

[54] WINDER

[76] Inventor: Charles M. Schott, Jr., Way Road,
Gloucester, Mass. 01930

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[51] Int. Cl. B65h 19/20

[58] Field of Search 242/56 A, 56 R, 64,
242/81; 221/205

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Primary Examiner—George F. Mautz

Assistant Examiner—Edward J. McCarthy

Attorney—John N. Williams

[57] ABSTRACT

Winders capable of production of consumer rolls of an elongated web. A turret assembly has spindles rotata-

ble about respective spindle axes and movable along a path through a series of index stations. A spindle drive is operable to produce spindle rotation at least at the start-up station and a turret drive is operable to move the spindles through the stations. A roll unloader is adjacent the roll unload station, a core loader is adjacent the core load station, and the loader and unloader each have elements movable parallel to the spindle axes to respectively slide fresh cores over and remove wound rolls from the spindles. A roll starting or tucking assembly comprises an enveloping member mounted adjacent the start-up station and movable across the path between a retracted position and an enveloping position adjacent a spindle at the start-up station, and a web tucking member mounted for movement about a tucking axis between a retracted position and a tucking position. The tucking member when in the tucking position extends between the enveloping member and the spindle at the start-up station, whereby the enveloping and tucking members cause the web to envelop the spindle from opposite sides thereof. Also shown are a core loader in the form of a tray and pushers; a core unloader in the form of grooved rings confined to the spindles and engaged by a stripping fork; simultaneous dependent drive of the loader and unloader; a hopper having a wall moving to and fro through a special path; a triggered idler method of controlling belt drive of the spindles and other important features. In another aspect spindle start-up for webs having perforations is accomplished by a blunt-edged blade which by impact breaks the perforations, with the free end carried about the blade edge into tucked relation. For non-perforated webs there is a severing member downstream from the tucking blade.

