

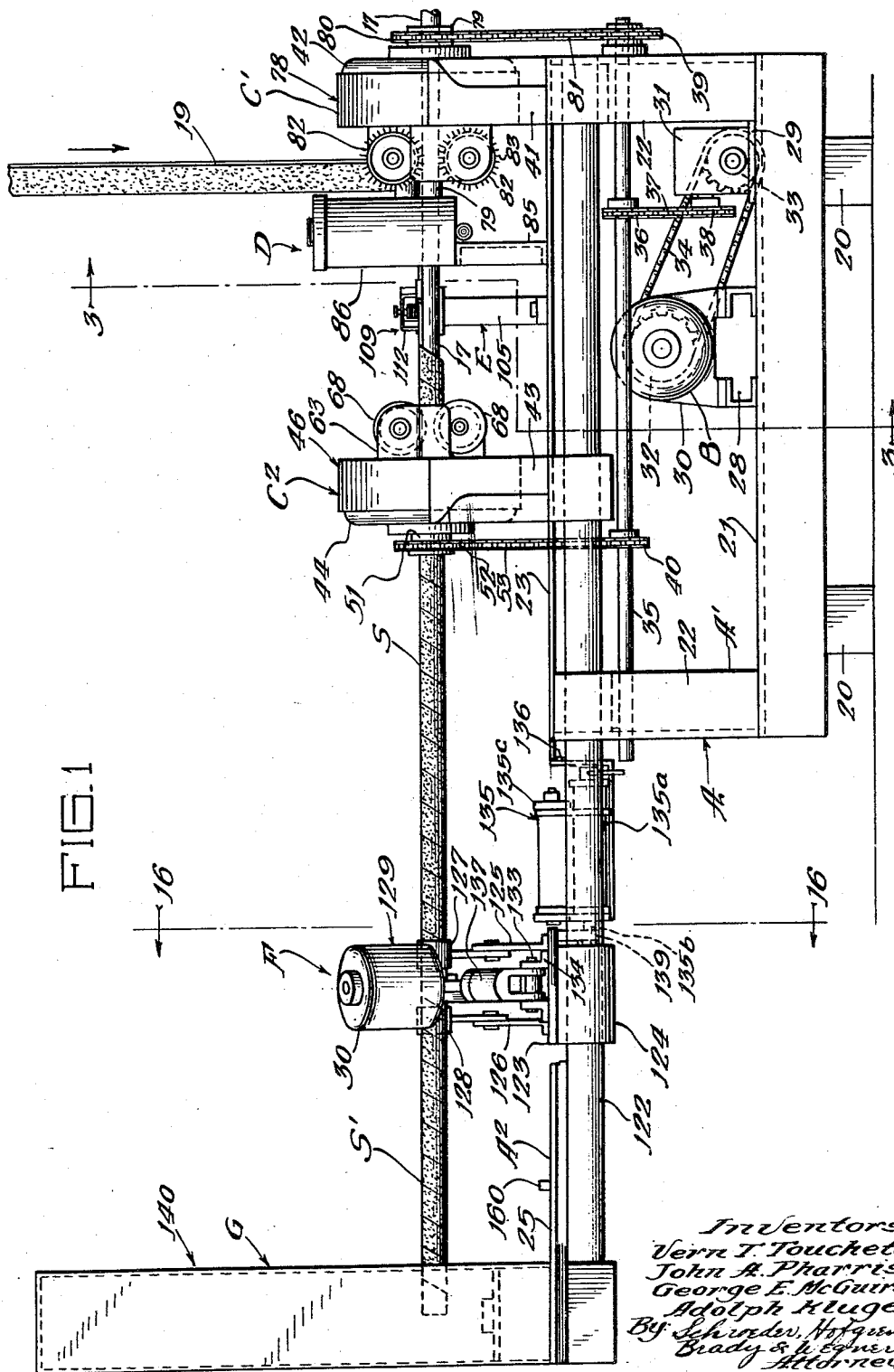
Nov. 5, 1957

V. T. TOUCHETT ET AL
APPARATUS FOR AND METHOD OF CONTINUOUSLY
PRODUCING PAINT ROLLER COVER SECTIONS

2,812,007

Filed July 16, 1954

8 Sheets-Sheet 1



