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TEXTILE PACKAGE FORMATION

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Fig. 2.

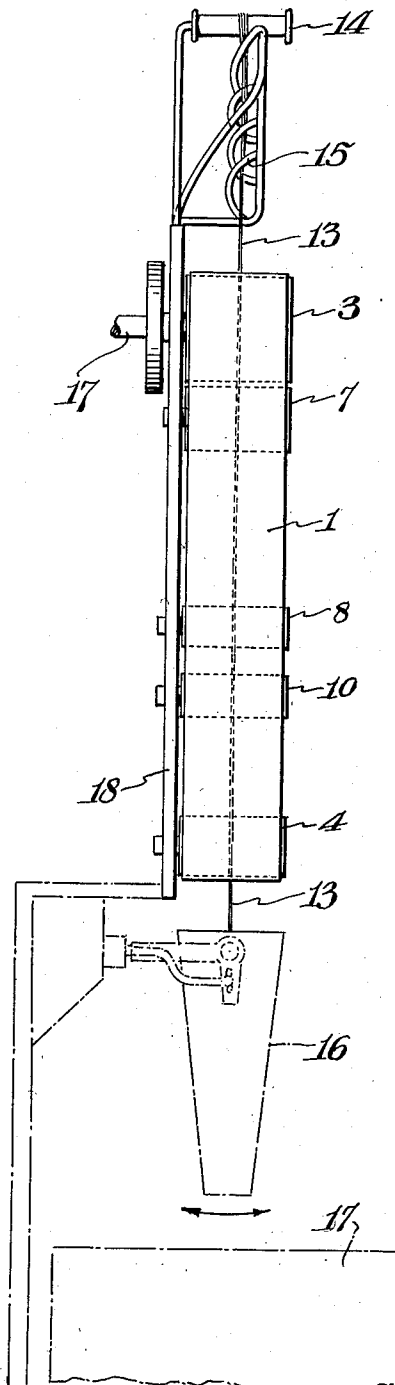
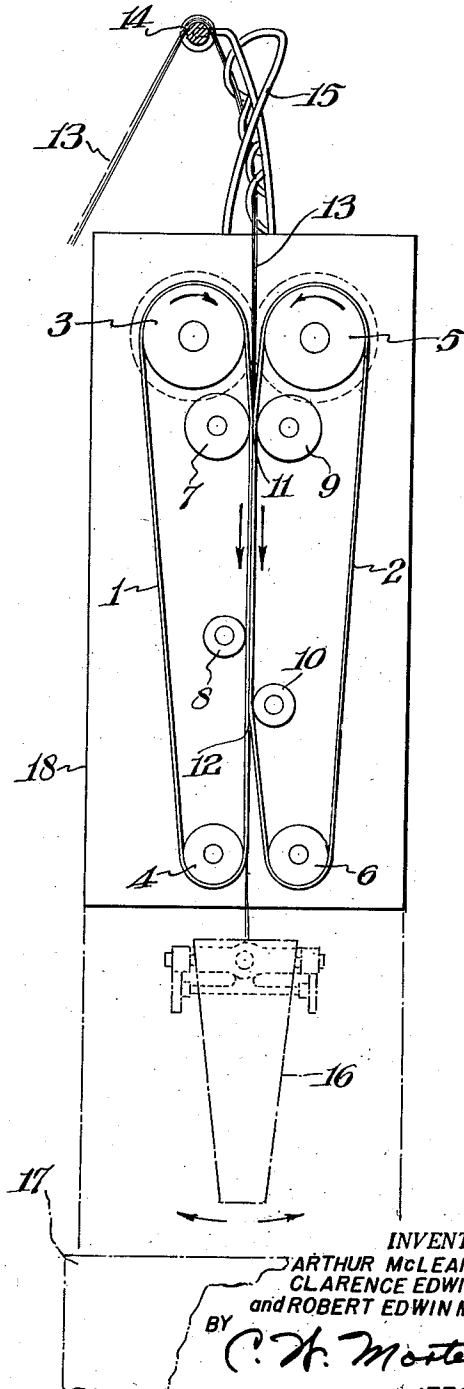


Fig. 1.