30 Claims, 14 Drawing Figures

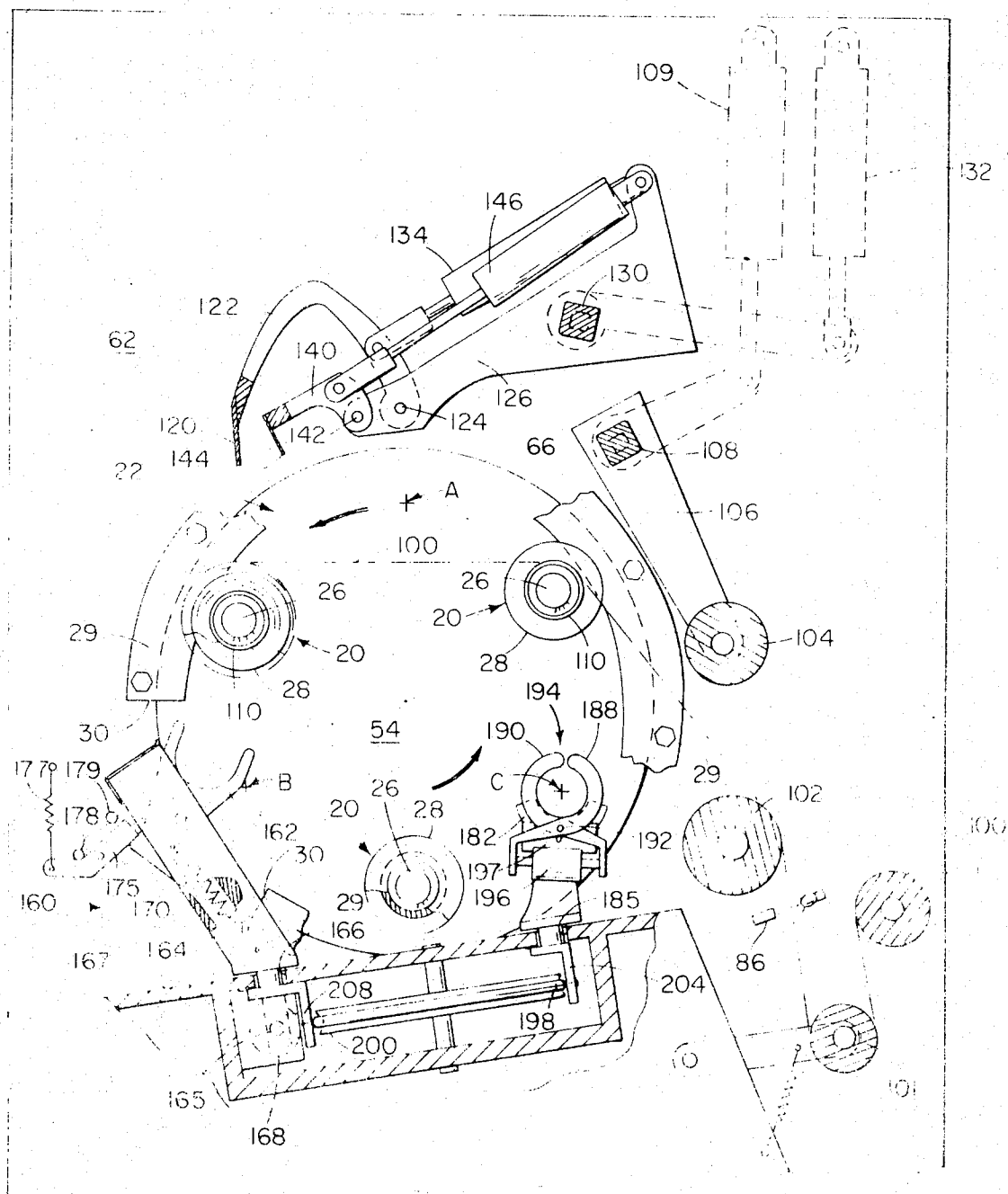


FIG 2

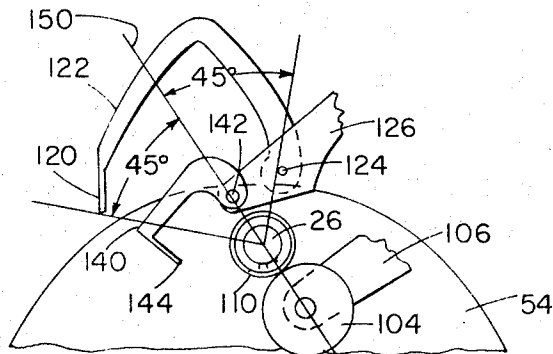
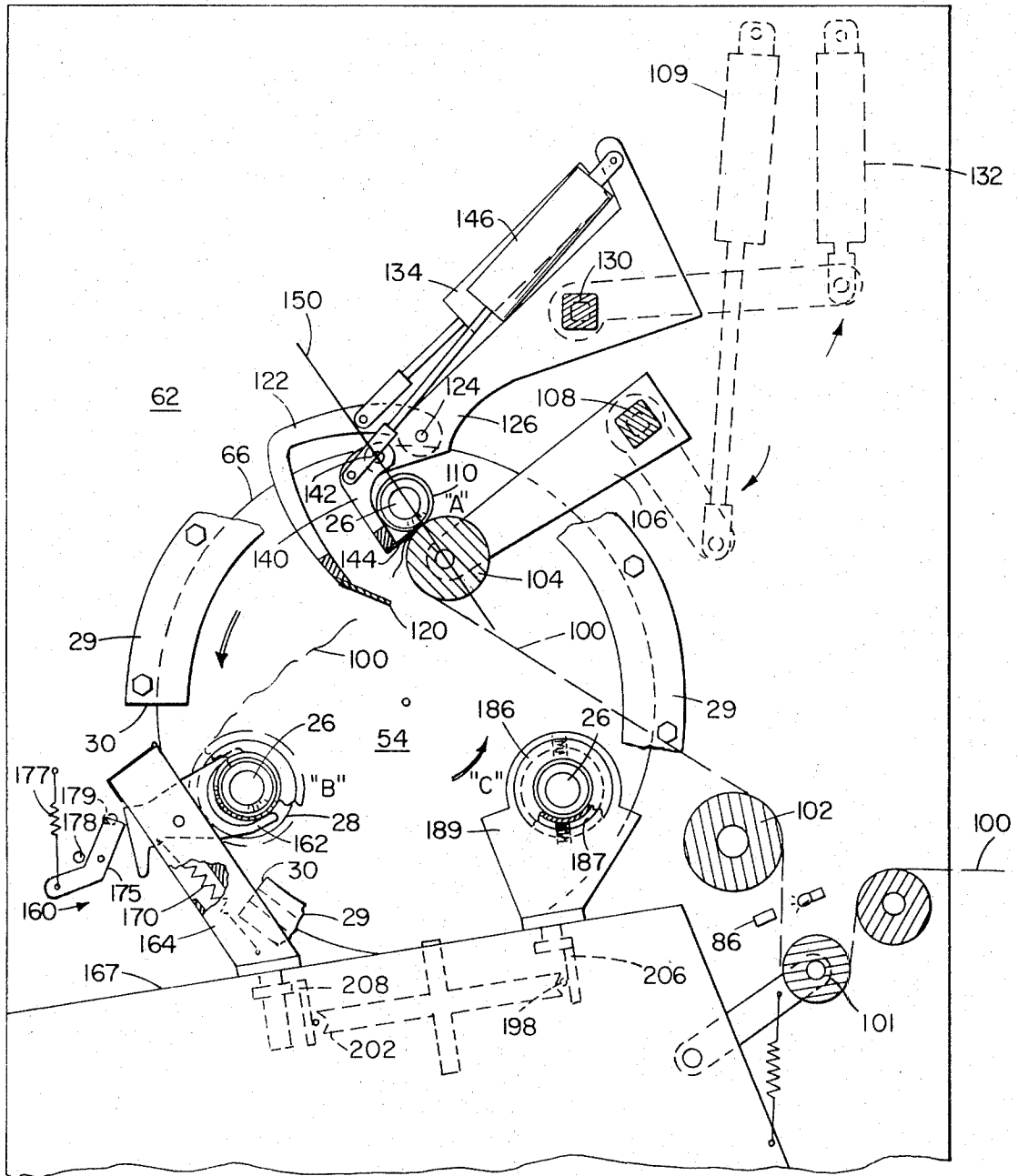
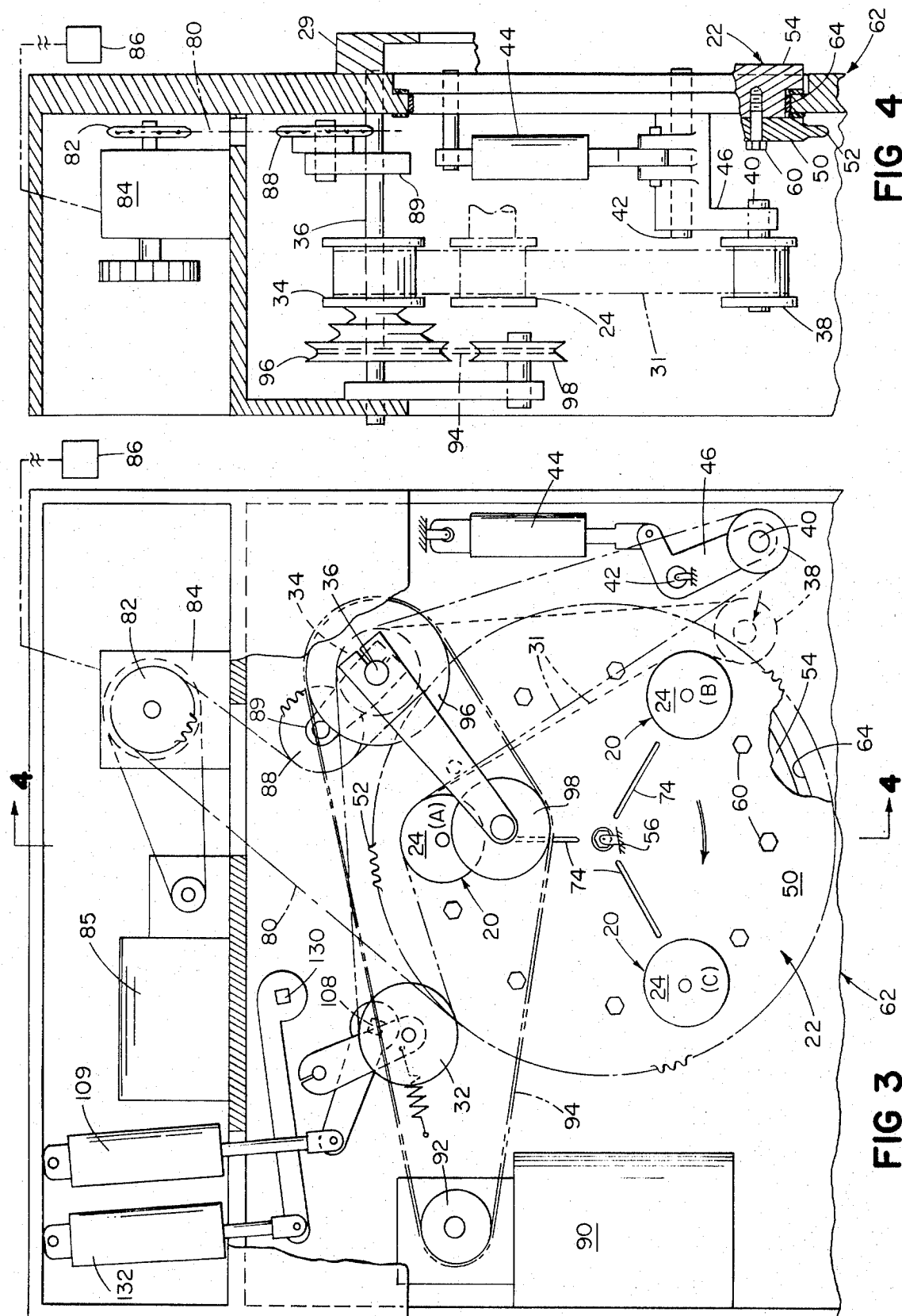
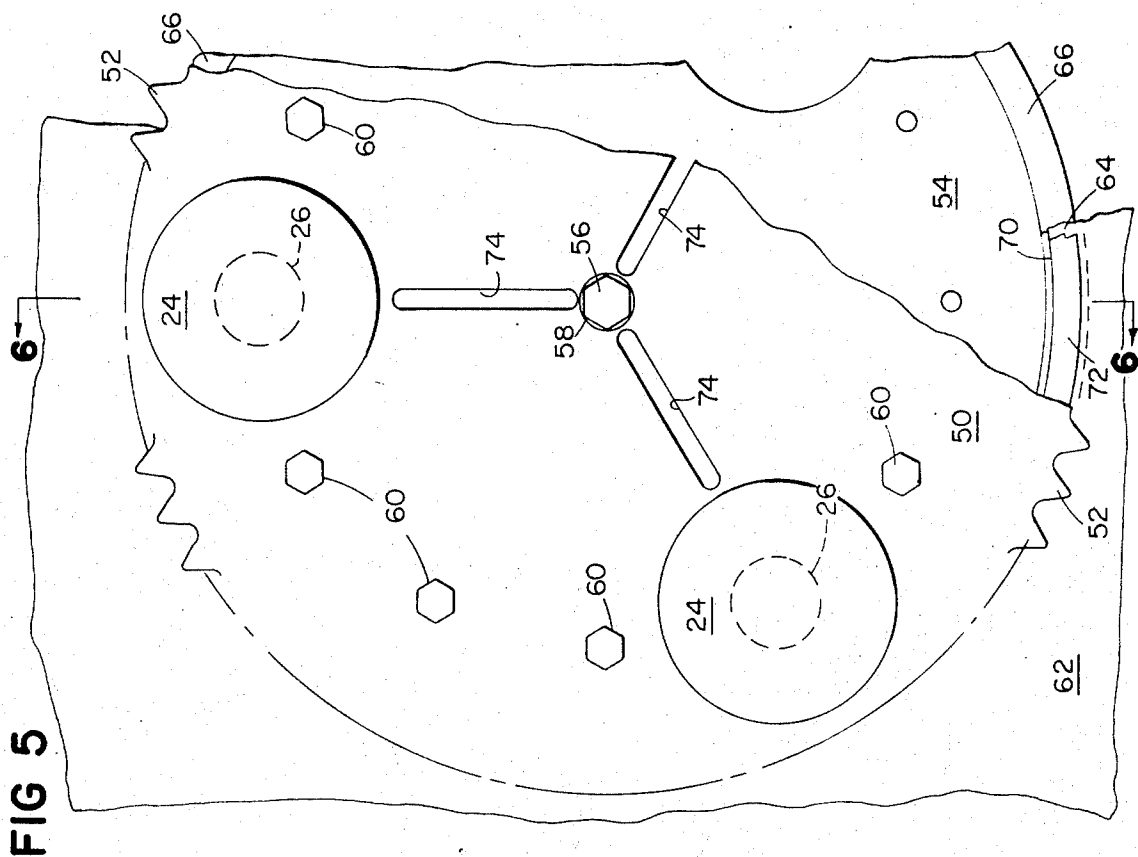
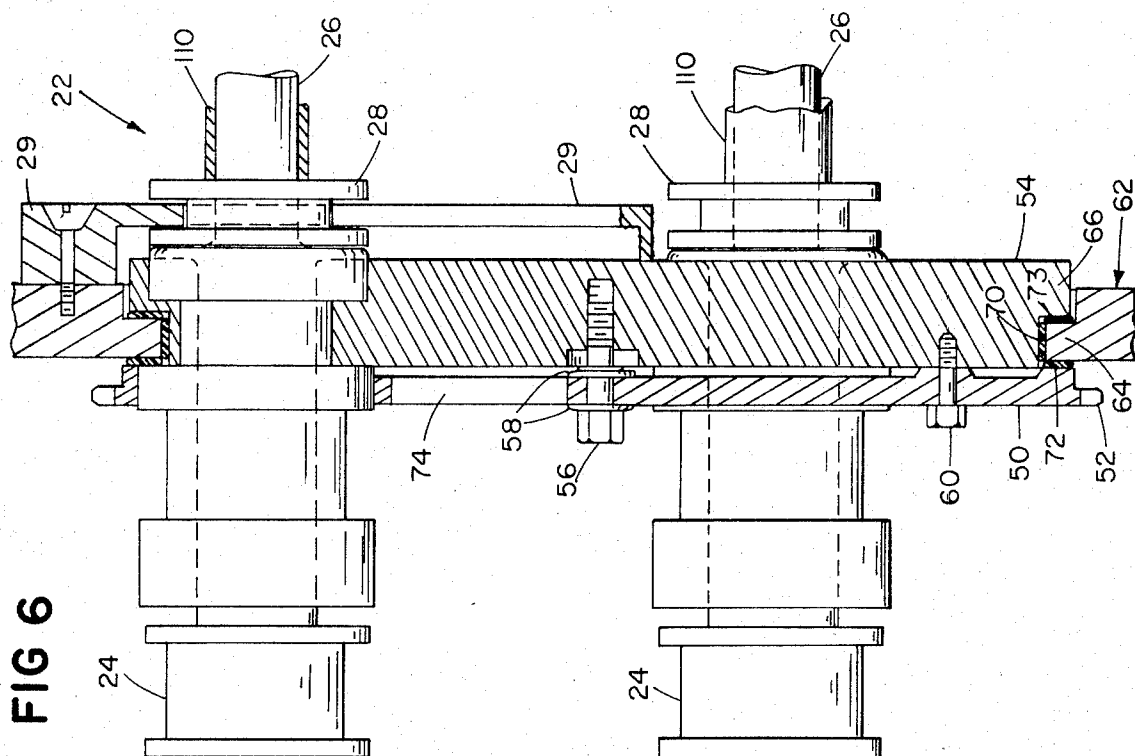