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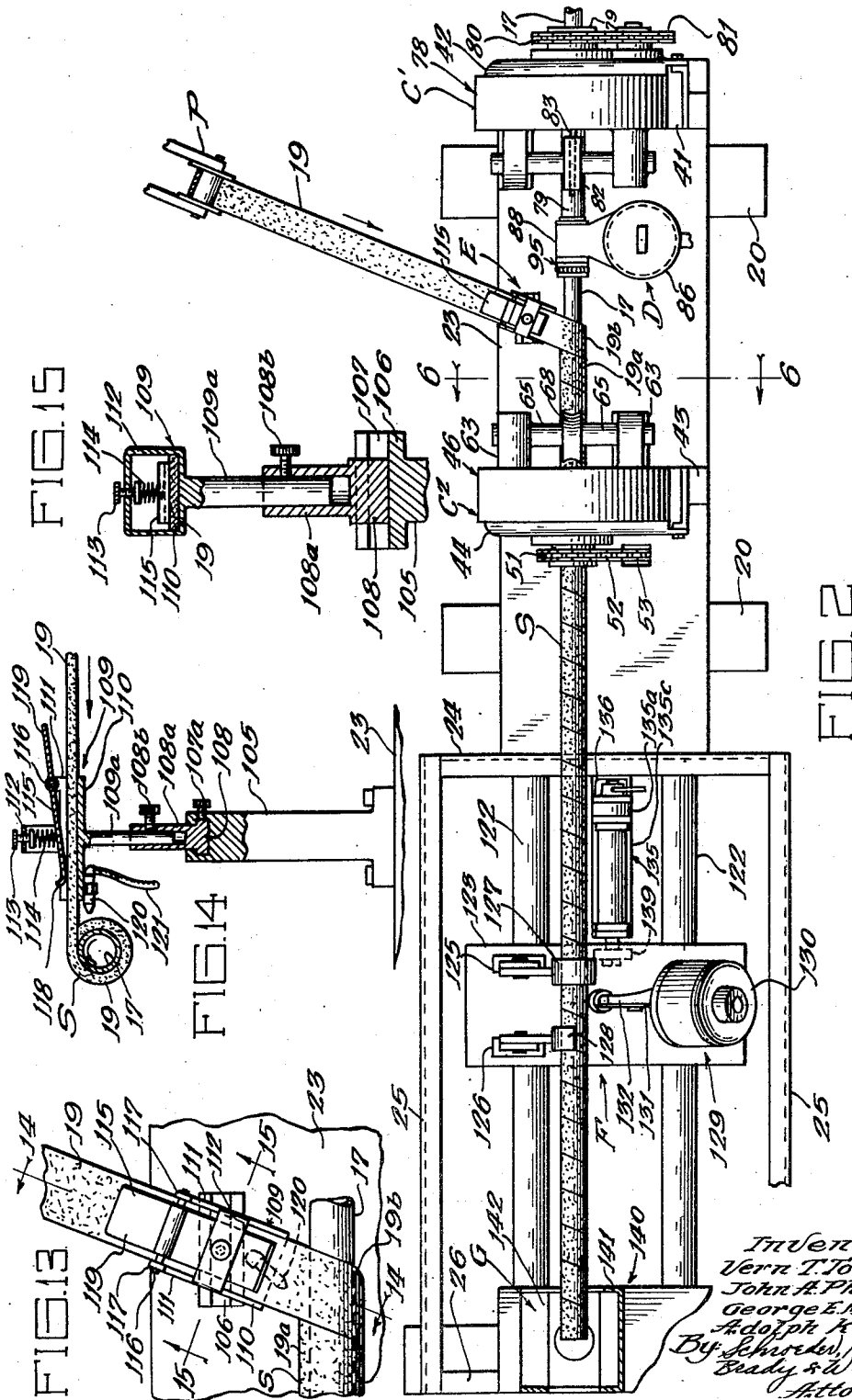
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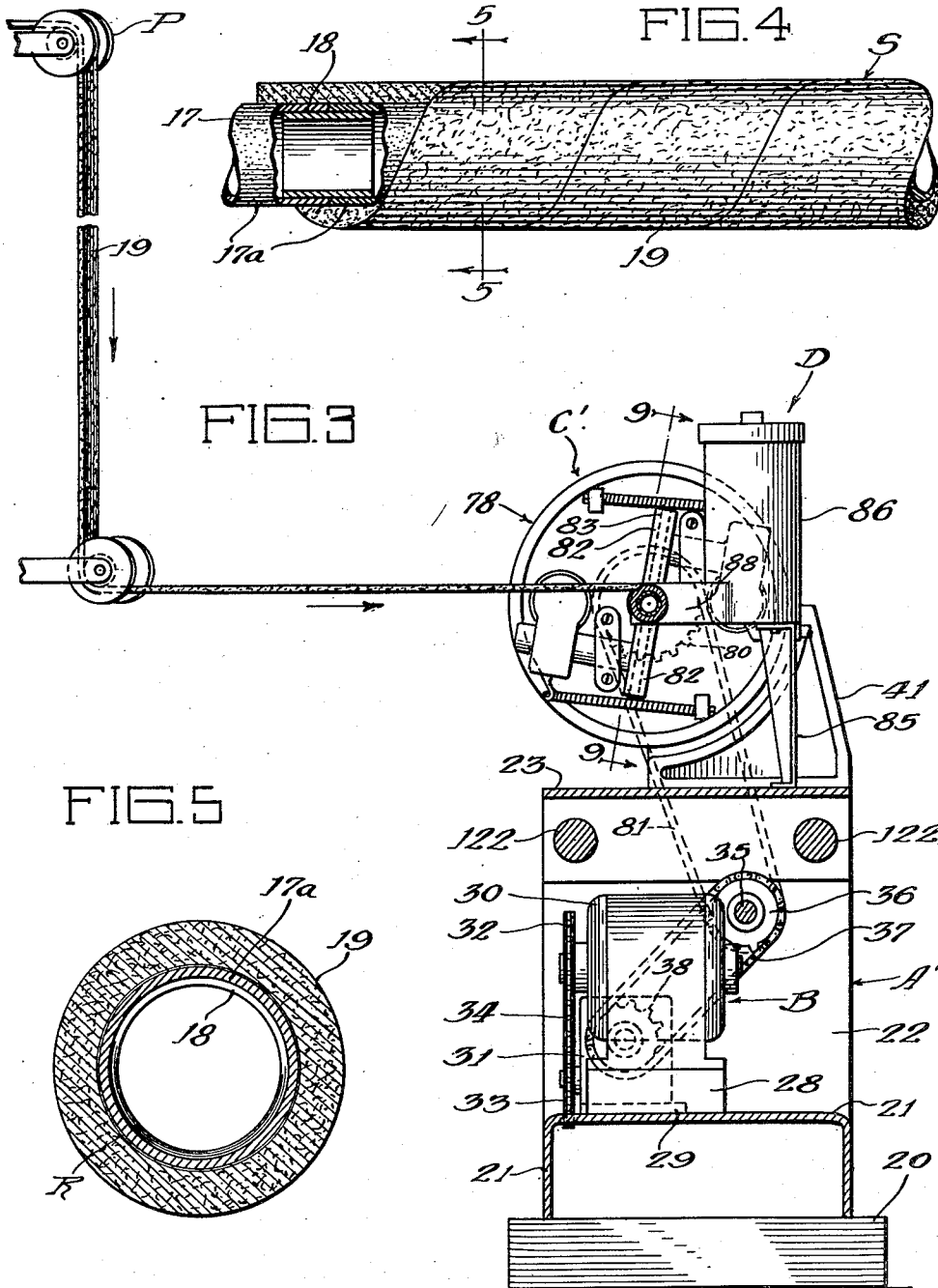
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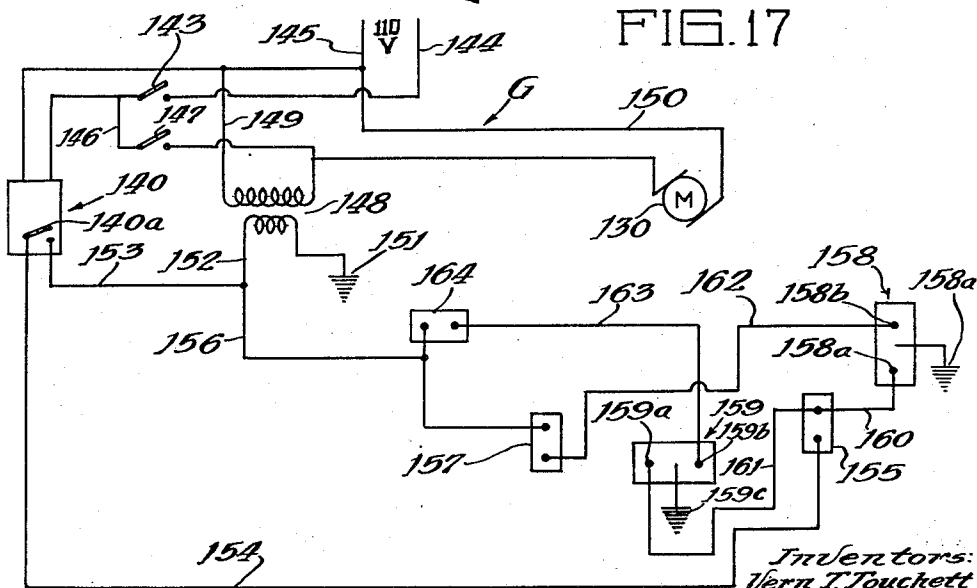
