

May 8, 1956

W. F. RICHARDSON

2,744,480

CONTINUOUS CORE WRAPPING MACHINE

Filed March 30, 1953

7 Sheets-Sheet 1

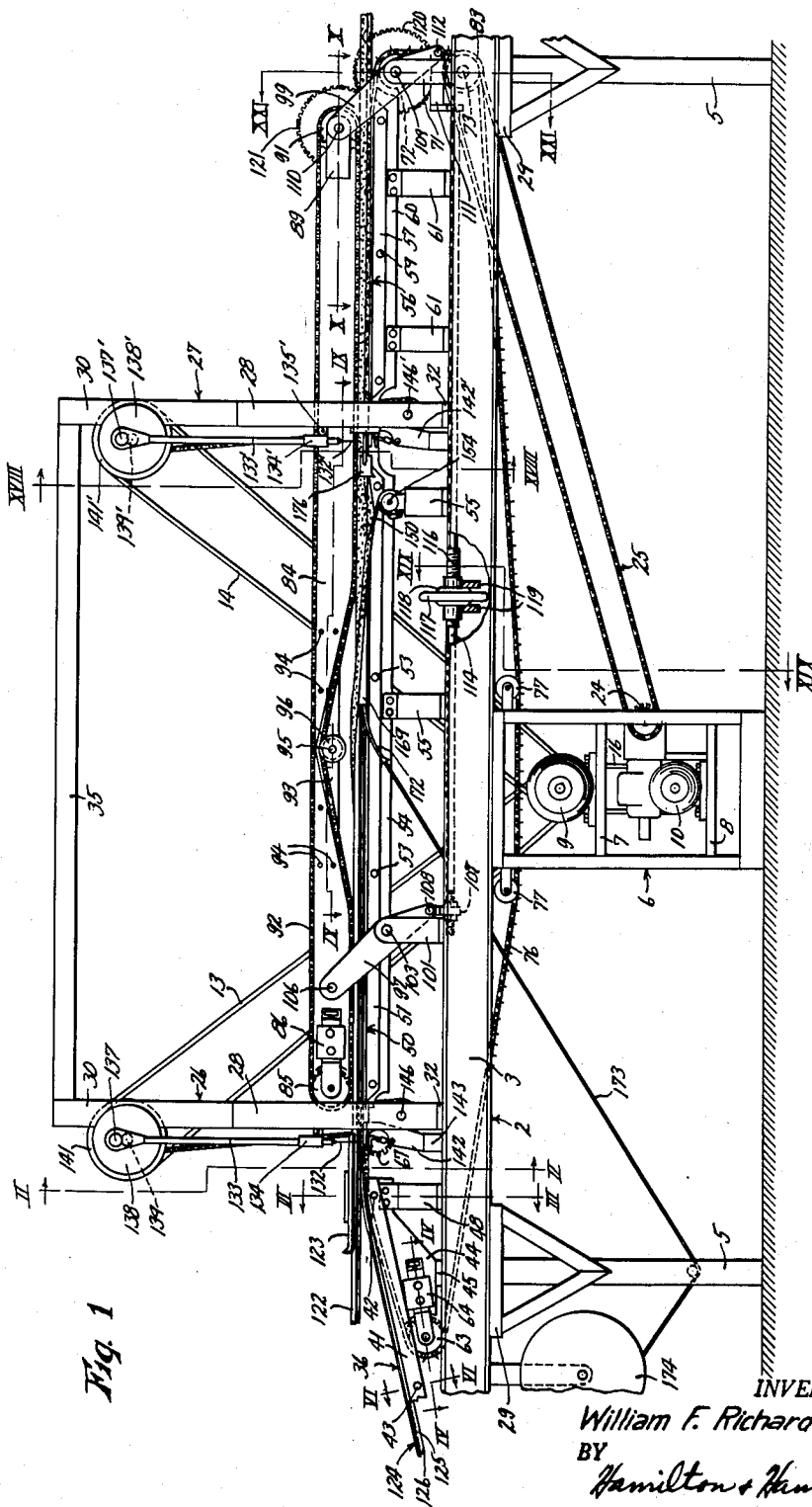


Fig. 1

INVENTOR.
William F. Richardson
BY
Hamilton & Hamilton
Attorneys.

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7 Sheets-Sheet 2

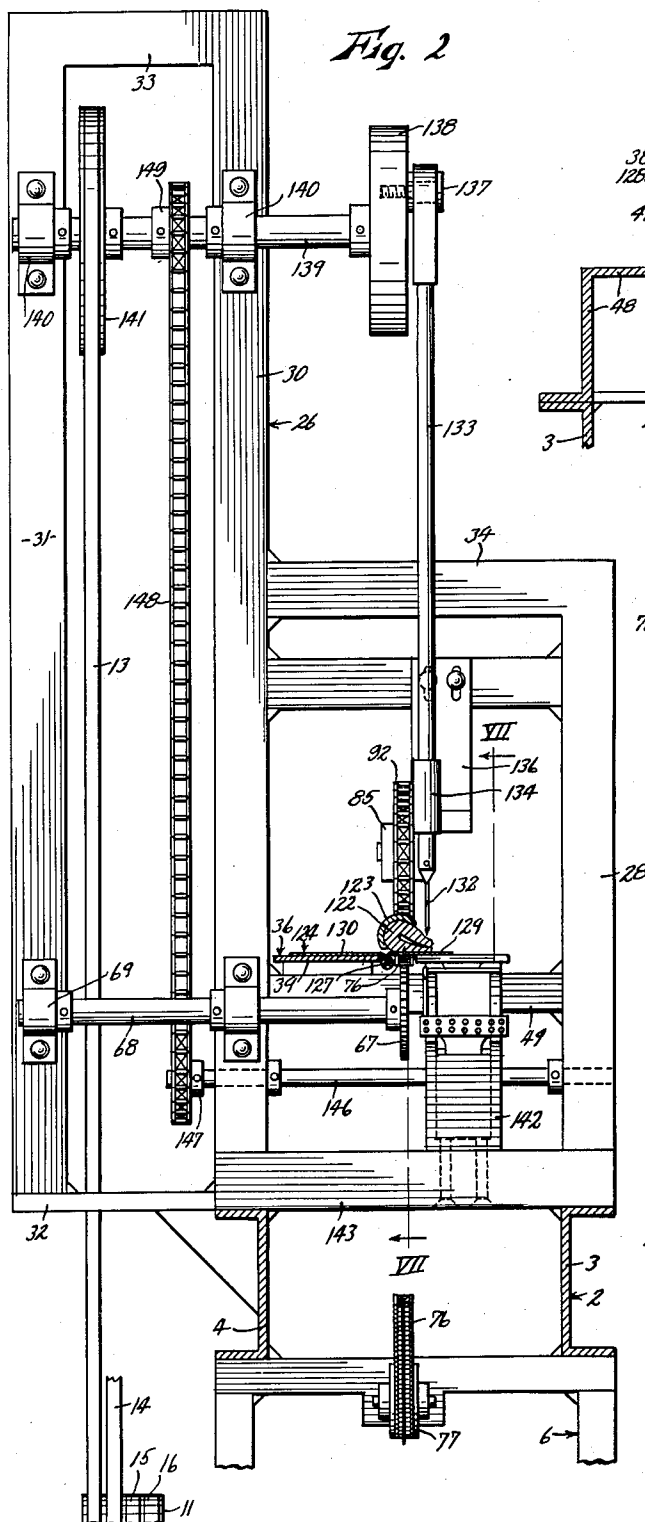


Fig. 2

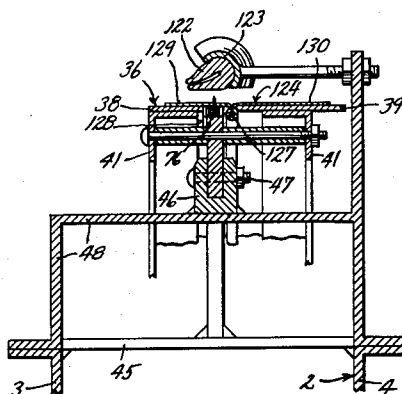


Fig. 3

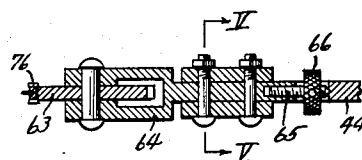


Fig. 4

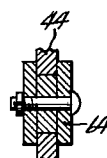


Fig. 5

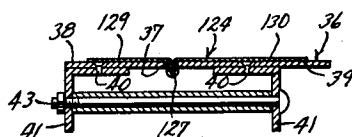


Fig. 6

INVENTOR.
William F. Richardson
BY
Hamilton & Hamilton
Attorneys.