FIG 2a





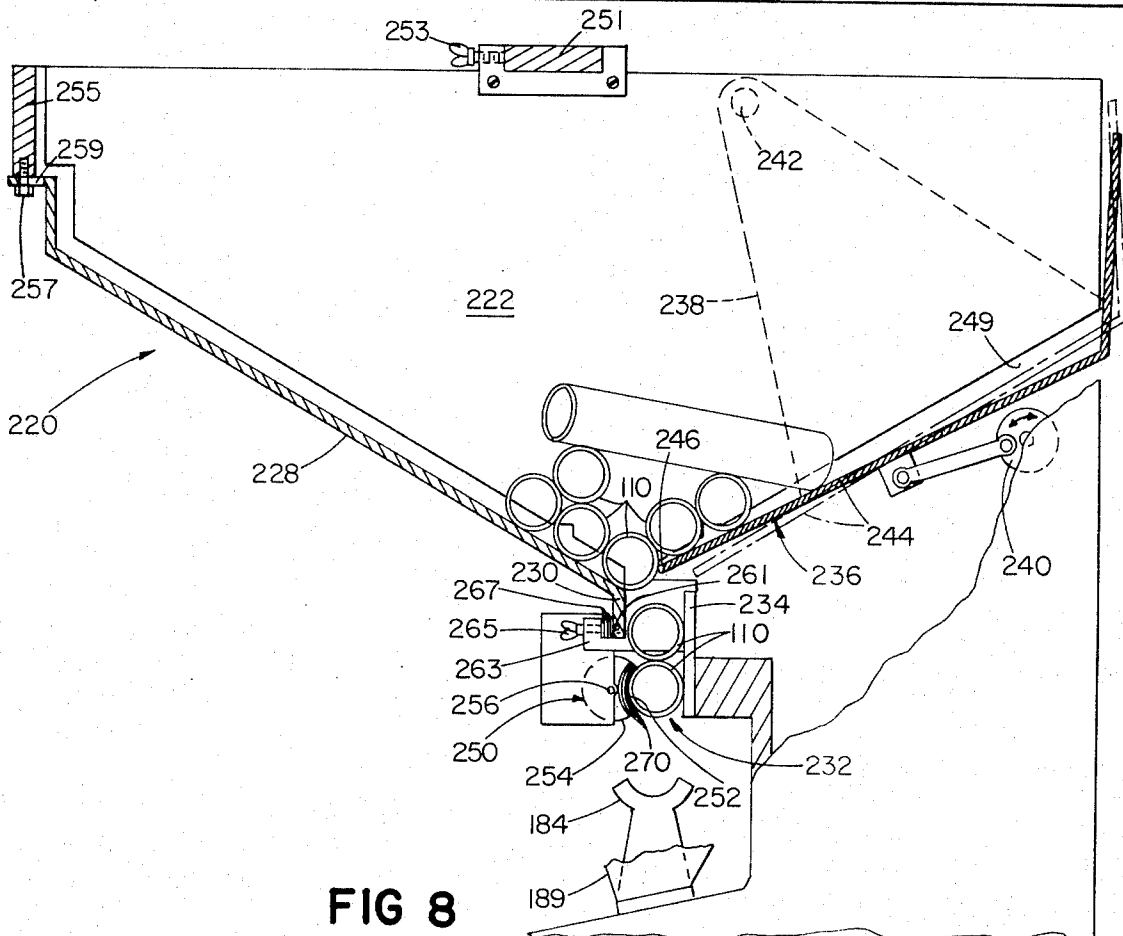
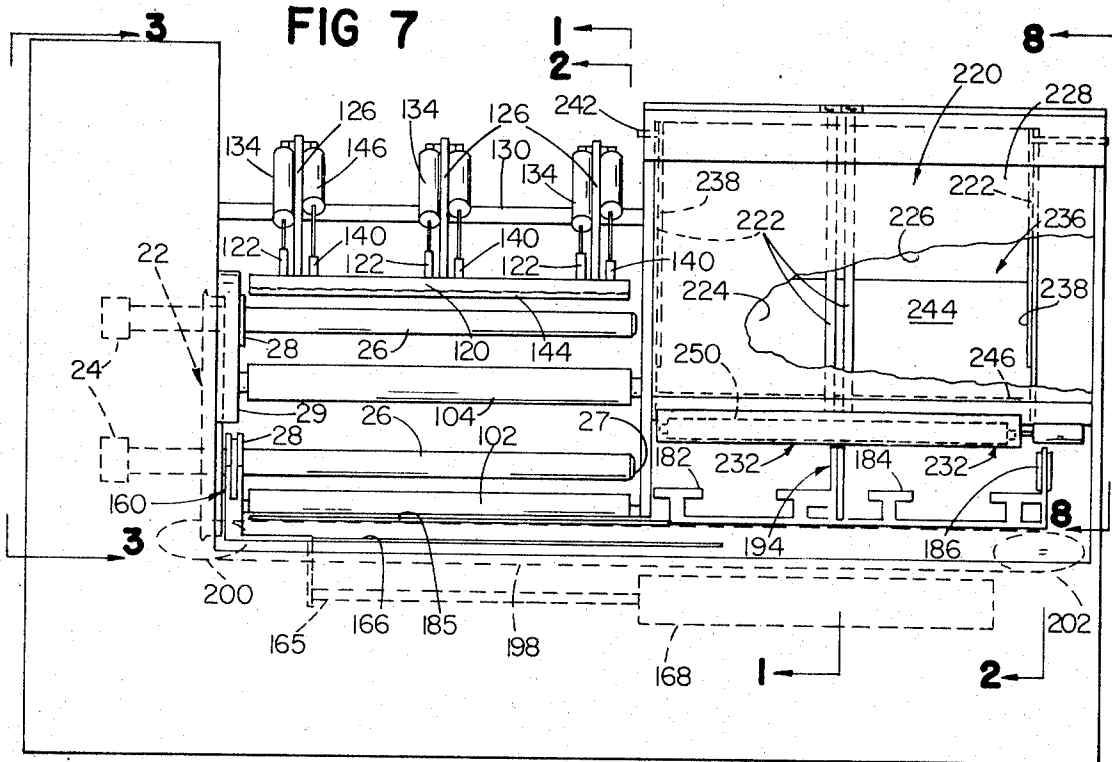