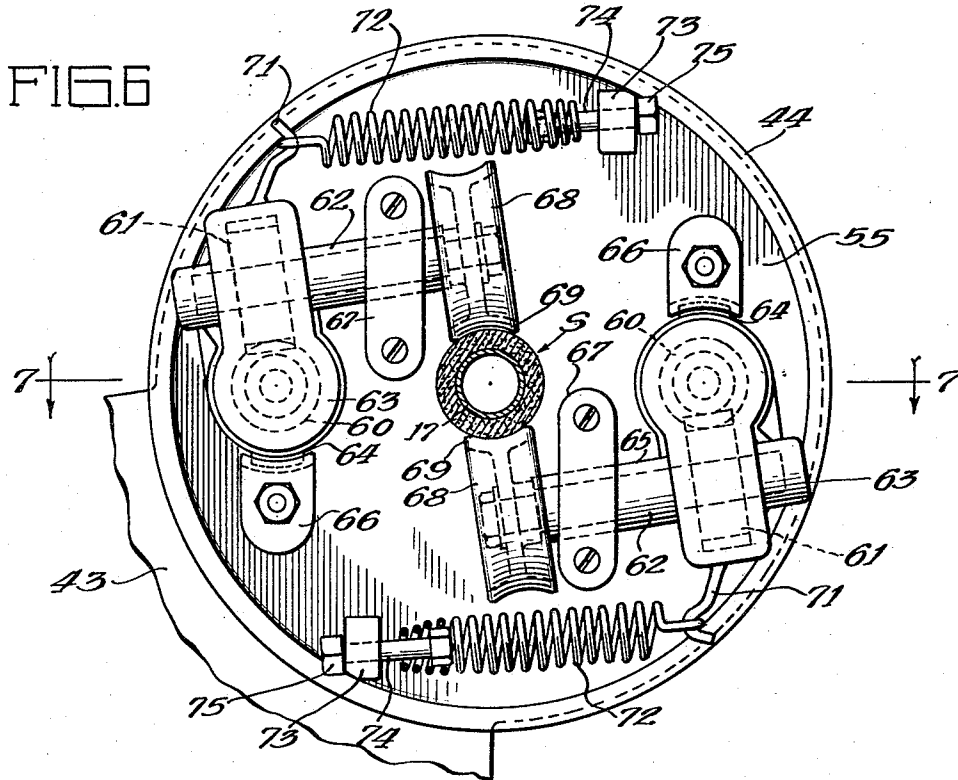
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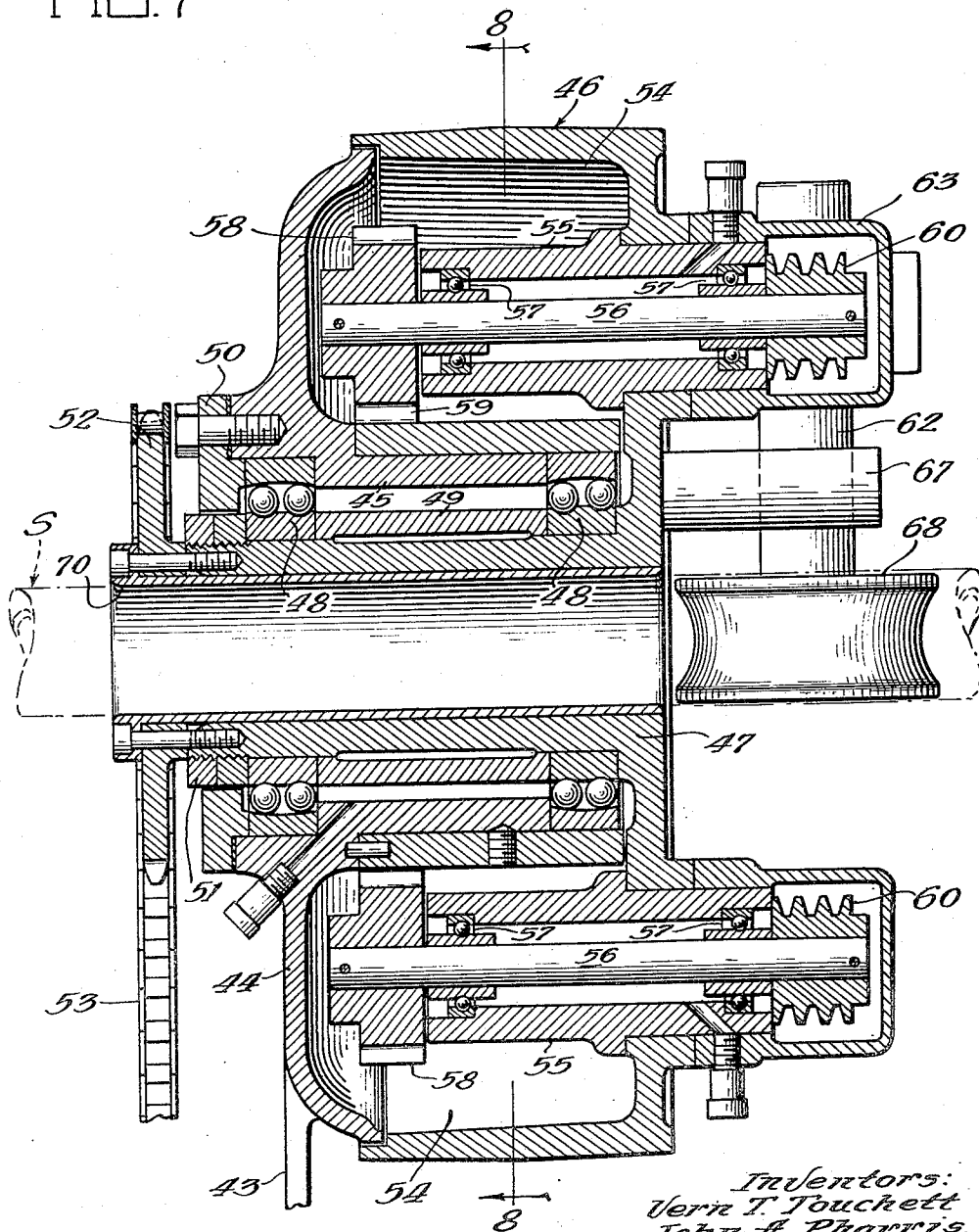
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FIG. 7