May 8, 1956

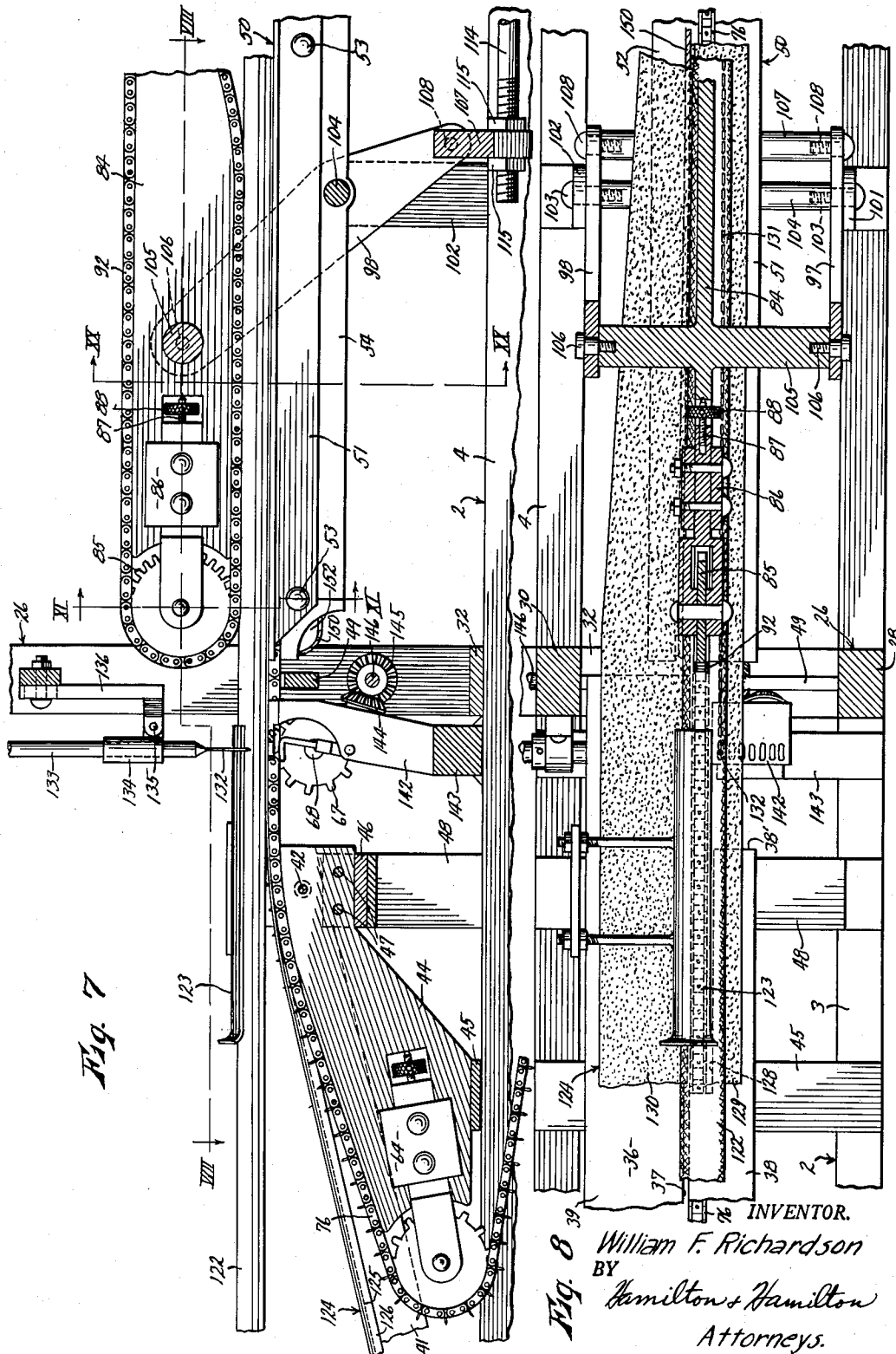
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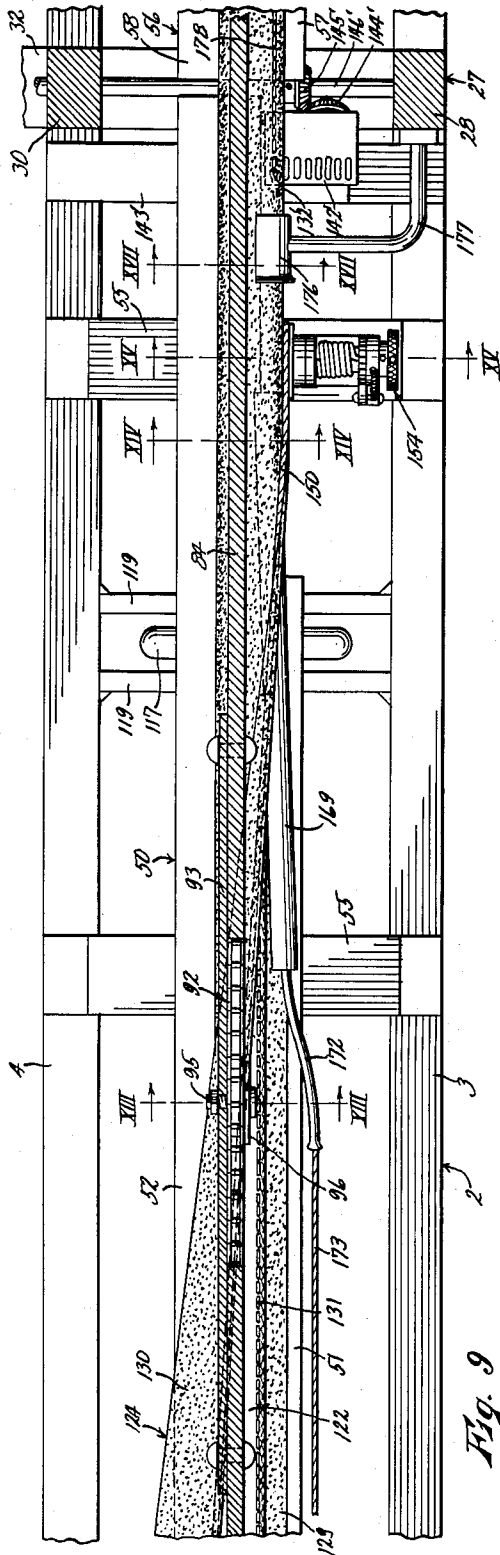


Fig. 9

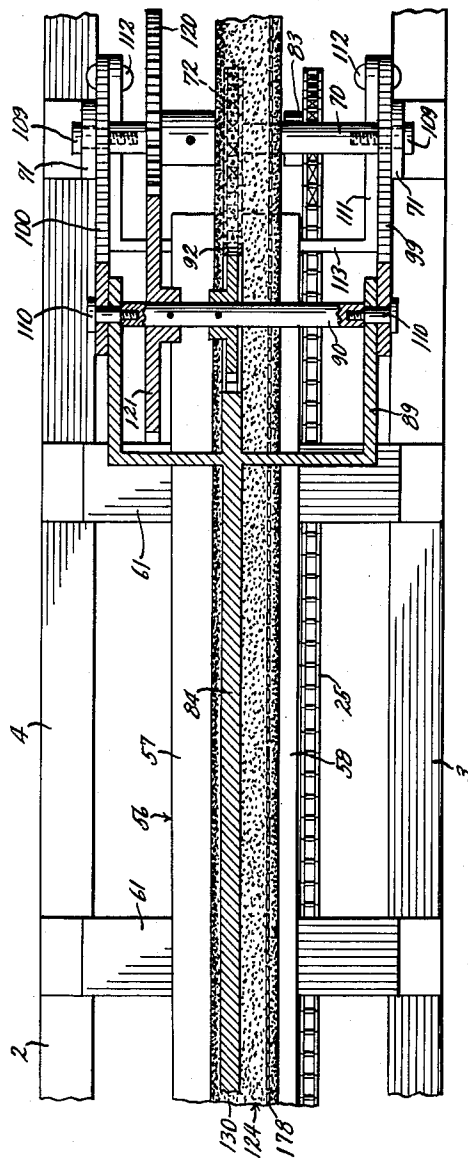


Fig. 10

INVENTOR.
William F. Richardson
BY
Hamilton & Hamilton
Attorneys.