FIG 10

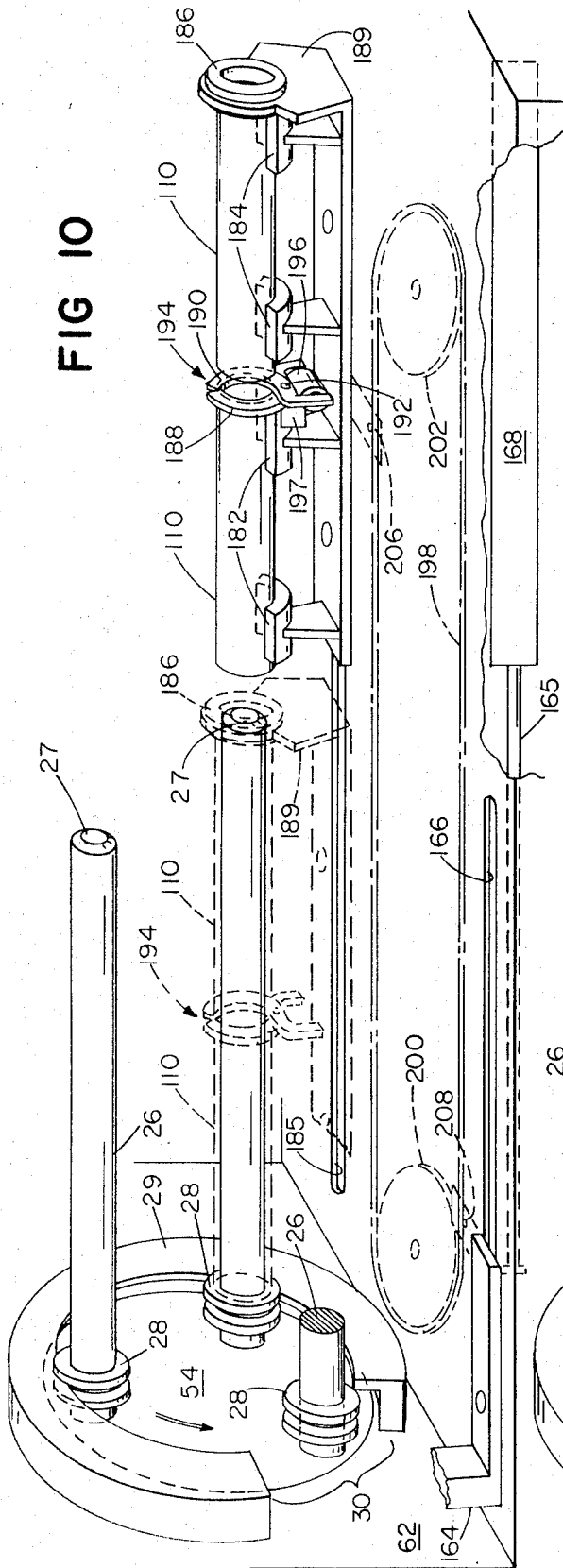
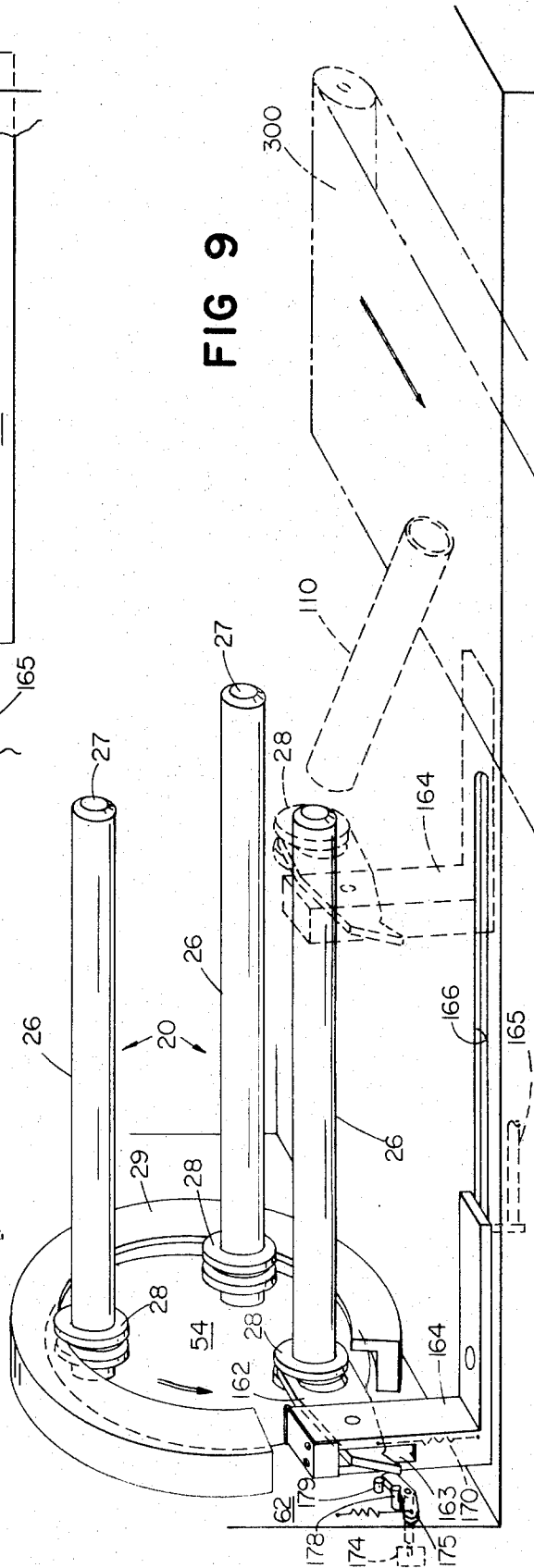


FIG 9



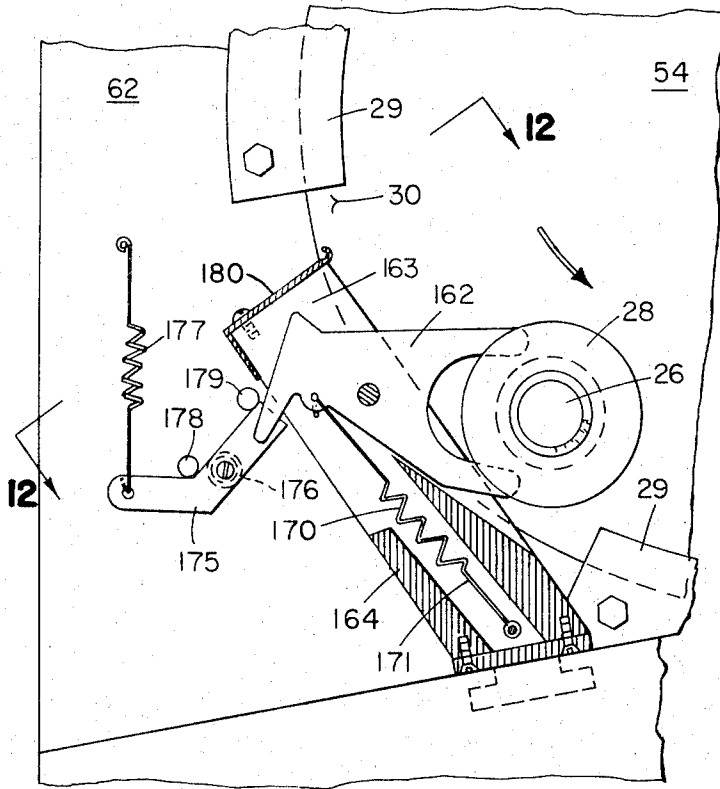


FIG 11

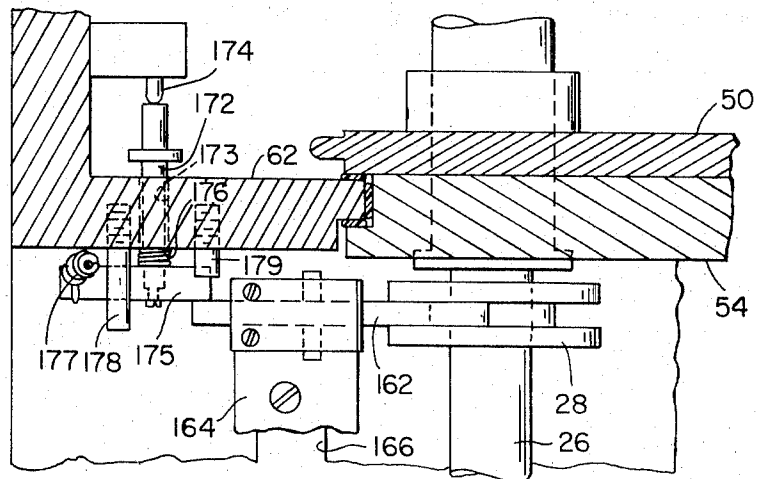


FIG 12

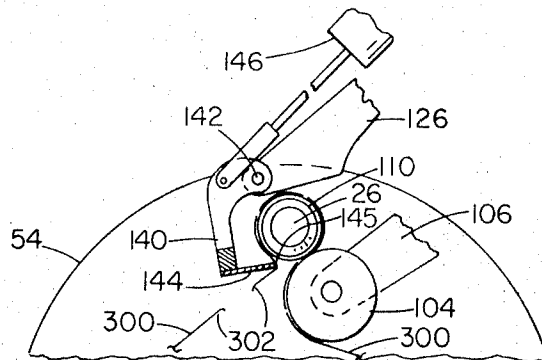


FIG 13

1 WINDER

This invention relates to producing rolls of an elongated web.