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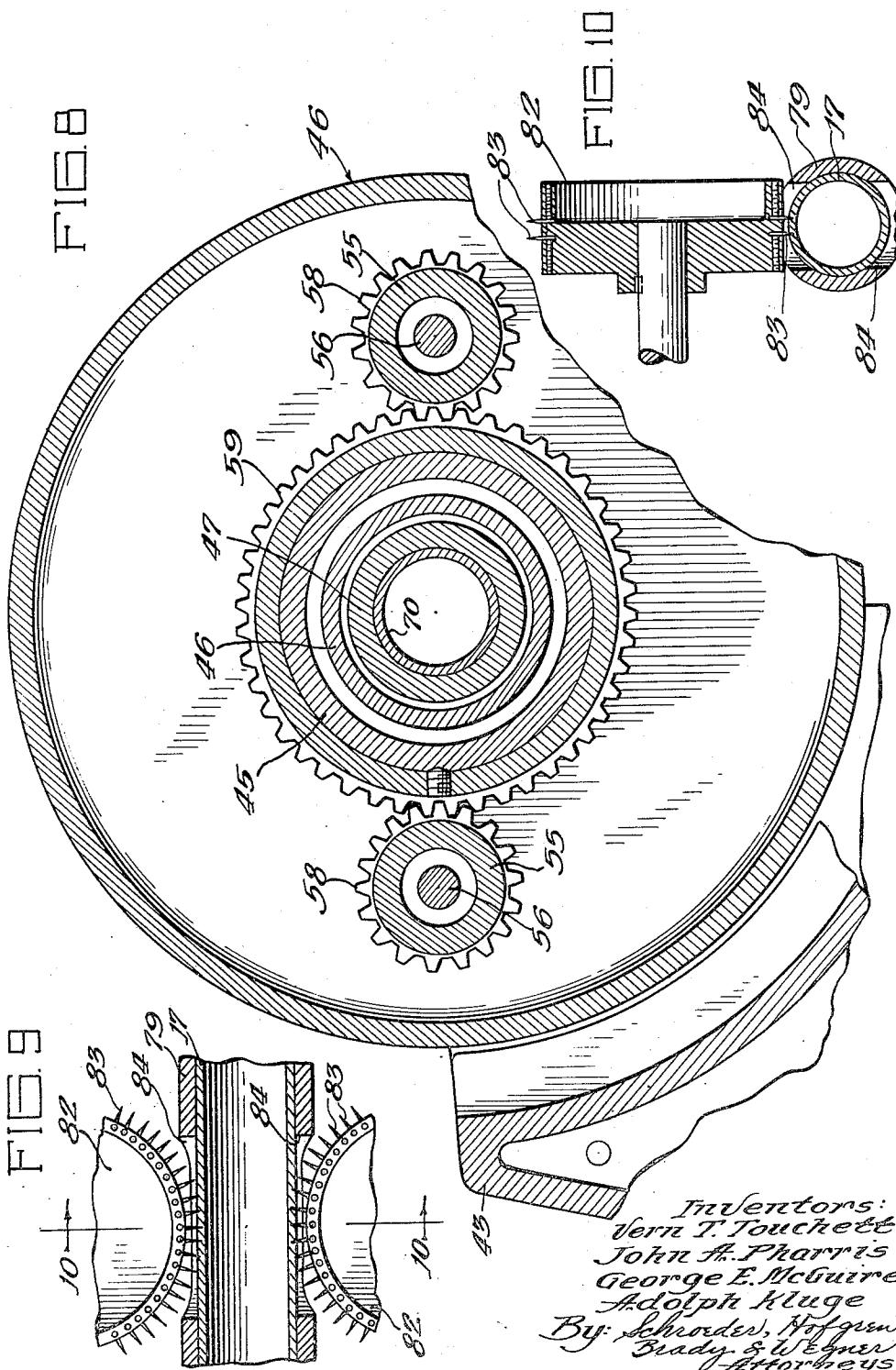
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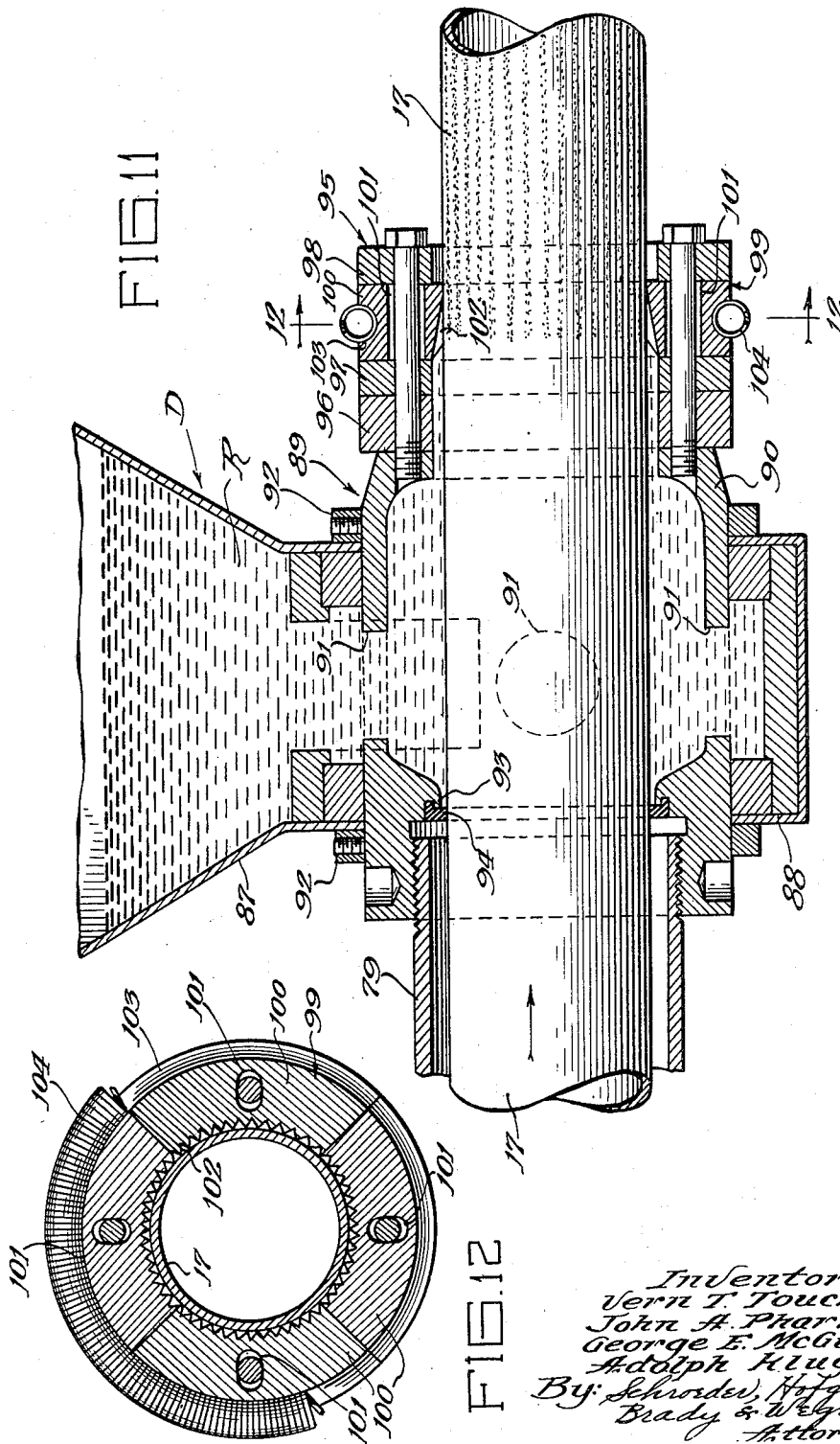
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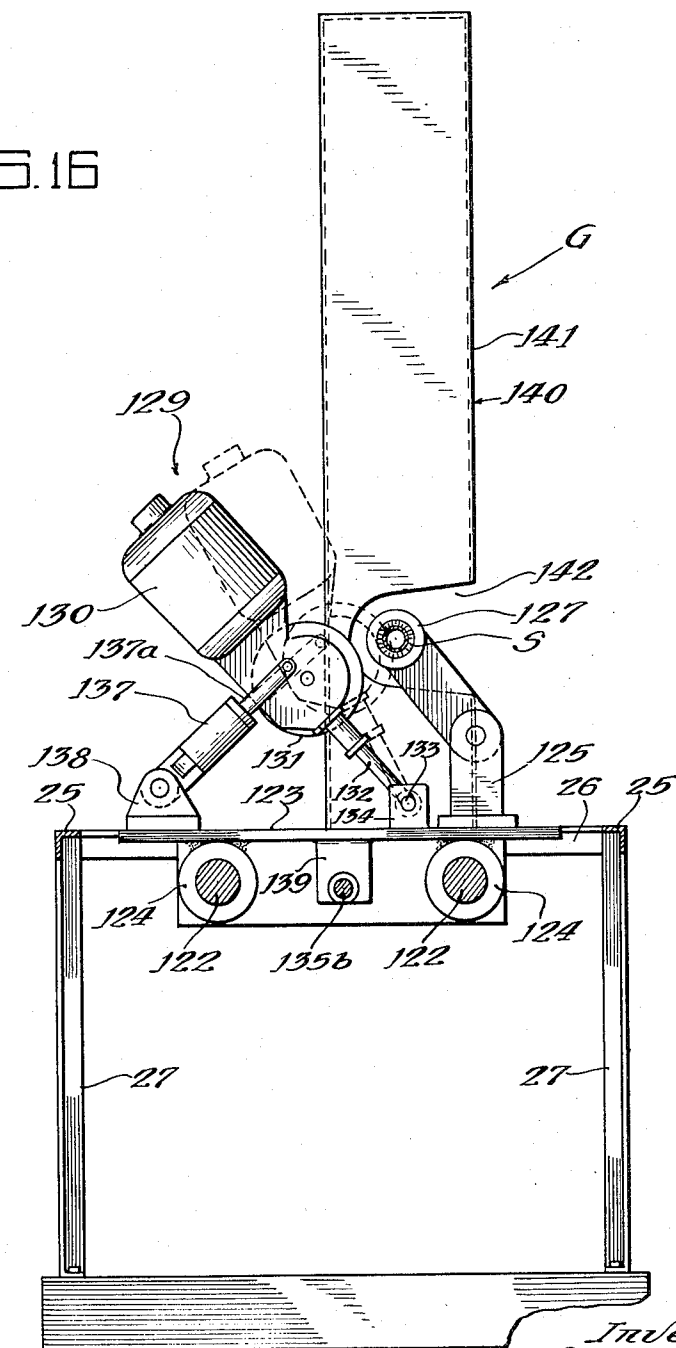
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FIG. 16