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TEXTILE PACKAGE FORMATION

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4 Claims. (Cl. 203—310)

This invention relates to apparatus for handling a running length of yarn or tow composed of a plurality of yarns. It relates in particular to a means for handling running lengths of yarn at high speed to form large packages from which the lengths are readily removed and rewound.

In the handling of yarns on the run difficulty is usually encountered by yarn breakage, wrap formation, tension variation and the like. When a large number of yarn ends are being run simultaneously, these difficulties must be avoided. The avoidance is particularly important in processing a tow composed of a large number of filaments or yarn ends.

An object of this invention is to provide an apparatus for feeding a traveling yarn to a position at which a package is to be formed. Another object is the provision of apparatus which will throw the yarn or tow into a container. A still further object is the provision of apparatus for effecting wrap-free consolidated discharge of a tow into a random package. Other objects will appear hereinafter.

The accomplishment of these objectives can be seen by reference to the figures given for illustrative purposes only and to the discussion below.

In the figures, Figure 1 is a front view, and

Figure 2 is an end view of the apparatus of this invention.

As can be seen the objects of this invention are attained by running the yarn end or plurality of ends preferably through a guide and then to a nip formed by two endless belts running in close proximity. The belts preferably run at substantially the same speed and the driving means of each belt are so located to form a passageway for said yarn ends to the nip. Press or squeeze rolls are located to keep the belts in close proximity throughout the nip area so that the yarn ends or tow are gripped by the moving belts and carried with them. At the exit end, one belt is made to pass away from the other which other belt then continues in its normal path carrying the yarn with it. At the place of return of this belt is a roller, normally an idle roller, which is preferably of a small size. By this provision centrifugal force is attained to throw the yarn from the belt thereby preventing it from following the belt. Below this exit is a traverse guide which moves in two directions at right angles to each other with a straight line motion in each direction. A container is provided below this guide to receive the yarn or tow.

In the figures there are two endless belts, designated 1 and 2, which are mounted to be in close proximity and form a nip of some length during a part of their respective travel. Belt 1 is mounted on rollers 3 and 4, being driven by roller 3. Belt 2 is similarly mounted on rollers 5 and 6, being driven by roller 5. These belts are made to contact or almost contact each other by the placement of these rolls and by the use of idle rollers 7 and 8 over which belt 1 runs and idle rollers 9 and 10

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over which belt 2 runs. As can be seen in Figure 1, the belts run so that a nip is formed near the top at 11 and extends to where belt 2 is made to travel away from belt 1 by roller 6. The two belts are then in close proximity between 11 and 12.

The yarn end, tow or rope 13 is fed from a source (not shown) over roller 14 to and through a false twister guide 15. It then passes into the nip of the belts and is carried by belts 1 and 2 from 11 to nip 12 and after riding on belt 1 to roller 4 it is thrown off the belt into a traverse guide 16 which is an oscillating funnel or boot. Under this guide 16 is a can or container 17 in which the tow 13 is deposited. The lay-down of the tow is uniform and dependable and easy backwinding is readily obtained. Upon filling a can, which can be of any desired capacity, the tow is cut and the can is removed either manually or mechanically and an empty container is placed under the guide 16.

The belts used in the apparatus of this invention can be knit cotton endless tubing, rubber-impregnated cotton belts, leather belts, etc. Usually the belt is about six inches wide and $\frac{3}{32}$ to $\frac{1}{8}$ inch thick. The choice of belt materials and dimensions will, of course, depend in part on the objects being processed, speeds, finishes being used and the like.

For best results, the two belts are run at the same surface speed. By so doing excessive belt wear is avoided. While there are a number of ways to get equal surface speeds, it is preferred to gear rollers 3 and 5 together so that they are driven from the same drive shaft 17. Rollers 3 and 5 are of the same or substantially the same diameter, the diameters being preferably within 0.001 inch. While it is possible to let one belt drive the other, the gearing together of the rollers 3 and 5 is preferred.