Objects of the invention are to provide simple, inexpensive, reliable apparatus for high speed, high volume winding of a long web into individual rolls, e.g., for consumer packaging of plastic bags. Other objects are to provide such apparatus that can be operated by unskilled persons; that can handle very thin cores on which the web is wound; that can simultaneously wind more than one roll while still permitting rapid automatic loading and unloading; and in which accurate spindle alignment can be maintained despite load-produced moments.

In one aspect the invention features a turret winder for production of consumer rolls of an elongated web, comprising a turret assembly having at least three spindles rotatable about respective spindle axes and movable along a path through a series of index stations including at least a start-up station, a roll unload station, and a core load station, a spindle drive operable to produce spindle rotation at least at the start-up station, a turret drive operable to move the spindles through the stations, a roll unloader adjacent the roll unload station, a core loader adjacent the core load station, the loader and unloader each having elements movable parallel to the spindle axes to respectively slide fresh cores over and remove wound rolls from the spindles, and a web tucking assembly adjacent the start-up station, comprising an enveloping member mounted adjacent the start-up station and movable across the path between a retracted position clear of the turret assembly and an enveloping position adjacent a spindle at the start-up station, and a web tucking member mounted for movement about a tucking axis between a retracted position and a tucking position, the tucking member when in the tucking position extending between the enveloping member and the spindle at the start-up station, whereby the enveloping and tucking members cause the web to envelop the spindle from opposite sides thereof. In another aspect the invention features a web tucking assembly adjacent the start-up station, comprising a nip member mounted adjacent the start-up station and movable between a retracted position clear of the turret assembly and an operating position providing a nip with a spindle at the start-up station, and a web tucking member mounted for movement about a tucking axis between a retracted position and a tucking position extending in close to the nip. In other aspects of the invention reciprocating elements of the loader and unloader are coupled to a common drive to synchronize their movements; the element of the unloader is pivoted about an axis parallel to the spindle axes; the element of the loader comprises a core support and a core pusher mounted so that a fresh core resting on the support has its axis slightly below the axis of a spindle at the load station, the spindles having tapered ends to facilitate core loading; the loader includes a hopper having stationary walls defining a downwardly extending channel through which the cores are metered, and an oblique wall extending upwardly from the channel and mounted for oscillation about an axis parallel to the channel to cause the cores to align with the channel; the spindle drive includes a driven belt in driving contact with a spindle at the start-up station and which passes around a clutching roll ad-

2

jacent the unload station, the clutching roll being mounted for movement between an operative position in which the belt is in effective driving contact with a spindle at the unload station and a retracted position in which the belt is spaced from the spindle at the unload station while remaining in driving contact with the spindle at the start-up station; and the turret assembly comprises a base plate mounted for rotational indexing in a stationary frame, the plate bearing on the frame along a cylindrical surface, and a plate sprocket mounted against the base plate and bearing on the frames along an annular surface adjacent the cylindrical surface, the plates being connected together along a circle having the turret axis as its center, and at the center, the connection at the center being adjustable to vary the distance between the plates at the center, the plate sprocket having a lever action to cause a decrease in plate-to-plate clearance at the annular surface upon an increase in plate-to-plate distance at the center. In another aspect a single member breaks and tucks the web. In preferred embodiments the web tucking member, when in the tucking position, is perpendicular to a plane including the tucking axis and passing through the nip, that plate also including the axis of an enveloping roll in its enveloping position; the web extends around the enveloping roll in its enveloping position to a line of initial contact with a core on the spindle, the line being in a plane including the axis of the spindle; the tucking axis lies within 45° of the plane just defined; the winder further comprises a web severing member mounted for pivotal movement about an axis parallel to the tucking axis between a retracted position and a severing position in which the severing member contacts the web downstream of a planar tucking blade in the direction of web travel, the tucking and severing members being mounted on a support movable between retracted and operating positions; the reciprocating element of the unloader is a fork which mates with grooved rings carried respectively at the inner ends of the spindles for stripping wound rolls therefrom, there being a stationary track to retain the grooved rings in fixed axial position on the spindles during turret movement except at a gap adjacent the unloader; the fork cooperates with a limit switch to signal the end of the loading cycle and the successful complete return of the fork; the common drive is effectively coupled to the reciprocating loading and unloading elements through a belt passing around a pulley, so that those elements move simultaneously in opposite directions parallel to the spindle axes; the reciprocating element of the loader is a support for a plurality of the cores arranged end-to-end and spaced apart, and a plurality of core pushers respectively adjacent the positions of the cores, each pusher except the outermost thereof being a split ring operable to open after loading and permit retraction of the loader with split rings back over the just loaded cores and past the outermost core loaded on the spindle, the split rings having a clearance with the spindle when closed of less than the wall thickness of the cores; and the oscillation of the hopper wall has a component transverse to the hopper channel approximately equal to the diameter of the cores; the axis of hopper wall oscillation is intermediate the ends of that wall to minimize volumetric changes in the hopper during the oscillation.

Other features are mentioned in the abstract and still other features, objects and advantages of the invention

will appear from the following description of a preferred embodiment taken together with the drawings in which:

FIG. 1 is a fragmentary view partially in section showing portions of the tucking, cutting, spindle, loading, and unloading assemblies, taken along 1—1 of FIG. 7;

FIG. 2 is a view similar to FIG. 1 with the mechanism in a different position, taken along 2—2 of FIG. 7;

FIG. 2a is a diagram showing the preferable range of tucking axis location;

FIG. 3 is a fragmentary view partially broken away showing portions of the turret and spindle drive assemblies, taken along 3—3 of FIG. 7;

FIG. 4 is a sectional view along 4—4 of FIG. 3;

FIG. 5 is a fragmentary side elevation of the turret assembly;

FIG. 6 is a sectional view along 6—6 of FIG. 5;

FIG. 7 is a fragmentary end view of the mechanism of FIG. 1;

FIG. 8 is a view taken along 8—8 of FIG. 7;

FIGS. 9 and 10 are partially diagrammatic perspective views of the core load and unload assemblies, respectively;

FIG. 11 is an enlarged view of the core stripping apparatus shown as part of FIG. 1;

FIG. 12 is a sectional view taken along 12—12 of FIG. 11; and

FIG. 13 is a fragmentary view of another embodiment.

Referring to the drawings, three cantilevered spindle assemblies 20 (FIGS. 1, 9) are mounted on turret assembly 22, spaced 120° apart. Each spindle assembly includes a drive pulley 24 (FIGS. 3—6) and a spindle or arbor 26 adapted to grip the core (FIG. 7), the outer end of the arbor being tapered at 27. A peripherally grooved, close-fitting plastic ring 28 is mounted for sliding movement on each arbor. The clearance between each ring 28 and its arbor 26 is preferably less than 75 percent of the wall thickness of the cores to be loaded on the spindles, and is most preferably just sufficient to allow free sliding of the ring (e.g., a 0.004"—0.007" difference between the outside spindle diameter and the inside diameter of a nylon ring). A stationary retaining track 29 (FIGS. 1, 9) mates with the grooves in rings 28 to hold them at the inner ends of the arbors as the turret assembly indexes. Track 29 has a gap 30 to permit unloading of wound cores from the arbors, as described below.

Spindle drive belt 31 (FIGS. 3—4) passes around adjustable take-up idler 32, drive pulley 34 mounted to rotate on shaft 36, and clutching idler 38 mounted on shaft 40 shiftable about pivot 42 by air cylinder 44 operating through bell crank 46.