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2,812,007

APPARATUS FOR AND METHOD OF CONTINUOUSLY PRODUCING PAINT ROLLER COVER SECTIONS

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Application July 16, 1954, Serial No. 443,888

11 Claims. (Cl. 154—1.8)

This invention relates to a machine for the automatic production of paint roller cover sections of predetermined length which may be recut into several paint roller covers.

Paint roller covers ordinarily have a cylindrical core of cardboard tubing, plastic or the like, around which is wrapped a paint receiving, pile surfaced cover material such as synthetic sheepskin. Insofar as applicants are aware, the manufacture of paint roller covers has heretofore been principally a hand operation. The most efficient cover making equipment required that a strip of pile surfaced fabric be wrapped by hand onto a length of cardboard core to the surface of which adhesive had been applied. The best estimates of comparative cost of paint roller covers indicates that covers produced on the equipment here disclosed and claimed will cost about one-sixth as much as covers produced on the most efficient machinery previously available. In terms of labor force, it permits seven operators to produce as many covers as fifty operators using the old type equipment.

In accordance with the present invention, six foot lengths of cardboard core are secured together in abutting end to end relationship by means of a cardboard connector piece which fits inside the adjacent ends of two core lengths. This operation may be performed as the forward core length of a pair is being fed into the continuous cover producing mechanism. This provides a continuous core which passes through a positive core feeder by means of which it is longitudinally advanced and axially rotated. The advancing and rotating continuous core passes through an adhesive applying device which applies a controlled amount of adhesive to the core surface in proper distribution for maximum adhesion of the pile surfaced cover material. Immediately after the adhesive is applied a continuous strip of pile surfaced cover material is spirally wrapped upon the advancing and rotating core; and the wrapped core then passes through an auxiliary frictional feed device to a cutoff mechanism which cuts the continuous cover stock (core with spirally wrapped cover material on it) into three foot cover sections. The entire operation requires the services of only three operators—one to fasten together the core lengths forming the continuous core, one to control the tension on the cover strip feed, and one to remove the severed cover sections from the discharge end of the machine.