May 8, 1956

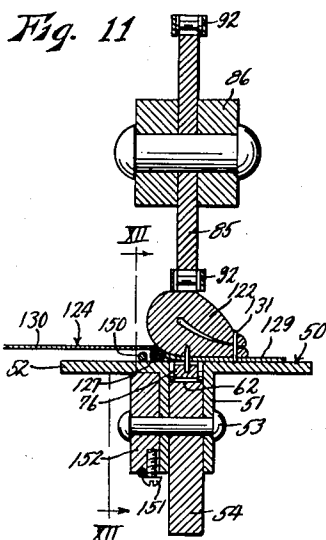
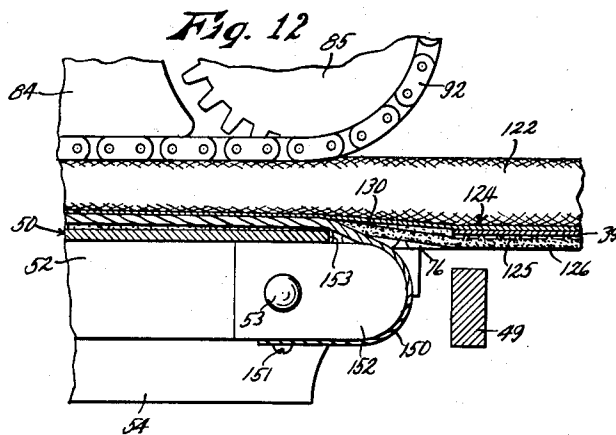
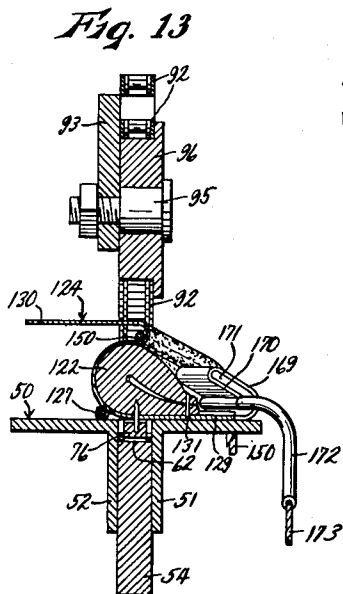
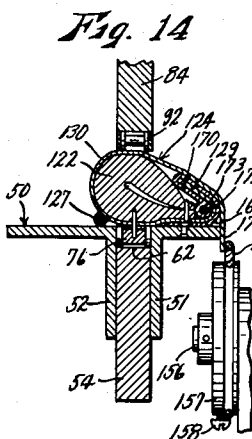
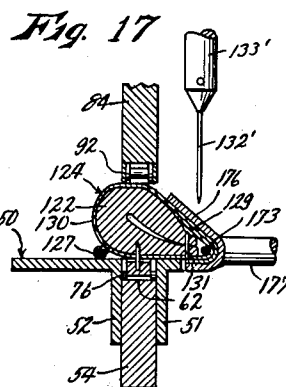
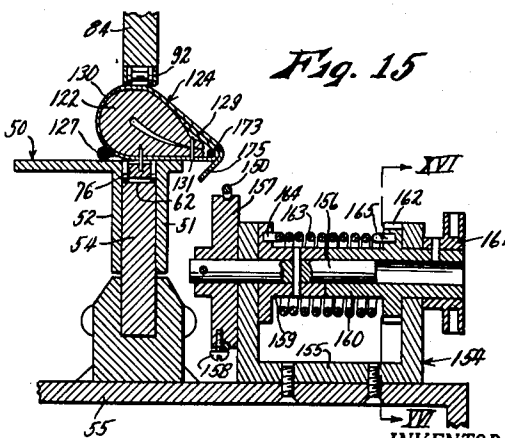
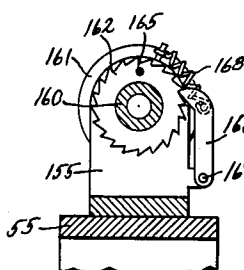
W. F. RICHARDSON

2,744,480

CONTINUOUS CORE WRAPPING MACHINE

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7 Sheets-Sheet 5



INVENTOR.
William F. Richardson
BY
Hamilton & Hamilton
Attorneys.

May 8, 1956

W. F. RICHARDSON

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CONTINUOUS CORE WRAPPING MACHINE

