speed. Accordingly, all the spools will be governed to turn with the same peripheral speed so that the windoff speed of the yarn will be uniform for all the spools. Inasmuch as all the rollers are interconnected and some of the rollers are engaging full spools, or spools having larger amounts of yarn thereon which are turned easily by pull of the yarn, the rollers engaging these spools will assist the rollers engaging spools having lesser amounts of yarn thereon and relieve them, so that the yarn will be delivered from off all the spools at a substantially uniform tension.

The yarn drawn from the spools passes through a pattern reed 21 to separate and space the yarns, and serve as a common junction for all the yarns on all the spools. The pattern reed may be mounted in any suitable manner on the frame of the machine.

The sheet of yarn drawn from the spools is led over a roll 22 suitably mounted on the frame on the machine, thence under a takeup roll 23 to which attention will later be directed, and thence through feed rolls 24 and 25 which provide a direct and positive feed for drawing the yarn from the spools. The feed rolls are mounted in bearings 26 on the frame of the machine. The roll 25 is driven through belted connection 27 by a motor 28, and the feed roll 26 is driven from off the feed roll 25 through geared connections 29.

Inasmuch as the yarn will be withdrawn from the spools and fed at a relatively high speed by the operation of the feed rolls it becomes necessary when the feed is stopped to prevent continued rotation of the spools by reason of their momentum which would cause disarrangement and tangling of the yarns. The immediate braking elements for stopping rotation of the spools are the traction rollers 7 which have constant bearing against the spools, and this by stopping rotation of these rollers. Rotation of the rollers 7 is stopped by braking elements in the mechanism interconnecting the rollers. To this end one of the shafts 12, and preferably the one adjacent the lowermost spool on the creel bears friction disks or wheels 30 which are keyed to the shaft. Arranged to engage the peripheral surface of each of these disks is a braking shoe 31, having a pivotal attachment 32. Each shoe is normally maintained in an inoperative position out of contact with its complementary friction disk by a spring 33. On the application of force to overcome the tensions of the springs and draw the brake shoes into contact with the friction disks the mechanism interconnecting the rollers 7 will be stopped. In consequence rotation of the rollers 7 will be stopped, so stopping rotation of the spools. The takeup roll 23 beneath which the

yarn passes before entering the feed rolls is the immediate instrument for actuating the brake shoes 31, to engage the friction disks and stop the rotation of the spools. The roll 23 is provided with a shaft 35 journaled to turn in the arms 36 of levers 37. These levers are pivotally arranged upon the frame of the machine to lie substantially in plane with the friction disks 30. Connecting with the arms 38 of these levers are connections 39 which pass through conduits 40 and connect with the ends of the brake shoes 31, for overcoming the tension of the springs 33, and drawing these shoes into braking contact with the friction disks 30 when pivoting of the levers 37 raises the arms 38 of these levers. The arms 38 of the levers are raised when the feed stops for thereupon the takeup roll 23 will drop inasmuch as the sheet of yarn will continue to come from the spools due to their momentum, permitting the roll 23 to drop and continuing until the roll has so far dropped as to raise the arms 38 of the lever sufficiently to apply the brakes and stop the operation of the spools. The takeup roll 23 may be a roll of some considerable weight, but it is preferred that quick drop of this roll, when slack occurs in the yarn sheet due to stoppage of the feed, shall occur by weighting the arms 36 of the levers on which the roll is mounted. To this end the levers are preferably provided with end extensions 41 on which weights 42 are hung, desired variation being attained by adding more or less of these weights.

After passing the feed the yarn is directed to pass through a lease reed 45, thence through a section reed 46, and is then wound upon the drum 2. This drum is one of a common type mounted upon a shaft 48 arranged to turn in side frames 49. The drum is provided with the customary pins 50 by which its exterior is separated into sections within which the yarn is wound. The frames bearing the drum are provided with wheels 51 arranged to run upon tracks 52 along which the drum may be moved, and its various sections brought into proper alignment for winding. At its ends the drum is provided with pulleys 54, around which are passed belts 55 from off pulleys 56 keyed to a rotary shaft 57, the ends of which are journaled to turn in the frames at either end of the drum. The rotation of the shaft 57 rotates the drum through the belted connection therewith. Any suitable belt tighteners 58 are provided for taking up slack in the belts. Power is applied for turning the shaft 57 by means of a motor 60 arranged upon the side of the frame 49, and to which frame is also affixed a motor casing 61. 62 represents the motor shaft, and as this shaft is turned its power is transmitted by a worm 63 to a worm wheel 64 suitably mounted within the motor casing and provided with a shaft 65 to which the wheel is keyed. Arranged upon the shaft 65 is a clutch member 66, the hub 68 of which is secured by a key 69 to the shaft 65. Arranged, also, upon the shaft 65 is a clutch member 70. This clutch member is provided with an elongated hub or sleeve 71 which embraces the shaft. The interior of this hub or sleeve is provided with a slot 72 adapted to receive a key 73 projecting from the shaft 65 and by means of which the clutch member is made to turn with the shaft but is longitudinally movable thereon. Interposed between the two clutch members is a rotating sprocket 75 which turns freely upon the shaft 65, ball bearings 76 being interposed between it and the shaft. The sides of the sprocket 75 adjacent its periph-