The invention is illustrated in a preferred embodiment in the accompanying drawings in which:

Fig. 1 is a side elevational view of a cover machine embodying the invention;

Fig. 2 is a plan view thereof;

Fig. 3 is a section on an enlarged scale taken as indicated along the line 3—3 of Fig. 1 with the cover strip feed removed for clearer illustration of the positive core feeder;

Fig. 4 is a fragmentary side elevational view partially in section of the continuous cover stock produced by the machine;

Fig. 5 is a section taken as indicated along the line 5—5 of Fig. 4;

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Fig. 6 is a fragmentary section on an enlarged scale taken as indicated along the line 6—6 of Fig. 2;

Fig. 7 is a section on an enlarged scale taken as indicated along the line 7—7 of Fig. 6;

Fig. 8 is a fragmentary section taken as indicated along the line 8—8 of Fig. 7;

Fig. 9 is a fragmentary section on an enlarged scale taken as indicated along the line 9—9 of Fig. 3;

Fig. 10 is a fragmentary section taken as indicated along the line 10—10 of Fig. 9;

Fig. 11 is a horizontal fragmentary sectional view of the adhesive applying apparatus;

Fig. 12 is a section taken as indicated along the line 12—12 of Fig. 11;

Fig. 13 is a fragmentary plan view showing the cover strip feed and tensioner;

Fig. 14 is a section taken as indicated along the line 14—14 of Fig. 13;

Fig. 15 is a section taken as indicated along the line 15—15 of Fig. 13;

Fig. 16 is a section on an enlarged scale taken as indicated along the line 16—16 of Fig. 1; and

Fig. 17 is a diagram of the control circuit for the cutter unit.

Referring first to Figs. 1 and 2, the machine includes a supporting frame A consisting of a main frame A1 and a cutoff mechanism frame A2; a drive mechanism B; feed means including a positive core feeder C1 and a frictional cover stock feeder C2; an adhesive applying apparatus D; a cover strip feed E; a cutter unit F; and a control mechanism G for the cutter unit F.

Referring to Figs. 4 and 5, continuous cover stock S delivered to the cutter unit F includes a continuous cardboard core 17 which is made up of a plurality of cardboard core lengths 17a secured together in end to end relationship by means of cardboard connector pieces 18. The core lengths may conveniently be six feet long, and consist of common spirally laid cylindrical cardboard tubing. The connector pieces 18 are smaller pieces of cardboard tubing about 4 to 6 inches long which may be slipped into the end of a first core length 17a with a portion projecting from said core length so that a second core length 17a may be slipped over the projecting portion of the connector piece.

In continuous operation of the cover making machine, a first core length is fed into the positive core feeder C1 which advances and rotates the core length 17a. Preferably a cradle standard (not shown) is positioned adjacent the entrance end of the machine to support the core length 17a. An operator may slip a connector piece 18 into the rotating and advancing core length 17a and slip a second core length 17a onto the connector piece with its forward end abutting the rear of the first core length. Thus, the continuously advancing and rotating core 17 is built up from a plurality of six foot core lengths 17a and connector pieces 18.

After passing through the positive core feeder C1 the advancing and rotating continuous core 17 goes through the adhesive applying device D where its surface is suitably coated with adhesive.

The cover material is preferably a synthetic sheepskin fabric in which a cloth backing is provided with a pile surface. The fabric is supplied to the machine in long rolls of strip material 19 which are preferably carried over a conventional festoon P such as is used in paper making, from which the cover strip material 19 passes through the strip feed device E and is spirally wrapped onto the advancing and rotating adhesive coated continuous core 17.

After the cover strip 19 has been wrapped onto the core 17 the finished cover stock S passes through the frictional auxiliary cover stock feeder C2 to the cutter

unit F where it is cut into three foot sections. The three foot sections may then be taken to a re-cutting unit of conventional construction and cut into five 7 inch covers with approximately 1 inch of waste. Since the original core lengths 17a are six feet long, and the cover sections are three feet long, every other cut by the cutter unit F goes through a connector piece 18, and when the three foot cover sections are slipped onto the mandrill of a re-cutting machine the connector pieces 18 are automatically pushed out of the cores.

Referring to the drawings in greater detail, and referring first to Figs. 1 and 2, the main frame A1 has legs 20 for a drive mechanism platform 21 at the two ends of which are supporting webs 22 for a main work table 23. The cutoff mechanism frame A2 includes a cross member 24 secured to one end of the main work table 23, a pair of longitudinal angle members 25, and a cross member 26 which is supported on legs 27 (see Fig. 16).

The drive mechanism B is mounted in the main frame A1 and includes a motor support 28 and a gear box base 29 both on the drive mechanism platform 21. An electric motor 30 on the motor support 28 and a gear box 31 on the base 29 are provided with pulleys 32 and 33, respectively, which are connected by a drive chain 34. A drive shaft 35 is suitably journaled in the upright webs 22 of the main frame A1 and has a drive sprocket 36 which is connected by a drive chain 37 to a drive sprocket 38 on the gear box 31. A pair of cover stock feed sprockets are likewise mounted on the drive shaft 35, there being a core feeder sprocket 39 at the extreme head end of the machine outside of the upright web 22 and a frictional cover stock feeder sprocket 40.

The cover stock feed mechanism C is illustrated in Figs. 6-10, inclusive; and the positive core feeder C1 and frictional feeder C2 are identical except for the construction of the rotating drive wheels by means of which the cover stock is longitudinally advanced and rotated. Figs. 6-8 are views of the frictional feeder C2, while Figs. 9 and 10 show the details in which the positive core feeder C1 differs from the frictional feed C2. As best seen in Figs. 1 and 3, the positive feed device C1 has a base member 41 which is mounted on the table 23 and has an offset fixed housing 42; and similarly the frictional feeder C2 has a base member 43 and an offset fixed housing 44.

Referring now particularly to Fig. 7, the fixed housing 44 has an internal hollow boss 45; and a rotor head, indicated generally at 46, has a central sleeve 47 by means of which it is rotatably supported in ball bearing sets 48 in the boss 45. A spacer ring 49 surrounds the sleeve 47 between the ball bearing sets 48 and the outer raceways of the ball bearing sets 48 are held in place by an annular retainer 50 which is bolted onto the fixed housing 44. A pair of retainer rings 51 are screwed onto the end of the sleeve 47 and outside the retainer rings is mounted a sprocket 52 to receive a drive chain 53 by means of which the frictional feeder C2 is driven from the sprocket 40 on the drive shaft 35.