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7 Sheets-Sheet 6

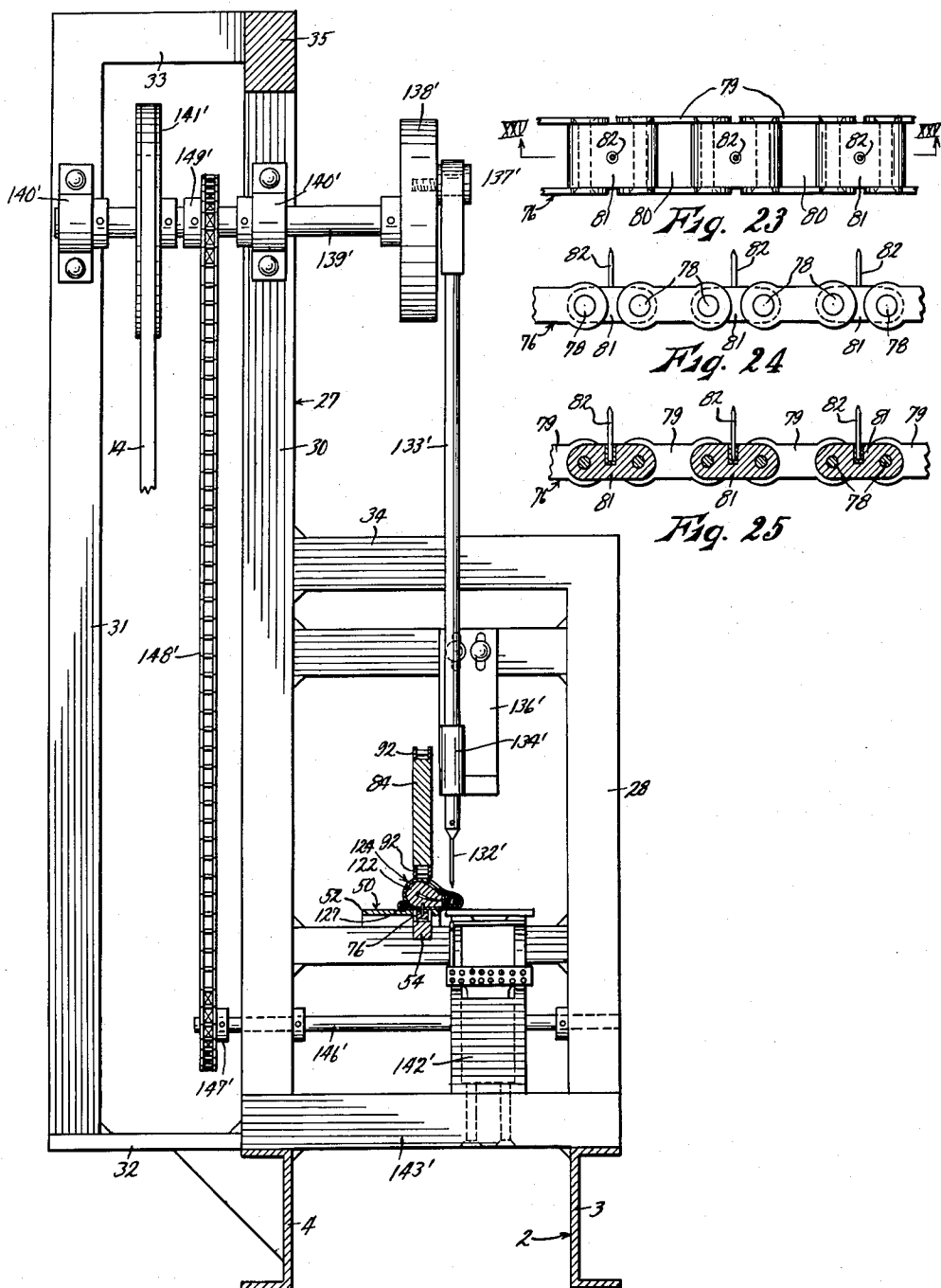


Fig. 18

INVENTOR.
William F. Richardson
BY
Hamilton & Hamilton
Attorneys.

May 8, 1956

W. F. RICHARDSON

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CONTINUOUS CORE WRAPPING MACHINE

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7 Sheets-Sheet 7

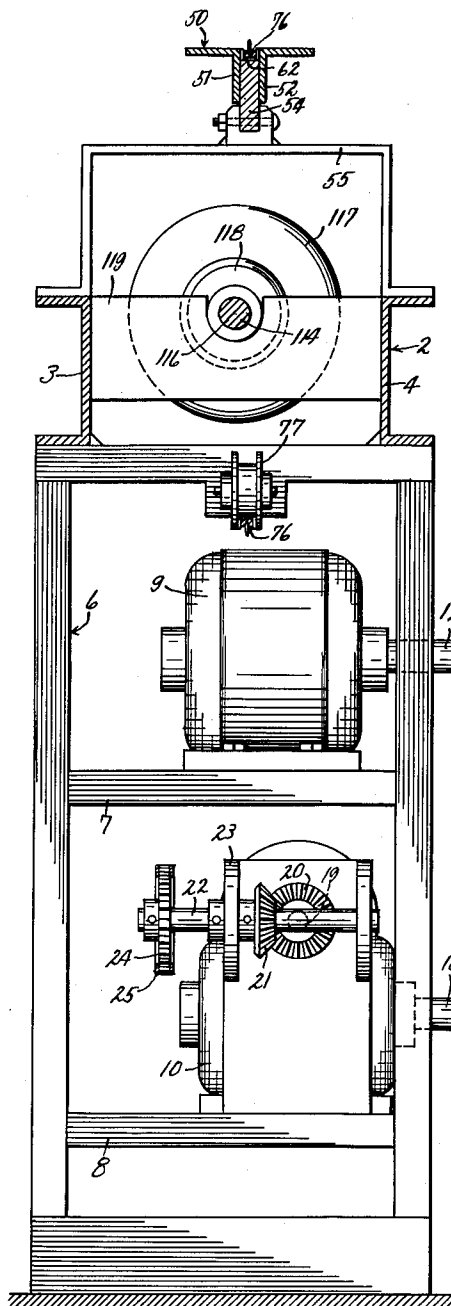


Fig. 19

Fig. 22

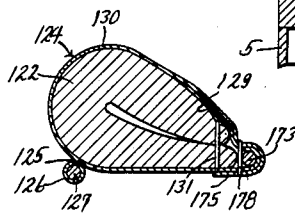


Fig. 20

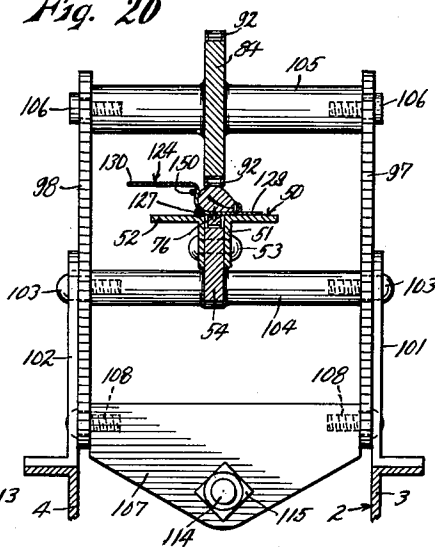
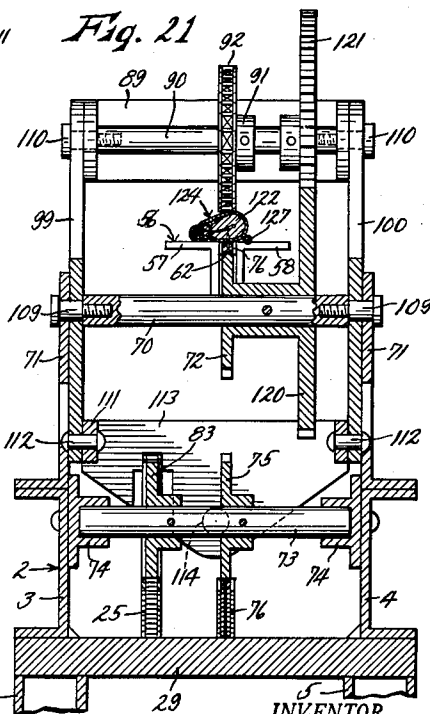


Fig. 21



INVENTOR.
William F. Richardson
BY
Hamilton & Hamilton
Attorneys.

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2,744,480

CONTINUOUS CORE WRAPPING MACHINE

William F. Richardson, Carthage, Mo., assignor to Flex-O-Lators, Inc., Carthage, Mo., a corporation of Missouri

Application March 30, 1953, Serial No. 345,438

9 Claims. (Cl. 112—2)

This invention relates to new and useful improvements in core wrapping machines, and relates particularly to a machine adapted to wrap a continuously moving core with a pliable cover sheet extending longitudinally of said core, by folding said cover sheet transversely about said core to bring its edges into overlapping relation, and securing said overlapping edge portions together. The particular product produced by the illustrated embodiment of the machine is an edge roll as is commonly used for protecting furniture upholstery from wearing contact with the underlying spring structure, and comprises a core of cushioning material having a cover sheet of pliable material secured thereabout. It is to be understood, however, that while certain features of the machine are peculiar to this particular product, the machine has general applicability for use in wrapping cores of many sorts, and useful for many purposes.

An important object of the present invention is the provision of novel means for wrapping the cover sheet about the core as said core moves longitudinally, said means including a flexible cable having its ends fixed to the machine frame and extending in generally helical form about said core, whereby a cover sheet introduced between said core and cable, and movable with said core, will be wrapped about said core.

Another object is the provision of means for adjusting the tension of said cable, whereby to vary the tightness with which the cover sheet is wrapped about the core. This feature is particularly useful where the core is of a resilient or compressible nature, and therefore adapted to be intended by the cable.

A further object is the provision of a novel means for supporting the core for straight line travel against the tendency of the cable to bend or twist said core, whereby to produce a wrapped core which is linearly straight and true.

Other objects are simplicity and economy of construction, efficiency and dependability of operation, and flexibility of application.

With these objects in view, as well as other objects which will appear in the course of the specification, reference will be had to the drawing, wherein:

Fig. 1 is a side elevational view of a continuous core wrapping machine embodying the present invention, wherein the travel of the core and cover sheet is from left to right.