eral edge are faced with friction rings 76 against which the clutch members have bearing. The sprocket 75 has sprocket chain connection 80 with a sprocket gear 81 on the end of the shaft 57. Arranged upon the hub 71 of the clutch member 70 is a spring 82 one end of which bears against the outer side of the clutch member 70 and the other end of which bears against a thrust roller bearing 84 on the face of an internally threaded nut 85. This nut is arranged to turn upon a threaded plug 86 carried by a bracket 87 on the motor casing. As the nut 85 is turned upon the threaded plug 86 the nut is moved in the longitudinal direction of the shaft and exerts pressure to compress the spring 82. The nut 85 is turned through connection with a worm 88 arranged upon a rod 89 which turns in bearings 90 on the frame of the drum and is turned by a hand wheel 91. By means of the hand wheel the gear 85 may manually be moved to compress the spring 82 and thereby bind the sprocket 75 between the two clutch members 66 and 70 whereupon the sprocket 75 will move with the shaft 65 and turn the drum through the interposed chain and belt connections before referred to. If the resistance offered by the drum for turning exceeds the frictional resistance between the clutch elements and the sprocket 75 then the drum will not be turned. The resistance offered by the drum to turning will depend essentially upon the tension of the yarn wound upon the drum. Accordingly, by varying the applied pressure of the clutch members upon the sprocket 75 any desired tension may be placed upon the yarn so that it will wind upon the drum with a substantially uniform tension.

I claim:

1. In a textile machine an unwinding combination comprising a plurality of yarn packages, means for mounting said packages whereby the yarn thereon will be unwound therefrom by pull on the yarn and rotation of said yarn packages, means for drawing the yarn from said packages by pull thereon and rotation of said yarn packages, rotary traction members, means for mounting said traction members whereby they will have constant traction engagement with said yarn packages and be rotated thereby when said traction members are free to rotate, or function as brakes to stop the rotation of said yarn packages when the rotation of said traction members is stopped, interconnecting mechanism whereby said traction members will be interconnected to rotate in unison when said traction members are free to rotate and for stopping the rotation of said traction members on stopping the operation of said interconnecting mechanism, and means for stopping the operation of said interconnecting mechanism on stoppage of said means for drawing the yarn from said yarn packages.

2. In a textile machine an unwinding combination comprising a plurality of yarn packages, means for mounting said packages whereby the yarn thereon will be unwound therefrom by pull on the yarn and rotation of said yarn packages, means for drawing the yarn from said packages by pull thereon and rotation of said yarn packages, rotary traction members, means for mounting said traction members whereby they will have constant traction engagement with said yarn packages and be rotated thereby when said traction members are free to rotate, or function as brakes to stop the rotation of said yarn packages when the rotation of said traction members is stopped, interconnecting mechanism whereby said traction members will be interconnected to

rotate in unison when said traction members are free to rotate and for stopping the rotation of said traction members on stopping the operation of said interconnecting mechanism, and means controlled by the yarn mass withdrawn from said packages for stopping the operation of said interconnecting mechanism on stoppage of said means for drawing the yarn from said yarn packages.

3. In a textile machine an unwinding combination comprising a plurality of yarn packages, means for mounting said packages whereby the yarn thereon will be unwound therefrom by pull on the yarn and rotation of said yarn packages, means for drawing the yarn from said packages by pull thereon and rotation of said yarn packages, rotary traction members, means for mounting said traction members whereby they will have constant traction engagement with said yarn packages and be rotated thereby when said traction members are free to rotate, or function as brakes to stop the rotation of said yarn packages when the rotation of said traction members is stopped, interconnecting mechanism whereby said traction members will be interconnected to rotate in unison when said traction members are free to rotate and for stopping the rotation of said traction members on stopping the operation of said interconnecting mechanism, and a brake for stopping the rotation of said traction members through stoppage of the operation of said interconnecting mechanism in unison with the stoppage of the means for drawing the yarn from said yarn packages.

4. In a textile machine an unwinding combination comprising a plurality of yarn packages, means for mounting said packages whereby the yarn thereon will be unwound therefrom by pull on the yarn and rotation of said yarn packages, means for drawing the yarn from said packages by pull thereon and rotation of said yarn packages, rotary traction members, means for mounting said traction members whereby they will have constant traction engagement with said yarn packages and be rotated thereby when said traction members are free to rotate, or function as brakes to stop the rotation of said yarn packages when the rotation of said traction members is stopped, interconnecting mechanism whereby said traction members will be interconnected to rotate in unison when said traction members are free to rotate and for stopping the rotation of said traction members on stopping the operation of said interconnecting mechanism, a brake for stopping the operation of said interconnecting mechanism, and means for applying said brake including a drop element beneath which the yarn mass withdrawn from said yarn packages passes and which is permitted to drop on stoppage of said means for drawing the yarn from said yarn packages.