In the periphery of the rotor head 46, flanking the boss 45 of the fixed housing 44, is a pair of opposed bores 54 in which are mounted sleeves 55 in which shafts 56 are journaled on antifriction bearings 57. At one end of each shaft 56 is keyed a pinion 58 which engages a fixed ring gear 59 on the boss 45 so that when the rotor head 46 is rotated, the pinions 58 meshed with the fixed ring gear 59 will rotate the shafts 56. At the opposite ends of the shafts 56 from the pinions 58 are worms 60 which mesh with gears 61 on friction wheel spindles 62. Cover members 63 have flanges 64 and extension arms 65 which are slidable, respectively, beneath gib plates 66 and bridge retainers 67 which are bolted to the face of the rotor head 46 so that the cover members 63 are rotatable through a few degrees with respect to the rotor head. The cover members provide housings for the worms 60, gears 61 and spindles 62. On the outer ends

of the spindles 62 are frictional drive wheels 68 which have concave rims 69 to fit the outside of the cover stock S which is frictionally driven by the drive wheels 68 so that it advances through a bore 70 in the sleeve 47.

The cover members 63 have hooks 71 to receive tension springs 72 which are secured to spring lugs 73 on the rotor head 46 by means of spring tension adjuster bolts 74 and nuts 75. The rotatable mounting of the cover members 63 permits them to be swung about the axes of the shafts 56 by the action of the tension springs 72, so that the drive wheels 68 are firmly urged into frictional engagement with the cover stock S.

Thus, when the motor 30 is operating, the rotor head 46 rotates, carrying with it the frictional drive wheels 68, and the intermeshing of the pinions 58 and ring gear 59 rotates the drive wheels 68 so as to advance the cover stock S as indicated by the arrow in Fig. 7, and so as likewise to axially rotate the cover stock.

The positive core feeder C1 is identical with the frictional cover stock feeder C2 except in the respects which will now be described with particular reference to Figs. 1, 3, 9 and 10. In its supporting frame 41 and fixed housing 42 the positive core feeder C1 has a rotor head, indicated generally at 78, which has an elongated sleeve 79 provided with a sprocket 80 at one end to receive a drive chain 81 by means of which the positive core feeder C1 is driven from the sprocket 39 on the drive shaft 35. At the opposite end of the rotor head 78, which is the exit side of the core feeder, the elongated sleeve 79 extends outwardly between a pair of needle drive wheels 82 which have radially extending peripheral needles 83 projecting through opposed slots 84 in the extension of the sleeve 79, as seen in Figs. 9 and 10. As seen in Fig. 10, there are two rows of needles 83 on each of the needle drive wheels 82. Except for the extension of the sleeve portion 79 of the rotor head 78 and the substitution of the positive needle drive wheels 82 for the frictional driving wheels 68, the positive core feeder C1 is identical with the frictional cover stock feeder C2.

Referring now to Figs. 11 and 12, the adhesive applying apparatus D is mounted on a leg 85 and includes an upright adhesive pot 86 (see Fig. 1) which has a transversely extending adhesive delivery throat 87 which communicates with an adhesive applying well 88. The adhesive applying well 88 has a continuous bore in which is mounted a rotary extruding head 89 which is screwed onto the outer end of the extension of the sleeve 79 on the rotor head 78 of the positive core feed C1. The extruding head includes a cylindrical body portion 90 which is entirely open in line with the mouth of the adhesive delivery throat 87 except for a pair of connecting webs 91. The extruding head 90 is rotatably positioned in the bore of the adhesive applying well 88 by means of a pair of clamping rings 92 which flank the well, and at the entrance side of the extruding head is an annular flange 93 to accommodate a neoprene seal 94 through which the continuous core 17 passes. At the exit side of the extruding head 89 is an extruding die assembly, indicated generally at 95, which includes a pair of inner support rings 96 and 97 and an outer support ring 98 which are bolted to the face of the extruding head 89, and an expansible segmented die 99 which is positioned between the ring 97 and 98. As best seen in Fig. 12, the die 99 is formed of four segments 100 each of which has a radial slot 101 so that the die segment is radially slidable on the bolts by means of which the die assembly is secured to the extruding head. As seen in Fig. 11, the die segments 100 are tapered toward the outside of the die assembly, and their inner faces are serrated at 102 as seen in Fig. 12. The die segments 100 have circumferential grooves 103 to receive a garter spring 104 by means of which the four segments of the extruding die 99 are resiliently clamped onto the continuous core 17. The expansible extruding die 99 is necessary because of

variations in the outside diameter of the cardboard tubes 17a which form the continuous core 17.

It is clear from Figs. 11 and 12 that the continuous core 17 when it passes the neoprene seal 94 enters a pool of adhesive R, and in passing through the extruding die 99 excess adhesive is scraped from the core by the serrated inner faces 102 of the die segments. The serrated die causes the adhesive R to form a film on the core 17 which is alternately thick and thin around the entire circumference of the core so as to provide the best conditions for adhesion of the fabric strip 19.

Due to the fact that the continuous core 17 passes directly through an adhesive loaded well, it is important that the core lengths 17a be precisely abutted so that there is no space between them which could let adhesive leak around the neoprene seal 94. Furthermore, it is obvious that any slight gap in the continuity of the core 17 could cause defects in the finished cover stock S.

Positioned immediately adjacent the adhesive extruding die a cover material strip feed E is mounted on a supporting column 105 which is bolted to the table 23; and as best seen in Figs. 13, 14 and 15 the column 105 has a head 106 which extends longitudinally of the line of travel of the continuous core 17, and said head has a longitudinal slot 107 to accommodate a complementary sliding base 108 for a strip guide and tensioning device, indicated generally at 109 which may be longitudinally adjusted in the slot and locked by a set screw 107a.

The base 108 includes a fixed sleeve 108a which is tapped to receive a set screw 108b so that a supporting post 109a for the strip guide 109 may be both elevated and rotated to obtain the proper height and angular adjustment for the tensioning device with respect to the core 17.

Surmounting the post 109a is a guide plate 110 having upright side walls 111 so that the cover strip material 19 drawn off the festoon P is supported on the guide plate and confined between the side walls. An integral clamp frame 112 spans the guide plate and is centrally apertured to receive a set screw 113 by means of which a compression spring 114 may be adjusted to vary the pressure with which said spring bears on a pivoted tensioning clamp 115. The clamp 115 is mounted on a pivot 116 which extends through a pair of upstanding ears 117 on the side walls 111 of the strip guide plate 110. The tensioning clamp 115 has an upturned forward margin 118 which bears upon the cover strip 19 adjacent the forward margin of the guide plate 110, and a rearwardly extending finger piece 119 permits an operator to vary the pressure of the clamp 115 on the strip 19 at will.