Fig. 2 is an enlarged fragmentary sectional view taken on line II—II of Fig. 1, partially broken away.

Fig. 3 is an enlarged fragmentary sectional view taken on line III—III of Fig. 1.

Fig. 4 is an enlarged fragmentary sectional view taken on line IV—IV of Fig. 1.

Fig. 5 is a fragmentary sectional view taken on line V—V of Fig. 4.

Fig. 6 is an enlarged sectional view taken on line VI—VI of Fig. 1.

Fig. 7 is a fragmentary sectional view taken on line VII—VII of Fig. 2, with parts left in elevation.

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Fig. 8 is a fragmentary sectional view taken on line VIII—VIII of Fig. 7.

Fig. 9 is an enlarged fragmentary sectional view taken on line IX—IX of Fig. 1, with parts left in elevation.

Fig. 10 is an enlarged fragmentary sectional view taken on line X—X of Fig. 1.

Fig. 11 is an enlarged sectional view taken on line XI—XI of Fig. 7.

Fig. 12 is a fragmentary sectional view taken on line XII—XII of Fig. 11.

Fig. 13 is an enlarged sectional view taken on line XIII—XIII of Fig. 9.

Fig. 14 is an enlarged fragmentary sectional view taken on line XIV—XIV of Fig. 9.

Fig. 15 is an enlarged fragmentary sectional view taken on line XV—XV of Fig. 9.

Fig. 16 is a fragmentary sectional view taken on line XVI—XVI of Fig. 15.

Fig. 17 is an enlarged fragmentary sectional view taken on line XVII—XVII of Fig. 9.

Fig. 18 is an enlarged fragmentary sectional view taken on line XVIII—XVIII of Fig. 1.

Fig. 19 is an enlarged fragmentary sectional view taken on line XIX—XIX of Fig. 1.

Fig. 20 is a fragmentary sectional view taken on line XX—XX of Fig. 7.

Fig. 21 is an enlarged fragmentary sectional view taken on line XXI—XXI of Fig. 1.

Fig. 22 is an enlarged cross-sectional view of the wrapped core produced by the machine.

Fig. 23 is an enlarged face view of the "needle" chain utilized in the machine.

Fig. 24 is an edge view of the chain shown in Fig. 23.

Fig. 25 is a sectional view taken on line XXV—XXV of Fig. 23.

Like reference numerals apply to similar parts throughout the several views, and the numeral 2 applies to a main frame comprising a pair of horizontally extending, outwardly opening channels 3 and 4. Said channels are parallel and spaced apart, and are rigidly joined together by plate members 29, to which the channels are welded or otherwise securely fixed, and to which floor engaging legs 5 are secured. Approximately centrally of the length of main frame 2, a depending sub-frame 6 is fixed thereto, the lower end thereof engaging the floor to serve as an extra leg. Supported in said sub-frame are a pair of shelves 7 and 8, on which are mounted respectively an electric motor 9 and geared speed-reduction unit 10. Referring particularly to Fig. 19, it will be seen that a sheave wheel 11 is secured to the drive shaft 12 of motor 9. A pair of belts 13 and 14 engaging said sheave wheel respectively furnish power to a pair of sewing machines as will be described later. Said sheave wheel is also interconnected by belts 15 and 16 to a sheave wheel 17 mounted on the input shaft 18 of gear reduction unit 10. The output shaft 19 of said reduction unit has a bevel gear 20 thereon meshing with a bevel gear 21 fixed on a counter shaft 22 journaled in a frame member 23 which is fixed to the gear reduction unit. A sprocket 24 is fixed on said counter shaft, and has trained thereabout a chain 25 which furnishes power to the core and wrapper propelling mechanism as hereinafter described.

Attached to main frame 2, respectively in oppositely spaced relation from sub-frame 6, are a pair of upper frames 26 and 27. Each of said upper frames is disposed in a plane transverse to the main frame and is rigidly attached thereto, and includes a vertical upright 28 extending upwardly from channel 3, an upright 30 extending upwardly from channel 4, and a vertical upright 31 disposed outwardly from channel 4 and secured at its lower end to a horizontal plate 32 fixed to and extending rearwardly from channel 4. Uprights 30 and

31 are rigidly interconnected at their upper ends by a cross bar 33, and upright 23, somewhat shorter, is rigidly interconnected to upright 30 by cross bar 34. The construction of the upper frames is best shown in Figs. 2 and 18. The upper ends of standards 30 are interconnected by a brace beam 35 extending parallel to main frame 2.

At the left end of frame 2, as viewed in Fig. 1, is a table 36 sloping upwardly from frame 2 to the right. Said table comprises a pair of longitudinally extending sheet metal strips 38 and 39 spaced apart to form a longitudinal slot 37 therebetween (Fig. 8). To the lower face of each of strips 38 and 39 is affixed, as by rivets 40 (Fig. 6), a longitudinally extending angle iron 41, said angle irons being connected rigidly together by spacer bolts 42 and 43 (Figs. 3 and 6) whereby strips 38 and 39 are held in rigidly spaced relation. Spacer bolt 42 (Fig. 3) also passes through a vertically disposed plate 44 extending longitudinally of frame 2 and disposed beneath table 36, and rigidly attaches said table to said plate. Said plate is in turn rigidly attached to frame 2 by means best shown in Fig. 3 and including a cross bar 45 welded respectively to plate 44 and channels 3 and 4, and a block 46 bolted to plate 44 at 47 and welded to an inverted U-shaped bracket 48 which is welded or otherwise fixed to channels 3 and 4. The upper surface of table 36, formed by strips 38 and 39, curves into a horizontal plane at the higher end of said table adjacent upper frame 26. Strip 38 is terminated at 38' (Fig. 8) in order to make room for a sewing machine mechanism as hereinafter described. Strip 39 extends to frame 26, being secured to a cross bar 49 extending horizontally between frame uprights 28 and 30.

Extending longitudinally of frame 2 between upper frames 26 and 27, at the same elevation as the upper end of table 36, is a table 50. As best shown in Figs. 11, 13, 14, etc., the horizontal surface of said table is formed by the oppositely extending horizontal legs of a pair of angle irons 51 and 52, the vertical legs of said angle irons being secured as by rivets 53 to the opposite faces of a longitudinally extending, vertically disposed plate 54. Plate 54 is rigidly secured to frame 2, whereby to support table 50, by means including a plurality of inverted U-shaped brackets 55. A table 56 similar to table 50, and comprising a pair of angle irons 57 and 58 is secured by rivets 59 to a plate 60, which is in turn secured rigidly to frame 2 by inverted U-shaped brackets 61. It will be noted, as in Figs. 11, 13, 14, 15, 17 and 21, that the horizontal surface of tables 50 and 56 are disposed above the upper edges of plates 54 and 60, whereby to form a continuous longitudinal groove 62 in said tables, whereby to carry a drive chain as hereinafter described.

At the left end of plate 44, beneath sloping table 36, a sprocket 63 is carried for rotation on an axis transverse to frame 2 by a slide 64 (see Figs. 4 and 5) carried for movement in plate 44 in a direction longitudinal to frame 2, said slide being movable by a screw 65 threaded in slide 64 and abutting against plate 44, and rotatable by a knurled hand wheel 66. At the left end of table 50, adjacent upright frame 26, a sprocket 67 is carried for rotation on an axis transverse to main frame 2, being mounted on an axle 68 journaled in bearings 69 fixed to frame uprights 30 and 31 (Fig. 2). At the right end of table 56, just below the level of the surface of said table, an axle 70 is carried rotatably between the upper ends of a pair of standards 71 affixed respectively at their lower ends to frame channels 3 and 4, said axle being horizontal and transverse to said channels. A sprocket 72 is fixed on said axle. Another axle 73 is disposed immediately beneath and parallel to axle 70, axle 73 extending between frame channels 3 and 4 and being journaled in bearings 74 secured to said channels (Fig. 21). A sprocket 75 is fixed on axle 73.