5. In a textile machine an unwinding and winding combination comprising a plurality of yarn packages, means for mounting said packages whereby the yarn thereon will be unwound therefrom by pull on the yarn and rotation of said yarn packages, a positive feed for drawing the yarn from said yarn packages by pull thereon and rotation of said yarn packages, rotary traction members, means for mounting said traction members whereby they will have constant traction engagement with said yarn packages and be rotated thereby when said traction members are free to rotate, or function as brakes to stop the rotation of said yarn packages when the rotation of said traction members is stopped, interconnecting

mechanism whereby said traction members will be interconnected to rotate in unison when said traction members are free to rotate and for stopping the rotation of said traction members on stopping the operation of said interconnecting mechanism, means for stopping the operation of said interconnecting mechanism on stoppage of said means for drawing the yarn from said yarn packages, a drum beyond said feed on which the yarn mass is wound, means for rotating said drum for winding the yarn mass thereon, and means whereby the yarn mass may be wound on said drum at a substantially uniform tension irrespective of the amount of yarn on said drum.

6. In a textile machine an unwinding and winding combination comprising a plurality of yarn packages, means for mounting said packages whereby the yarn thereon will be unwound therefrom by pull on the yarn and rotation of said yarn packages, a positive feed for drawing the yarn from said yarn packages by pull thereon and rotation of said yarn packages, rotary traction members, means for mounting said traction members whereby they will have constant traction engagement with said yarn packages and be rotated thereby when said traction members are free to rotate, or function as brakes to stop the rotation of said yarn packages when the rotation of said traction members is stopped, interconnecting mechanism whereby said traction members will be interconnected to rotate in unison when said traction members are free to rotate and for stopping the rotation of said traction members on stopping the operation of said interconnecting mechanism, means for stopping the operation of said interconnecting mechanism on stoppage of said means for drawing the yarn from said yarn packages, a drum beyond said feed on which the yarn mass is wound, and means for rotating said drum for winding the yarn massed thereon including a slip clutch through which force is imparted for rotating said drum.

7. In a machine for unwinding and winding textile strands; the combination comprising a creel for supporting a plurality of yarn packages whereby they may be rotatable thereon and the yarn be unwound therefrom by pull on the yarn strands, a positive feed for the yarn mass unwound from said packages for unwinding the yarn from said packages by pull thereon and rotation of said yarn packages, a controlling mechanism for the yarn packages including rollers engaging the yarn packages and rotated by frictional contact therewith, and means common to all said rollers whereby they will be connected to

rotate in unison and with the same peripheral speed of rotation, a brake for the means connecting said rollers as aforesaid for stopping the rotation thereof whereby rotation of the rollers will operate as brakes to stop rotation of said packages, means whereby said brake will automatically be applied when the feed is stopped, a drum located beyond said feed on which the yarn mass is wound, means for turning said drum for drawing the yarn mass from the feed and winding it upon the drum, and means whereby said drum will be rotated only when the yarn mass emanating from said feed will wind upon the drum at a determinate tension whereby the yarn mass will wind upon the drum at a substantially uniform tension.

8. In a textile machine an unwinding combination comprising a creel for supporting a plurality of yarn packages whereby they may be freely rotatable thereon and the yarn unwound from said packages by pull of the yarn strands, a positive feed for the yarn mass unwound from said packages for unwinding the yarn from said packages by pull thereon and rotation of said yarn packages, rotary traction members engaging the yarn packages and rotated by frictional contact therewith, means connecting said traction members whereby they will be connected to rotate in unison for assisting in the rotary control of said yarn packages, and means for stopping in unison the operation of said traction members in unison with the stoppage of said feed whereby said traction members will act as brakes to stop the rotation of said yarn packages.

9. In a textile machine an unwinding combination comprising a creel for supporting a plurality of yarn packages whereby they may be freely rotatable thereon and the yarn unwound from said packages by pull of the yarn strands, a positive feed for the yarn mass unwound from said packages for unwinding the yarn from said packages by pull thereon and rotation of said yarn packages, rotary traction members engaging the yarn packages and rotated by frictional contact therewith, means connecting said traction members whereby they will be connected to rotate in unison for assisting in the rotary control of said yarn packages, and means for stopping the operation of said traction members through stoppage of the operation of said interconnecting mechanism as said feed is stopped whereby said traction members will act as brakes to stop the rotation of said yarn packages.

LESLIE A. RUNTON.