Turret assembly 22 (FIGS. 5—6) includes a moment-bearing plate sprocket 50, with peripheral drive teeth 52, mounted on base plate 54 by central bolt 56 (which grips plate sprocket 50 between flanges 58 and is threaded into base plate 54) and a ring of bolts 60 located at two-thirds of the radius of the turret assembly. Machine frame 62 has a circular opening defined by flange 64 which fits between plate sprocket 50 and flange 66 of base plate 54 to support the turret assembly for rotation. Bearing surfaces for the turret assembly are provided by sleeve 70 and annuli 72 and 73 of self-lubricating material which respectively contact base plate 54 and the peripheral face of plate sprocket

50. The bearing of plate sprocket 50 against annulus 72 can be adjusted by rotating bolt 56 to slightly separate the center of plate sprocket 50 from plate 54, causing bolts 60 to act as a circular fulcrum so that the periphery of plate sprocket 50 is moved into contact with annulus 72. The flexure of plate sprocket 50 required for that adjustment is facilitated by slots 74, which reduce rigidity. By keeping the bearing in tight adjustment, axial misalignment of the turret assembly due to moments created by spindle loading is avoided.

Turret assembly 22 is indexed through roller chain 80 (FIGS. 3—4) and sprocket teeth 52. Chain 80 passes around sprocket wheel 82 driven through clutch 84 by indexing motor 85. The clutch is controlled by sensor 86, which counts the number of bags being fed to the winder. Adjustable sprocket idler 88, mounted on arm 89 pivoted on shaft 36, controls tension in chain 80. As the turret intermittently indexes, the spindle assemblies successively occupy a winding station A at the top of the turret, an unloading station B, and a core loading station C.

Motive power for rotating the spindle assemblies originates at motor 90 (FIG. 3) which drives step pulley 92. V-belt 94 passes around pulley 92 and step pulley 96, the latter locked to pulley 34 on shaft 36. Adjustable idler 98 controls tension in belt 94.

Side-by-side webs 100 (FIGS. 1—2) of plastic bags, after entering the winder, pass under dancer roll 101, over guide roll 102, and past rubber covered enveloping roll 104 mounted on arm 106 pivoted on shaft 108 for movement under power of cylinder 109 between a retracted position (FIG. 1) clear of turret assembly 22 and an operating position (FIG. 2) in nip relationship with cardboard cores 110 carried on spindle arbor 26 in the winding position A.

Web cutting blade 120 is supported at its ends and midpoint by curved arms 122 (FIGS. 1, 2, 7) pivoted at their opposite ends on shaft 124 carried by brackets 126, the brackets in turn being pivoted on shaft 130 and powered by air cylinder 132 for movement between a retracted position (FIG. 1) away from the turret assembly and an operating position (FIG. 2) adjacent the spindle assembly at station A. Air cylinders 134 extend between arms 122 and brackets 126 to control the movement of blade 120.

Additionally pivoted on head 126 are three curved arms 140, mounted on shaft 142, and carrying flexible web tucking blade 144 (e.g. of 0.025" thick steel). Air cylinders 146 extend between arms 140 and head 126 to control the movement of blade 144.

When enveloping roll 104 and brackets 126 are in their operating positions the axes of roll 104, arbor 26 at station A, and tucking blade shaft 142, lie in a common plane 150, with the arbor between the brackets and the enveloping roll. In general, plane 150 is defined by the axis of the arbor at station A and the upstream line of initial contact between the web and the core on that arbor. In operating position, with cylinders 146 expanded, tucking blade 144 will enter the nip between roll 104 and cores 110 on arbors 26, the blade being perpendicular to plane 150 and extending into the nip to within ½" or less (preferably less than ¼") of plane 150. In general, to ensure adequate tucking, the axis of shaft 142 should lie either in plane 150 or within an angular sector of no more than 45° either side of plane 150, the angle being measured with respect to the arbor axis (see FIG. 2a).

Loading and unloading assembly 160 (FIGS. 1, 2, 7, 9 and 10) is mounted just below the turret assembly. Below turret station B is a fork 162 pivoted in slot 163 of support bracket 164 which is connected through slot 166 in plate 167 to rod 165 of air cylinder 168. The fork is positioned at gap 30 in track 29, and reciprocates with rod 165 along slot 166. Slot 166 is parallel to the axes of arbors 26. Spring 170 in bore 171 of bracket 164 biases fork 162 in position (FIG. 1) to receive ring 28 at the inner end of the arbor 26 moving into station B from station A.

Rod 172 is mounted for rotation and translation in bore 173 in frame 62, with one end of the rod opposite electrical limit switch 174 mounted on the frame, and with a lever 175 fixed to the other end of the rod adjacent fork 162. Prior to the receipt by fork 162 of a ring 28, spring 176 biases lever 175 in the plane of the fork (FIG. 1), with spring 177 biasing the lever in a clockwise sense against the fork and stop pin 178. Stop pin 179 is also provided in the pivotal path swept by lever 175 about rod 172, but, unlike pin 178, pin 179 is too short to interfere with the lever in the plane of the fork (FIG. 1). Stop pin 179 interferes with lever 175 only when the lever is pressed back toward the frame by the fork (FIG. 12) in another phase of the operation described below, compressing spring 176 and actuating (through rod 172) switch 174.

Spring steel bracket 180 acts as a cover for slot 163 and as a bumper to cushion fork 162 when the fork pivots counterclockwise.

Below station C core loading strays 182 and 184 are mounted for reciprocation along slot 185 in plate 167, parallel to slot 166. The trays are preferably spring mounted for freedom in all directions to allow self-centering of the trays with the spindles despite minor indexing errors. Core pusher ring 186 (FIGS. 2, 7, 10), identical to rings 28, is spring mounted to float in circular opening 187 (FIG. 2) in bracket 189 at the outermost end of tray 184. Between trays 182 and 184 arms 188, 190 (FIGS. 1, 10) are pivoted scissors fashion on pin 192 to form a split pusher ring 194 which can be opened by solenoid 196. Pin 192 is mounted with some play in bracket 197, to give split ring 194 the same floating characteristic as ring 186. Split ring 194 and ring 186 have inside diameters equal to those of rings 28, just barely larger than the outside diameters of arbors 26, to permit the rings to slide on the arbors without passing over cores 110. The floating action of the pusher rings facilitate their alignment with the arbors. The rings may have tapered counterbores (not shown) for assisting in alignment and push-on of the cores. In this case the small bore is sized to fit closely over the spindle, and the enlarged outer end of the ring is sized to engage the core when lying in the tray. As pushing proceeds the core end will slide on the counterbore surface and be raised thereby, off of the tray, into aligned position with the spindle. Trays 182 and 184 are driven by cylinder 168 through belt or band 198 which passes around pulleys 200 and 202 (FIGS. 7, 10) and is fastened to the trays at 204 and 206, and to support arm 164 at 208.

Hopper 220 (FIGS. 7, 8) is provided to feed cores 110 to trays 182 and 184, four partitions 222 respectively acting as end walls and dividing the hopper into two compartments 224 and 226 respectively above the two trays, each compartment being slightly wider than the core length. The hopper has a stationary sloping

side wall 228 with a vertical flange 230 defining one boundary of outlet channel 232, a separate vertical wall 234 defining the opposite boundary of channel 232, and a sloping side wall 236 supported on a bracket 238. Bracket 238 is pivoted at 242 and is connected through a rocker shaft to a driver which acts to gently oscillate (at, e.g., 180 cycles/minute) wall 236 about its pivot. The oscillations are of sufficient amplitude to move edge 246 of wall 236 a distance having a horizontal component approximately that of the diameter of cores 110. The gap 249 between wall 236 and partitions 222 permits the oscillation, and the slope of wall 236 allows the horizontal component of the oscillation to have an amplitude greater than the width of gap 249, so that the gap width need not be so close to core diameter as to risk passage of a core into the gap.

Partitions 222 are supported from above on rail 251, and can be adjusted along the rail by loosening knob screws 253 to accommodate different core lengths. Wall 228 is in turn supported at its top from rail 255 by knob screws 257 in slots 259, and at its bottom in grooves 261 in partition flanges 263. Screws 265 act against spacers 267 in grooves 261 to hold the bottom of wall 228 in place. By changing the number of spacers, and by virtue of the adjustment permitted by slots 259, wall 228 can be repositioned toward or away from wall 234 to accommodate the width of channel 232 to different core diameters.

Core metering cam 250, with a concave surface 252 and a convex surface 254, is mounted just below wall flange 230 for rotation about pivot 256. Surface 252 matches the curvature of cores 110 and provides for one-by-one metering of cores to the trays. Removable inserts 270 can be added or deleted to accommodate cores of different diameters.

In operation, empty cores 110 are deposited in both sides of hopper 220. The gentle to and fro movement of wall 244 causes the cores to align with channel 232 and prevents bridging of the cores that would interrupt feed. Rotation of cam 250 feeds two cores respectively into trays 182 and 184.