An endless drive chain 76 has its upper reach passing

over sprocket 63, thence along the upper edge of plate 44, thence over sprocket 67 and through the groove 62 of tables 50 and 56, thence over sprockets 72 and 75, and the lower reach thereof returns to sprocket 63 substantially beneath frame 2, being guided by a pair of guide rollers 77 carried rotatably by sub-frame 6. It will be noted in Figs. 23, 24 and 25 that said chain is comprised of a series of links hinged together successively at 78, alternate links 79 thereof being open whereby to provide spaces 80 to receive the sprocket teeth, and the intervening links 81 being solid and each having a needle 82 soldered or otherwise fixed centrally therein and extending outwardly from the face of the chain. Said needles are useful in positioning and driving the core and cover sheet as hereinafter described. A sprocket 83 fixed on axle 73 is operatively engaged by chain 25, previously described, whereby chain 76 is driven, the upper reach thereof traveling from left to right as viewed in Fig. 1.

A plate 84 is disposed in a vertical plane above and in vertical alignment with the upper reach of chain 76, and is approximately coextensive in length with the combined lengths of tables 50 and 56. At its left end, as viewed in Fig. 1, said plate carries a sprocket 85 for rotation on a horizontal transverse axis, said sprocket being rotatably carried by a slide 86 carried for longitudinal movement by plate 84, and movable by a screw 87 operable by hand wheel 88, in the same manner as slide 64. At its right end, plate 84 is provided with a rigid yoke 89, and an axle 90 is carried rotatably between the arms of said yoke, said axle being horizontal and transverse to plate 84. A sprocket 91 is fixed on said axle in the vertical plane of plate 84. An endless chain 92 is trained about sprockets 85 and 91, the upper reach of said chain being supported on the upper edge of plate 84, and the lower reach of said chain being supported by the lower edge of said plate. Manipulation of slide 86 by screw 87 provides means for adjusting the tension of chain 92, in the same manner that slide 64 provides means for adjusting the tension of chain 76. Approximately midway between upright frames 26 and 27, the lower edge of plate 84 is notched upwardly, and is reinforced by a plate 93 affixed to a vertical face of plate 84 as by rivets 94. Affixed to plate 93 within the notch of plate 84 is an axle bolt 95 (Fig. 13) on which is rotatably mounted a guide roller 96 over which the lower reach of chain 92 passes. The chain is thereby elevated at its central portion above the core, for a purpose hereinafter indicated.

Plate 84 is supported for adjustable vertical movement by a parallelogram mechanism including double levers 97—98 adjacent the left end of said plate, and double levers 99—100 at the right end of said plate. Levers 97 and 98 are disposed respectively at opposite sides of table 50, being pivoted coaxially intermediate their ends to the upper ends of a pair of standards 101 and 102 which are fixed respectively at their lower ends to frame channels 3 and 4, by means of coaxial pivot bolts 103. Said pivot bolts are threaded into the opposite ends of a rod 104 welded to plate 54 and extending transversely to said plate, whereby to serve as an additional support for table 50. At their upper ends, links 97 and 98 are pivotally connected respectively to the opposite ends of a rod 105 welded to plate 84 and extending transversely therefrom, by means of pivot bolts 106. At their lower ends, levers 97 and 98 are pivotally connected respectively to the opposite ends of a plate 107 extending transversely to frame 2, by means of pivot bolts 108. Levers 99 and 100 are disposed respectively at opposite sides of table 56, being pivoted intermediate their ends to standards 71 coaxially with axle 70, by means of pivot bolts 109. Said levers are pivotally connected at their upper ends to yoke 89 of plate 84 coaxially with axle 90, by means of pivot bolts 110. Said levers are pivoted respectively at their lower ends to the arms of a yoke 111, by means of

coaxial pivot pins 112, said yoke including a plate 113 extending transversely of frame 2. A rod 114 extends longitudinally of frame 2, being secured at its opposite ends in plate 113, and in plate 107 by a pair of lock nuts 115 (Fig. 7). Said rod is provided intermediate its ends with a threaded portion 116 on which is threaded a hand wheel 117, the hub 118 of said hand wheel being retained rotatably between a pair of cross plates 119 extending between and affixed to frame channels 3 and 4. It is evident that by turning hand wheel 117, rod 114 will be moved longitudinally, thereby pivoting double levers 97—98 and 99—100 to raise or lower plate 84 to vary the distance between the adjacent reaches of chains 76 and 92 for a purpose hereinafter indicated. By adjusting lock nuts 115 along rod 114, plate 84 may be adjusted to bring it into precise parallelism with tables 50 and 56.

A spur gear 120 fixed on axle 70 and rotatable therewith is meshed at all times with a spur gear 121 fixed on axle 90, whereby chain 92 is driven. Since sprockets 75, 72 and 91 all have equal numbers of teeth, and further since spur gears 120 and 121 have equal numbers of teeth, it is apparent that chains 76 and 92 will be driven at equal linear speeds, and the confronting reaches of said chains will both travel in the same direction, to the right as viewed in Fig. 1.

The core 122 to be wrapped approaches the machine horizontally from the left, as viewed in Fig. 1, above table 36, moving longitudinally in a direction parallel to the longitudinal axis of the machine. Said core, although the specific structure thereof forms no part of the present invention, may be formed of a plurality of layers of paper folded longitudinally whereby to assume a tear-drop cross-sectional shape, as shown. A guide 123 of arcuate cross-sectional form engages said core just ahead of upright frame 26, whereby to hold the core in folded position and to position it arcuately in alignment with the upper reach of chain 76. Said guide is rigidly attached to bracket 48. The core may be formed by other portions of the complete core forming and wrapping machine of which the present wrapping machine forms only a part.

The cover sheet 124 in which the core is to be wrapped also approaches the machine from the left as viewed in Fig. 1, sliding along the inclined surface of table 36. Said cover sheet is of pliable material which must be perforable by needles 82 and may also be paper, is in the form of a longitudinal strip extending longitudinally of the machine. The surface of said cover sheet is stippled throughout the drawing for convenience in following the various operations. It has a longitudinal bight 126 secured therein by stitching 125 and a pliable cord 127 extends through said bight, although this particular feature does not affect the present invention. Said bead rides in slot 37 of table 36. As the cover strip rides upwardly along table 36, the upper reach of chain 76 approaches the under surface thereof, strip 38 being notched out as at 128 (Figs. 3 and 8) to permit contact therebetween, whereby needles 82 of said chain are caused to penetrate said cover sheet, as best shown in Fig. 7. At the upper end of table 36, said needles are caused to project also into core 122, said cover sheet and core thereafter being held in positive relation to each other by said needles. The cover sheet, with the core superimposed thereon, then enters upon table 50, between the confronting reaches of chains 76 and 92. The movement of said chains to the right constitutes the sole driving means for the core and cover sheet. Chain 76 preferably extends very slightly above the surfaces of tables 50 and 56, whereby to avoid excessive friction between said tables and the cover sheet.

It will be noted, particularly in Figs. 3 and 8, that the core is not disposed centrally between the edges of the cover sheet, but is offset from the center thereof, whereby to provide a relatively narrow edge portion 129 of said strip extending transversely forwardly from said core, and a relatively wide edge portion 130 extending transversely

rearwardly from the core. As the core and cover sheet, united by needles 82, approach upright frame 26, said core is stitched to the cover sheet, as at 131, by a suitable sewing machine. As shown, said sewing machine comprises a needle 132 disposed above the core and fixed in the lower end of a rod 133. Adjacent its lower end, rod 133 is carried for axial oscillatory movement in a sleeve 134 which is pivoted at 135 on an axis transverse to the main frame, to a bracket 136 fixed to upright frame 26, as best shown in Fig. 7. The upper end of rod 133 is rotatably attached by bolt 137 (Fig. 2) to a flywheel 138, which is fixed to an axle 139 journaled in bearings 140 mounted on frame uprights 30 and 31. Also fixed on said axle is a sheave wheel 141 operatively engaged by belt 13, whereby axle 139 is driven. Bolt 137 is eccentric to axle 139, whereby as axle 139 is turned rod 133 will be vertically oscillated to cause needle 132 to penetrate the core and cover sheet. Said needle cooperates with a sewing machine unit 142 disposed beneath the core to produce stitches, said machine unit being mounted on a cross bar 143 extending between frame channels 3 and 4. The internal operation of unit 142 is well known, and need not be detailed here. It is driven by a bevel gear 144 (Fig. 7) associated therewith and meshing with a bevel gear 145 fixed on an axle 146 (Fig. 2) extending between and journaled in frame uprights 28 and 30. A sprocket 147 fixed on said axle is operatively connected by chain 148 with a sprocket 149 fixed on axle 139, whereby unit 142 is driven in synchronization with needle 132.