As shown in the figures, the rollers driving and/or carrying the belt are mounted on a plate 18. Such mounting permits the determination of the arrangement best suited for the prevailing conditions. Rollers 7 and 9 are usually rubber covered rolls acting as squeeze rolls. These assure positive tow gripping and there is practically zero angularity of the belts around these rolls or other belt supporting rolls located in the nip area, such as rolls 8 and 10. The vertical length of belt 1 below the last consolidating roll 10 affords a steady, vertical discharge of the tow from the belts. This length need not be perfectly vertical and in fact roller 4 may be situated like roller 6 so that both belts move away from each other. While the apparatus may be used in horizontal and in tilted positions, the position shown in Figure 1 is preferred, for it affords smoother delivery. Similarly, the length of the nip between points 11 and 12 is not critical. The length is finite so that sufficient positive gripping of the tow is afforded and so that roll wraps are avoided. The length of the nip will, then, depend on the yarn ends being processed, their state of dryness, etc.

The drive rolls may be of any desired diameter, but for most purposes a diameter of about five inches is satisfactory. This diameter reduces rotative speed. The bottom roll 4 is smaller in diameter, usually about three inches, to promote high centrifugal forces on the tow to reduce the tendency of the tow to follow the belt 1.

When a plurality of yarn ends are being processed to form a tow, it is preferred to use the false twister guide 15. For example, when a 100,000 denier tow was running a consolidation from a tow width of 1.5 inches to about $\frac{5}{8}$ inch was accomplished.

The traverse guide 16 can be constructed of any material desired. Usually chromium plated steel is used that has no burrs or rough edges on the internal surfaces. For most purposes a boot of about 2 feet 8 inches long is satisfactory, the upper diameter being about 8 inches

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and the lower diameter being about 2 inches and the thickness of the wall being about $\frac{1}{8}$ inch. These boots are mounted in gimbals below the belts so that the guide is free to move in any direction and is readily removed. The traverse guide is traversed in two directions. One motion is preferably a straight line motion perpendicular to the tow and the other motion is preferably a straight line motion at right angles to the first motion. Motions other than straight line motions can be used if desired. The rate in strokes per minute in these directions will, of course, be adjusted to the processing speed and the desired rate of filling a can.

In operation, a tow from a spinning machine is passed over a liquid applicator (not shown) which may be simply a piece of $\frac{1}{4}$ inch pipe containing a narrow slot or pipes arranged in T form, one branch bearing the slot. Water is the liquid usually used and it is passed through the slot and is carried away by the filaments as they run over the applicator. The addition of water assists in condensing the ends into a tow. After leaving this applicator, to wet the other side of the filaments or tow, the running lengths are preferably passed under a similar applicator a short distance away and are then passed through the guide 15 and from there to the nip as described above. After leaving the belt 1 the tow is passed through the funnel guide 16 which distributes the tow in a uniform package in the receptacle beneath the boot. The two directional traverse features of the guide 16 eliminate the necessity for rotating or traversing the take-up can 17.

The apparatus of this invention may be used for low denier yarns as for example 680 denier yarns and smaller. It has particular utility in the high speed packaging of heavy denier tows.

The apparatus of this invention is useful in handling running yarn ends or tows of any material synthetic or natural. It is particularly useful in staple production. The rectangular shaped packages formed in the cans are readily transferred either within a given area or to a point removed or the yarn therein is converted into staple for further processing.

Any departure from the above description which conforms to the present invention is intended to be included within the scope of the claims.

We claim:

1. An apparatus adapted to handle running lengths of

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yarn and tow which are capable of being charged by static electricity which comprises two narrow smooth endless belts adapted to travel rapidly at equal speeds and having vertical sections in contiguous relation to form a means for gripping the yarn or tow lightly and advancing it, driving means for the said belts, a pair of oppositely disposed squeeze rolls located to form a "V" shaped entrance passageway for the yarn to the gripping and advancing sections of the said belts, and means for deflecting a portion of one of the said belts out of its normal path at the exit end and beyond the gripping section, the other belt being positioned in its normal straight vertical path and out of contact with the said deflected portion, whereby the material being handled is delivered downwardly and away from both belts without tension other than gravity.

2. The apparatus of claim 1 in which a guide for the yarn or tow is positioned immediately before the said V-shaped entrance passageway.

3. The apparatus of claim 1 in which an oscillatable funnel is disposed at the exit end of the belts into which the yarn or tow is delivered.

4. The apparatus of claim 1 in which both belts are driven by the same driving means.

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