In operation, upon the indexing of an empty arbor 26 to station C cylinder 168 is actuated, and the motion of belt or band 198 draws trays 182 and 184 toward the turret along the axes of the arbor. Cores 110 successively slide onto the arbor, respectively pushed along by split rings 194 and ring 186, until they are in place on the arbor (dashed lines, FIG. 10), spaced apart by the thickness of split ring 194. Tapered spindle end 27 facilitates loading of the cores, which are carried on trays 182, 184 with their common axis slightly below the arbor axis.

Simultaneously with the core loading, the wound rolls at station B are stripped from their arbor by fork 162. In particular, as an arbor 26 approaches station B (FIG. 1) ring 28 mates with fork 162 and causes the fork to rotate as the turret completes its indexing movement (FIG. 2). As the fork rotates, it pushes against lever 175, pivoting the lever against the force of spring 177. The axes of the turret and the spindle being unloaded lie in common planes with the pivot of fork 162. Ring 28 is then located at gap 30 in track 29, so that when cylinder 168 is actuated the ring strips both wound rolls off the spindle. Spring 177 returns lever 175 to its original position. Prior to the stripping of the rolls cylinder 44 is actuated to disengage drive belt 31 from pulley 24 of the spindles being unloaded, while

allowing winding to proceed at station A. The stripped rolls drop onto a conveyor 300 (dashed lines, FIG. 9).

The use of one belt to drive both the loading and unloading members achieves synchronization of these operations.

After loading an unloading as just described, solenoid 196 opens split ring 194 and cylinder 168 reversed, returning trays 182, 184, fork 162 and ring 28 to their original positions. As the fork returns, it forces lever 175 toward frame 62 (FIG. 12), compressing spring 176 and causing rod 172 to actuate limit switch 174, thereby signalling the ready for start of the next turret indexing cycle. Then, as the turret indexes, ring 28 (still engaged with the fork) causes the fork to undergo a further clockwise rotation until the ring withdraws from the fork (FIG. 11), at which time the released fork is returned by spring 170 to its original position (FIG. 1), allowing spring 176 to return lever 175 to the plane of the fork, so that switch 174 is deactuated. During the final clockwise movement of the fork, pin 179 prevents rotation of lever 175 so as to prevent it slipping off fork 162. Failure of switch 174 to deactuate would trigger an alarm (not shown), indicating failure of fork 162 to have returned to its proper position. Switch 174 thus acts both to signal return of unloader and to signal return of the fork 162.

The use of stripping and pushing rings with accurate dimensional control relative to the cores and arbors ensures successful loading and unloading without damage to the fragile thin wall cores (e.g. by upsetting the core ends). In particular, the combination of rings 28 with fork 162 allows all the close dimensional tolerances to be limited to the rings and arbors, since the fork position need not be kept in exact relationship to the arbors to successfully engage, unload, return, and separate from the rings.

Winding of the web 100 onto the cores occurs primarily at station A, and is completed between stations A and B and at station B prior to disengagement of drive belt 31. As the winding is almost completed, web 100 extends from roll 102 over the fresh spindle at station A, and across the turret to station B (compare FIG. 1). At this time, just before loading and unloading occur, cylinders 109 and 132 are actuated to respectively move enveloping roll 104 and brackets 126 to their operating positions (FIG. 2). As a result web 110 is enveloped around more than 180° of spindle 26. Then cylinders 136 and 146 are successively actuated, causing blade 120 to cut web 100 between stations A and B and blade 144 to pivot in the nip between cores 110 and and roll 104, further enveloping the cores (from the side opposite roll 104) and carrying into the nip the free end of web 100, thus further enveloping the cores, the free web end being tucked against the cores, covered and held in place by the successive turns of web as the winding proceeds. In its final movement into the nip, blade 144 is mutually tangent to cores 110 and roll 104 (by virtue of the coplanar geometry of the axes of the spindles, enveloping roll, and pivot 142), ensuring good tucking. For optimal tucking it is important that pivot 142 not lie outside the 45° sector on either side of plane 150. Cylinders 134 and 146 are then reversed, withdrawing blades 120 and 144, after which cylinders 109 and 132 are reversed, returning roll 104 and brackets 126 to their retracted positions.

When the web cut occurs, the nip of roll 104 against the cores prevents dancer 101 from pulling the web off the fresh cores.

Since the tucking blade is slightly upstream (along the web) of the cutting blade, the free end of the web folds over blade 144 during the tucking action, reducing the likelihood of web slippage past the blade.

In the embodiment described, web movement is at 10 ft/sec.

In another embodiment shown in FIG. 13 web 300 of plastic bags is perforated between adjacent bags 302, and arms 122 and blade 102 are omitted. Blade 144, with blunt edge 145, acts both to break the web at its perforations and to tuck as in the embodiment of FIGS. 1-12. As shown in FIG. 13, blade 144, moving at high speed (e.g., 700 ft/min.) strikes the web upstream of a line of perforations, causing the web to snap and its free tail to wrap around the blade and be carried thereby into tucked position. The blunt edge prevents the web from being cut.

Other embodiments will occur to those skilled in the art and are within the following claims.

What is claimed is:

1. A turret winder for production of rolls for an elongated web, comprising
 - a turret assembly having at least three spindles rotatable about respective spindle axes and movable along a path through a series of index stations including at least
 - a start-up station,
 - a roll unload station, and
 - a core load station,
 - a spindle drive operable to produce spindle rotation at least at said start-up station,
 - a turret drive operable to move said spindles through said stations,
 - a roll unloader adjacent said roll unload station,
 - a core loader adjacent said core load station,
 - said loader and unloader each having elements movable parallel to said spindle axes to respectively slide fresh cores over and remove wound rolls from said spindles, and
 - a web tucking assembly adjacent said start-up station, comprising
 - an enveloping member mounted adjacent said start-up station and movable across said path between a retracted position clear of said turret assembly and an enveloping position adjacent a said spindle at said start-up station, and
 - a web tucking member mounted for movement about a tucking axis between a retracted position and a tucking position, said tucking member when in said tucking position extending between said enveloping member and said spindle at said start-up station,
 - whereby said enveloping and tucking members cause said web to envelop said spindle from opposite sides thereof.
2. The winder of claim 1 wherein said enveloping member is positioned to form a nip at said start-up station when in said enveloping position.
3. The winder of claim 2 wherein said web tucking member, when in said tucking position, is perpendicular to a plane including said tucking axis and passing through said nip.
4. The winder of claim 3 wherein said enveloping member is a roll having an axis lying in said plane when

said enveloping member is in said enveloping position.

5. The winder of claim 1 wherein said web extends around said enveloping member in said enveloping position to a line of initial contact with said spindle at said start-up station, said line being in a plane including the axis of said spindle; said tucking axis lying within 45° of said plane with respect to said axis of said spindle when said tucking member is in said tucking position.

6. The winder of claim 1 wherein said tucking member includes a flexible blade.

7. The winder of claim 1 further comprising a web severing member mounted for pivotal movement about an axis parallel to said tucking axis between a retracted position and a severing position in which said severing member contacts said web downstream of said tucking member in the direction of web travel.

8. The winder of claim 7 wherein said tucking and severing members are mounted on a support movable between retracted and operating positions.

9. A turret winder for production of consumer rolls of an elongated web, comprising

a turret assembly having at least three spindles rotatable about respective spindle axes and movable along a path through a series of index stations including at least

a start-up station, and

a roll unload station,

a spindle drive operable to produce spindle rotation at least at said start-up station,

a turret drive operable to move said spindles through said stations,

a roll unloader adjacent said roll unload station, said loader having an element movable parallel to said spindle axes to remove wound rolls from said spindles, and

a web tucking assembly adjacent said start-up station, comprising

a nip member mounted adjacent said start-up station and movable between a retracted position clear of said turret assembly and an operating position providing a nip with a said spindle at said start-up station, and

a web tucking member mounted for movement about a tucking axis between a retracted position and a tucking position extending to within ½ inch of a plane including the axis of said spindle at said start-up station and extending through said nip.

10. A turret winder for production of consumer rolls of an elongated web, comprising

a turret assembly having at least three spindles rotatable about respective spindle axes and movable along a path through a series of index stations including at least

a start-up station, and

a roll unload station,

a spindle drive operable to produce spindle rotation at least at said start-up station,

a turret drive operable to move said spindles through said stations, and

a roll unloader adjacent said roll unload station, said unloader having an element mounted for movement parallel to said spindle axes to remove wound rolls from said spindles,

said element of said unloader being a fork constructed and arranged to mate with peripherally grooved rings carried respectively at the inner

ends of said spindles for stripping said wound rolls from said spindles, said fork being pivoted about an axis parallel to said spindle axes.