It will be seen that due to the eccentricity of bolt 137 to axle 139, needle 132 will tilt as it oscillates vertically, and that since axle 139 turns in a clockwise direction as viewed in Fig. 1, said needle will move transversely in the direction of movement of the core during the portion of the needle stroke during which it is projecting through said core. This constitutes the sewing machine a "walking needle" machine, and permits the sewing operation to be performed as the core moves continuously. The stitching 131 serves to hold the core securely in its folding form, being disposed adjacent the thin or open edge of said core, and also serves to further secure the core and cover sheet against any possible relative movement.

After leaving the sewing machine, the core and cover sheet traverse the length of table 50 to upright frame 27, being propelled by the movement of chains 76 and 92. During this movement the relatively broad edge portion 130 of the cover strip is brought over the top of the core and down to the table 50 by means of a flexible cable 150. Said cable is secured by screw 151 (Figs. 11 and 12) to a block 152 rigidly fixed, as by rivet 53, to the vertical leg of angle iron 52 of table 50, adjacent upright frame 26, and extends upwardly through a slot 153 (Fig. 12) formed in the horizontal leg of said angle iron. The cable then extends longitudinally to the right along table 50, passing upwardly over and around the core 122 and downwardly to and below the level of the forward edge of table 50, being secured at its right end to a tightening mechanism, detailed in Figs. 15 and 16. Said tightening mechanism comprises a U-shaped bracket 155 secured to one of brackets 55 which support table 50 adjacent upper frame 27. An axle 156, extending transversely of the frame is journaled in one leg of bracket 155, and a grooved wheel 157 is secured to the outer end of said axle. Cable 150 is secured to said wheel by screw 158 whereby to be wound thereon. A flanged sleeve 159 is secured rigidly on the inner end portion of said axle. A hollow shaft 160 is journaled in the other leg of bracket 155 coaxially with axle 156. Said hollow shaft engages rotatably the free end of axle 156, and is manually rotatable by hand wheel 161. A ratchet wheel 162 is fixed on shaft 160. A helical spring 163 is disposed about shaft 160 and sleeve 159, one end of said spring being fixed in sleeve 159, as at 164, and the other end of said spring being fixed in ratchet 162, as at 165. Thus by turning hand wheel 161, spring 163

is tensioned to apply a rotative load to wheel 157 to tighten cable 150. Any desired tension may be applied, and is maintained by a dog 166 (Fig. 16) pivoted to bracket 155 at 167 and urged into engagement with the teeth of ratchet wheel 162 by spring 168.

The relatively narrow edge portion 129 of the cover sheet is turned upwardly over the adjacent edge of the core by a guide 169 best shown in Figs. 9, 13 and 14. Said guide is disposed ahead of tightening mechanism 154 and is elongated in a direction longitudinal of table 50. It is formed of sheet metal and has a generally V-shaped cross-sectional form, having a rounded section joining the legs thereof, and opening toward the core 122. One leg thereof is fixed flat against the upper surface of angle iron 51 of table 50, and the other leg thereof slopes upwardly toward the core. At its left end, the guide is spaced sufficiently far from core 122 that edge portion 129 of the cover sheet may enter therein in flat position (Figs. 9 and 13), but is gradually angled toward the core so that as said edge portion 129 passes therethrough it will be turned upwardly over the adjacent edge of the core. The upper or sloping leg of guide 169 is provided with an inwardly bent, re-entrant flange 170 (Fig. 13) extending substantially the length of the guide, thereby forming a channel 171 opening toward the angle of the guide. The edge portion 129 of the cover sheet is led into said channel, as indicated in Fig. 14, thereby preventing any possibility that the edge of the cover sheet will be brought into abutment with the edge of the core, but will be folded neatly thereover.

A tube 172 is welded or otherwise fixed to the inner or free edge of flange 170, and projects outwardly from the left end of the guide. A pliable cord 173 supplied from a reel 174 (Fig. 1) carried by frame 2 is led through said tube, whereby it is introduced within the fold of the edge portion 129 of the cover sheet adjacent the thin edge of the core, as shown in Figs. 13, 14, 15 and 17. The positioning of the core, cover sheet, and cord 173 as they emerge from the right end of guide 169 is shown in Fig. 15.

It is apparent that the relatively wide edge portion 130 of the cover sheet, since it is disposed between cable 150 and core 122, and since said cable passes over the core, will be wrapped over said core by said cable, and the extreme edge portion 175 thereof extended beneath the level of table 50, as shown in Figs. 14 and 15. Cable 150 passes downwardly over the outer edge of guide 169, thereby insuring that edge portion 129 of the cover sheet will be folded inside of edge portion 130. Cable 150 passes over the top of core 122 through the opening provided by the fact that the central portion of chain 92 is elevated away from the core to pass over roller 96. The plate 84 may be lowered into compressive contact with the core by the means previously described, thereby clamping the core securely between the confronting reaches of chains 76 and 92. By this means, it is also assured that the core cannot "climb" upwardly off of the needles 82, and that the core cannot shift transversely due to the force of cable 150 thereagainst, but will travel accurately in a straight line as it is wrapped. This straight-line travel is quite important in that if the core were allowed to shift transversely due to the pressure of the cable thereagainst, the core in its finished form would have a bent or "corkscrew" shape which is objectionable. Edge portion 130 of the cover sheet may be wrapped about the core with any desired tension by regulating the tension of cable 150. Said cable may be drawn into actual compressive contact with the core.

After the core and cover sheet have emerged from the right end of guide 169, the extreme edge portion 175 of the cover sheet is folded beneath the adjacent edge of the core by a V-shaped guide 176 rigidly attached by means of bracket 177 to upper frame 27. Said guide is formed of sheet metal, opening toward and closely embracing

the edge portion of the core where the edges of the cover sheet overlap, as shown in Figs. 9 and 17.

As the now completely wrapped core emerges from guide 176, it passes in operative relation to a sewing machine associated with upper frame 27 and similar in all respects to the previously described sewing machine associated with frame 26, parts of the later machine being designated by primed numerals corresponding to the numerals designating similar parts of the earlier described machine. Said later described machine, powered by belt 14, produces stitches 178 extending longitudinally of the core, said stitches extending through the overlapping edge portions of the cover sheet substantially between cord 173 and the adjacent edge of the core, thereby securing said cover sheet about the core.

The finished core then traverses the length of the table 56, being propelled therealong by the confronting parallel reaches of belts 76 and 92. The inclusion of the additional length of the finished core between said chain is advantageous in providing the very substantial traction force on said core necessary to pull it through the machine. The finished core is ejected from the right end of the machine as shown in Fig. 1, whereupon it may be severed in desired lengths, or other operations performed thereon, by additional machine units not involved in the present invention.

It is apparent that while I have shown and described a specific embodiment of my invention, many minor changes of structure and operation could be made without departing from the spirit of the invention as defined by the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A machine for wrapping a continuous core in a pliable cover sheet extending longitudinally of said core, said machine comprising a fixed table having a continuous groove formed therein and adapted to receive said cover sheet in laid-out form thereon parallel to and overlapping said groove with said core superimposed thereon parallel to and above said groove, a first endless chain carried operably by said table and having a reach thereof carried slidably in said groove, a frame member carried by said table and disposed above the groove of said table, a second endless chain carried operably by said frame member and having a reach thereof disposed above and generally parallel to said table groove, whereby said core and cover sheet are clampingly engaged between the confronting reaches of said chains, means operable to drive said chains whereby the confronting reaches thereof are moved in the same direction at equal speeds to propel said core and cover sheet along said table, and a longitudinally tensioned cable having its respective ends secured in fixed relation to said table at points spaced apart longitudinally of the path of said core and respectively closely adjacent the opposite lateral edges of the path of said core, said cable extending over and around said core, a portion of the core-engaging reach of said second chain being trained over a guide carried by said frame member whereby to elevate it above the core to permit the passage of said cable over said core.

2. A machine for wrapping a continuous core in a pliable cover sheet extending longitudinally of said core, said machine comprising a fixed table having a continuous groove formed therein and adapted to receive said cover sheet in laid-out form thereon parallel to and overlapping said groove with said core superimposed thereon parallel to and above said groove, a first endless chain carried operably by said table and having a reach thereof carried slidably in said groove, a frame member carried by said table and disposed above the groove of said table, a second endless chain carried operably by said frame member and having a reach thereof disposed above and generally parallel to said table

groove, whereby said core and cover sheet are clampingly engaged between the confronting reaches of said chains, a series of outwardly projecting needles fixed in said first chain and adapted to penetrate said cover sheet and enter said core, whereby said core and cover sheet are securely joined together and secured against movement transverse to the plane of said confronting chain reaches, means operable to drive said chains whereby the confronting reaches thereof are moved in the same direction at equal speeds to propel said core and cover sheet along said table, and a longitudinally tensioned cable having its respective ends secured in fixed relation to said table at points spaced apart longitudinally of the path of said core and respectively closely adjacent the opposite lateral edges of the path of said core, said cable extending over and around said core, a portion of the core-engaging reach of said second chain being trained over a guide carried by said frame member whereby to elevate it above the core to permit the passage of said cable over said core.

3. A machine for wrapping a continuous core in a pliable cover sheet extending longitudinally of said core, said machine comprising a fixed table having a continuous groove formed therein and adapted to receive said cover sheet in laid-out form thereon parallel to and overlapping said groove with said core superimposed thereon parallel to and above said groove, a first endless chain carried operably by said table and having a reach thereof carried slidably in said groove, a frame member carried by said table and disposed above the groove of said table, a second endless chain carried operably by said frame member and having a reach thereof disposed above and generally parallel to said table groove, whereby said core and cover sheet are clampingly engaged between the confronting reaches of said chains, means operable to drive said chains whereby the confronting reaches thereof are moved in the same direction at equal speeds to propel said core and cover sheet along said table, and a longitudinally tensioned cable having its respective ends secured in fixed relation to said table at points spaced apart longitudinally of the path of said core and respectively closely adjacent the opposite lateral edges of the path of said core, said cable extending over and around said core, a portion of the core-engaging reach of said second chain being trained over a guide carried by said frame member whereby to elevate it above the core to permit the passage of said cable over said core, and means operable to adjust the tension of said cable.

4. A machine for wrapping a continuous core in a pliable cover sheet extending longitudinally of said core, said machine comprising a fixed table having a continuous groove formed therein and adapted to receive said cover sheet in laid-out form thereon parallel to and overlapping said groove with said core superimposed thereon parallel to and above said groove, a first endless chain carried operably by said table and having a reach thereof carried slidably in said groove, a frame member carried by said table and disposed above the groove of said table, a second endless chain carried operably by said frame member and having a reach thereof disposed above and generally parallel to said table groove, whereby said core and cover sheet are clampingly engaged between the confronting reaches of said chains, means operable to drive said frame member vertically with respect to said table whereby to adjust the spacing between said confronting chain reaches to vary the clamping force exerted thereby on said core and cover sheet, means operable to drive said chains whereby the confronting reaches thereof are moved in the same direction at equal speeds to propel said core and cover sheet along said table, and a longitudinally tensioned cable having its respective ends secured in fixed relation to said table at points spaced apart longitudinally of the path of said core and respectively closely adjacent the opposite lateral edges of the path of said core, said

cable extending over and around said core, a portion of the core-engaging reach of said second chain being trained over a guide carried by said frame member whereby to elevate it above the core to permit the passage of said cable over said core.

5. A machine for wrapping a continuous core in a pliable cover sheet extending longitudinally of said core, said machine comprising a fixed table having a continuous groove formed therein and adapted to receive said cover sheet in laid-out form thereon parallel to and overlapping said groove with said core superimposed thereon parallel to and above said groove, a first endless chain carried operably by said table and having a reach thereof carried slidably in said groove, a frame member carried by said table and disposed above the groove of said table, a second endless chain carried operably by said frame member and having a reach thereof disposed above and generally parallel to said table groove, whereby said core and cover sheet are clampingly engaged between the confronting reaches of said chains, means operable to adjust said frame member vertically with respect to said table whereby to adjust the spacing between said confronting chain reaches to vary the clamping force exerted thereby on said core and cover sheet, a series of outwardly projecting needles fixed in said first chain and adapted to penetrate said cover sheet and enter said core, whereby said core and cover sheet are securely joined together and secured against movement transverse to the plane of said confronting chain reaches, means operable to drive said chains whereby the confronting reaches thereof are moved in the same direction at equal speeds to propel said core and cover sheet along said table, and a longitudinally tensioned cable having its respective ends secured in fixed relation to said table at points spaced apart longitudinally of the path of said core and respectively closely adjacent the opposite lateral edges of the path of said core, said cable extending over and around said core, a portion of the core-engaging reach of said second chain being elevated above said core by a suitable guide carried by said frame member.

6. The structure as recited in claim 5 with the addition of means operable to adjust the tension of the cable.

7. A machine for wrapping a continuous core in a pliable cover sheet extending longitudinally of said core, said machine comprising a frame, a table fixed to said frame and adapted to receive said cover sheet in laid-out form thereon with said core superimposed thereover and parallel therewith, means operable to move said core and cover sheet longitudinally along said table, a sewing machine carried by said frame adjacent the end of said table at which said core and cover sheet enter on said table, and operable to stitch said core to said cover sheet, whereby said cover sheet and core are securely joined, and a longitudinally tensioned flexible cable secured at its respective ends in fixed relation to said table at points spaced apart longitudinally of the path of said core and respectively at opposite lateral edges of said path, whereby one transversely extending edge portion of said cover sheet is folded over said core and brought into overlapping relation with the opposite edge portion of said cover sheet, and a sewing machine carried by said frame adjacent the end of said table at which said core and cover sheet leave said table, said last named sewing machine being operable to stitch together the overlapping edge portions of said cover sheet.

8. The structure as recited in claim 7 wherein each of the sewing machines includes a needle extending transversely to the line of travel of said core and longitudinally reciprocable to perform the sewing operation, said needle being simultaneously reciprocable transversely to its axis in a direction parallel to the line of movement of said core whereby to move with said core during the portion of the stroke of the needle during which said needle is disposed within said core.

9. A machine for wrapping a continuous core in a

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pliable cover sheet extending longitudinally of said core, said machine comprising a fixed table adapted to receive said cover sheet in laid-out form thereon with said core superimposed thereon and parallel therewith, means operable to advance said core and cover sheet longitudinally along said table, said advancing means including gripping members operable to engage and drive said core and cover sheet and to prevent movement of said core transversely to its line of travel, and a flexible cable having its respective ends secured in fixed relation to said table at points spaced apart longitudinally of the path of said core and respectively closely adjacent the opposite lateral edges of the path of said core, said cable being adapted to pass over the top of said core, whereby said cover sheet is wrapped about said core, and needles carried by one

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of said gripping members and adapted to pierce said cover sheet and enter said core, whereby to insure uniformly equal longitudinal movement of said core and cover sheet.

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