11. A turret winder for production of consumer rolls of an elongated web, comprising

a turret assembly having at least three spindles rotatable about respective spindle axes and movable along a path through a series of index stations including at least

a start-up station,

a roll unload station, and

a core load station,

a spindle drive operable to produce spindle rotation at least at said start-up station,

a turret drive operable to move said spindles through said stations,

a roll unloader adjacent said roll unload station, and a core loader adjacent said core load station,

said loader and unloader each having elements mounted for movement parallel to said spindle axes to respectively slide fresh cores over and remove wound rolls from said spindles,

said element of said unloader being pivoted about an axis parallel to said spindle axes,

said element of said loader comprising a core support and a core pushing ring.

12. The winder of claim 11 wherein a common drive member is coupled to said elements of said loader and said unloader to synchronize said movement parallel to said spindle axes.

13. The winder of claim 10 further comprising a stationary track having a gap adjacent said unloader and constructed and arranged to mate with said rings to retain them in fixed axial position on said spindles during turret movement except at said gap.

14. A turret winder for production of consumer rolls of an elongated web, comprising

a turret assembly having at least three spindles rotatable about respective spindle axes and movable along a path through a series of index stations including at least

a start-up station,

a roll unload station, and

a core load station,

a spindle drive operable to produce spindle rotation at least at said start-up station,

a turret drive operable to move said spindles through said stations,

a roll unloader adjacent said roll unload station, and a core loader adjacent said core load station,

said loader and unloader each having elements mounted for reciprocal movement parallel to said spindle axes to respectively slide fresh cores over and remove wound rolls from said spindles, said elements being coupled to a common drive to synchronize said reciprocal movements.

15. The winder of claim 14 wherein said drive is coupled to said elements through a belt passing around a pulley, whereby said elements move simultaneously in opposite directions parallel to said spindle axes.

16. The winder of claim 14 wherein said element of said loader comprises a support for a plurality of said cores arranged end-to-end and spaced apart, and a plurality of core pushers respectively adjacent the positions of said cores, each said pusher except the outermost thereof being a split ring operable to permit retraction of said loader past the outermost core loaded

on said spindle, said split ring having a clearance with said spindle when closed of less than the wall thickness of said cores.

17. A turret winder for production of consumer rolls of an elongated web, comprising
 a turret assembly having at least three spindles rotatable about respective spindle axes and movable along a path through a series of index stations including at least
 a start-up station,
 a roll unload station, and
 a core load station,
 a spindle drive operable to produce spindle rotation at least at said start-up station,
 a turret drive operable to move said spindles through said stations,
 a roll unloader adjacent said roll unload station, and
 a core loader adjacent said core load station,
 said loader and unloader each having elements movable parallel to said spindle axes to respectively slide fresh cores over and remove wound rolls from said spindles,
 said spindle drive including a driven belt in driving contact with a spindle at said start-up station and which passes around a clutching roll adjacent said unload station, said clutching roll being mounted for movement between an operative position in which said belt is in effective driving contact with a said spindle at said unload station and a retracted position in which said belt is spaced from said spindle at said unload station while remaining in driving contact with said spindle at said start-up station.

18. A turret winder for production of consumer rolls of an elongated web, comprising
 a turret assembly having at least three spindles rotatable about respective spindle axes and movable along a path through a series of index stations including at least
 a start-up station, and
 a roll unload station,
 a spindle drive operable to produce spindle rotation at least at said start-up station,
 a turret drive operable to move said spindles through said stations, and
 a roll unloader adjacent said roll unload station, said unloader having an element movable parallel to said spindle axes to remove wound rolls from said spindles,
 said turret assembly comprising
 a base plate mounted for rotational indexing in a stationary frame, said plate bearing on said frame along a cylindrical surface, and
 a face plate mounted against said base plate and bearing on said frame along an annular surface adjacent said cylindrical surface,
 said plates being connected together along a circle having the turret axis as its center, and at said center, the connection at said center being adjustable to vary the distance between said plates at said center, said face plate having sufficient spring to cause an increase in plate-to-plate pressure at said annular surface upon an increase in plate-to-plate distance at said center.

19. In combination with a winder assembly for an elongated web, including a spindle and a spindle drive operable to produce spindle rotation,

a web tucking assembly, comprising
 an enveloping member mounted adjacent said spindle and movable between a retracted position and an enveloping position, and
 a web tucking member mounted for movement about a tucking axis between a retracted position and a tucking position, said tucking member when in said tucking position extending between said enveloping member and said spindle, said web extending around said enveloping member in said enveloping position to a line of initial contact about said spindle, said line being in a plane including the axis of said spindle, said tucking axis lying within 45° of said plane with respect to said axis of said spindle when said tucking member is in said tucking position.

20. The winder of claim 19 further comprising a web severing member mounted for pivotal movement about an axis parallel to said tucking axis between a retracted position and a severing position in which said severing member contacts said web downstream of said tucking member in the direction of web travel.

21. The winder of claim 10 further comprising a reciprocating drive for reciprocating said fork along said spindle axes thereby to push off a wound roll and return said rings to their initial positions.

22. The assembly of claim 20 wherein said reciprocating drive includes a coupling member adapted to engage said stripping member during cycles of reciprocation, and to disengage therefrom between said cycles.

23. The assembly of claim 22 further comprising a limit switch assembly arranged at an end of the path of reciprocation of said coupling member, for actuation by said coupling member to signal the end of a cycle of reciprocation.

24. The assembly of claim 23 wherein said limit switch assembly includes a pivoted lever having a first position in said path and a second position out of said path, whereby said switch assembly is deactuated when said lever is in said second position, and said coupling member moves between first and second positions upon disengagement from said stripping member, said coupling member including a portion for retaining said lever in its said first position when said coupling member is in its said first position and for allowing said lever to return to its said second position when said coupling member is in its said second position.

25. The assembly of claim 22 wherein said spindle is bodily moved during winding, said fork having a receiving position whereby said ring moves into said fork into mating engagement.

26. The assembly of claim 25 wherein said spindle is mounted to rotate bodily on a turret, said fork being rotatable on an axis parallel to the axis of said turret, said fork being biased into said receiving position, and being rotatable when engaged by said ring during terminal movement of said spindle to a position for unloading.

27. The winder of claim 25 further comprising a stationary track having a gap adjacent said unloader and constructed and arranged to mate with said stripping member to retain it in fixed axial position on said spindle during movement of said spindle except at said gap, said stripping member being a ring.

28. A turret winder for an elongated web, comprising

13

- a turret assembly having at least three spindles rotatable about respective spindle axes and movable along a path through a series of index stations including at least
 a start-up station, and
 a roll unload station,
 a spindle drive operable to produce spindle rotation and a turret drive operable to move said spindles through said stations,
 said spindle drive including a driven belt in driving contact with a spindle at said start-up station and which passes around a clutching roll adjacent said unload station, said clutching roll being mounted for movement between an operative position in which said belt is in effective driving contact with a said spindle at said unload station and a retracted position in which said belt is spaced from said spindle at said unload station while remaining in driving contact with said spindle at said start-up station.
29. A turret winder for production of rolls of an elongated web, comprising
 a turret assembly having a plurality of spindles rotatable about respective spindle axes and movable along a path through a plurality of stations including
 a start-up station, said spindles mounted so as to permit cantilever support from said turret for loading or unloading cores upon said spindles,
 a spindle drive operable to produce spindle rotation at least at said start-up station,
 a turret drive operable to move said spindles through said stations, and
 a web tucking assembly adjacent said start-up station, comprising
 an enveloping member mounted adjacent said

14

- start-up station and movable across said path between a retracted position clear of said turret assembly and an enveloping position adjacent a said spindle at said start-up station, and
 a web tucking member mounted for movement about a tucking axis between a retracted position and a tucking position, said tucking member when in said tucking position extending between said enveloping member and said spindle at said start-up station,
 whereby said enveloping and tucking members cause said web to envelop said spindle from opposite sides thereof.
30. In a winder for production of rolls of an elongated web having transverse perforations between adjacent longitudinal sections, a start-up assembly comprising
 a spindle mounted for rotation about an axis,
 an enveloping member mounted for movement between an enveloping position adjacent said spindle and a retracted position,
 a web breaking and tucking member mounted for pivotal movement about an axis parallel to the spindle axis between a retracted position and a tucking position,
 said web breaking and tucking member when in said tucking position extending between said enveloping member and said spindle, and
 a drive for pivoting said web breaking and tucking member through said web at a velocity sufficiently high to cause said web to break at said perforations,
 said web breaking and tucking member having an edge shaped to avoid cutting said web, whereby said web will wrap around said member for tucking after breaking at said perforations.

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