The strip guide and tensioning device 109 is diagonally disposed with respect to the advancing and rotating core 17 so that the cover strip 19 passing through the device 109 may be adhered to the wet adhesive on the advancing and rotating core 17 and is spirally wrapped by the core movement. As shown by Fig. 14, the guide plate 110 is aligned with the top of the core 17 so that the strip is drawn straight off the guide plate onto the core which rotates as indicated by the arrow in Fig. 14.

It is extremely important that adjacent layers 19a and 19b of the strip 19 have their facing margins in perfect abutment, so that there are no gaps in the complete coverage of the core 17, and it is equally important that there be no overlapping of adjacent layers 19a and 19b. The cover strip material 19, as previously pointed out, is a fabric with a pile surface, and the fabric back of the strip is of a loose enough weave that the strip may be stretched by increasing the tension on it, which likewise makes it narrower. A typical strip material which is used for paint roller covers is nominally 2½ inches wide and may be narrowed as much as ¼ inch by increasing the tension on the strip guide device. This characteristic of the cover material, therefore, in combination with a continuously adjustable tensioning clamp such as the clamp

115, permits continuous control of the strip width where it is laid on the core 17, and this permits the necessary perfect abutment between adjacent margins of adjacent layers 19a and 19b of the spirally wound strip 19.

Another factor which must be met is the possibility that the pile surface of the layer 19a which has just been laid on the core 17 may be bent outwardly so that it will be trapped beneath the oncoming adjacent layer 19b. This possibility is completely eliminated in the present mechanism by mounting an air nozzle 120 beneath the guide plate 110, the nozzle being on a slightly sharper diagonal with respect to the line of the core 17 than is the strip guide and tensioning device 109. The nozzle 120 has a flexible tubing 121 connecting it to a source of air under pressure (not shown), and the air jet from the nozzle 120 is directed precisely at the rear margin of the last laid layer 19a of the strip 19 so that the air blast can deflect the pile away from the margin of the strip against which the oncoming layer 19b is abutting. The two features of a constantly variable tensioning device for the strip material 19, and an air nozzle to deflect the pile away from the line of abutment of the oncoming layer with the last laid layer, practically eliminate defects in the continuous cover stock due to gaps between adjacent layers or due to interference between adjacent layers.

Referring again to Figs. 1 and 2, the wrapped core forming the cover stock S passes from the strip feed E through the auxiliary frictional cover stock feeder C2 to the cutter unit F, the operation of which is controlled by the control mechanism G.

The cutter unit includes a pair of rails 122 which extend the entire length of the main frame A1 so that they are supported in both of the upright webs 22, and extend six or seven feet beyond the end of the main frame A1 between the longitudinal angles 25 of the cutoff mechanism frame A2. As best seen in Fig. 16, a traverse table 123 has a pair of sleeves 124 welded to its lower face so that it is slidably supported on the rails 122 for movement between a battery position which it occupies in Figs. 1 and 2 and a return position near the outer ends of the rails 122. Referring to Fig. 2, a pair of longitudinally spaced brackets 125 and 126 on the traverse table 123 have cover stock support elements 127 and 128, respectively, between which the cut for severing a cover section from the continuous stock is made by means of a cutter member, indicated generally at 129. The element 127 is annular so that the stock passes through it, while the element 128 is substantially semicircular to permit a severed cover stock section to be easily removed by an operator. The cutter member 129 is an electric rotary cutter having a motor 130 below which is journaled a circular cutting blade 131 which is driven from the motor 130 through suitable gearing in the customary fashion. The cutter member 129 is provided with a supporting leg 132 which is pivoted at 133 in a bifurcated boss 134 on the traverse table 123.

Movement of the cutter unit F is effected by means of a controlled speed air motor 135 which is secured to a bracket 136 on the cross rail 24 of the cutter unit frame A2, and a reciprocating air motor 137 which is pivotally mounted between a pair of bosses 138 on the traverse table 123. Both air motors are connected by suitable air lines (not shown) with an air compressor (not shown) which may conveniently be a central compressor which is used to supply air under pressure to numerous units including the cover making machine.

The controlled speed air motor 135 is a conventional unit having an air cylinder 135a the piston of which has its connecting rod 135b secured to a bracket 139 on the bottom of the traverse table 123; and a control cylinder 135c surmounting the air cylinder permits the rate of movement of the air motor piston to be adjusted to any speed within the range of adjustment of the control cylinder 135c. Thus, by reason of the adjustable control cylinder 135c the controlled speed air motor 135 may be

set to drive the traverse table 123 along the rails 122 at the same speed as the advancing cover stock S.

The air motor 137, which is pivotally mounted on the bosses 138 has its piston rod 137a pivotally connected to a portion of the frame of the cutter member 129 so that operation of the air motor 137 will rock the cutter member 129 about the pivot 133 to bring the rotary cutting blade 131 into cutting engagement with the cover stock S between the brackets 127 and 128.

The control mechanism G for the cutter unit F includes an electric eye element 140 which has an upright housing 141 provided with a forwardly open recess 142 (see Fig. 16) through which the advancing cover stock S may pass to break a light beam and actuate the electric eye mechanism in the conventional manner. The electric eye unit 140 is the prime control for the control mechanism G which is illustrated diagrammatically in Fig. 17, and actuates the control mechanism G to cut a cover section S1 from the end of the advancing continuous cover stock S. The control mechanism is so arranged that the cutter member 129 is rocked into cutting engagement with the cover stock S only when the traverse table 123 is moving on the rails 122 in the same direction, and at the same speed as the advancing stock, so that the cutting blade 131 may make a clean straight cut through the stock S without stopping the feed movement of the stock.

Referring to Fig. 17, the control mechanism G has a manual switch 143 in a line 144 which connects the electric eye 140 to a 110 volt power source, and the electric eye is also connected to a positive lead 145 from which current is likewise supplied to the other elements of the control mechanism. A transformer and motor lead 146 is wired through a manual control switch 147 which controls the operation of a transformer 148 and the cutter motor 130, current to the transformer being supplied through a line 149 off the positive lead 145, while the motor 130 has a connection 150 from the positive lead 145.

The induction side of the transformer 148 is grounded at 151 and has a lead 152 with a branch 153 to a microswitch 140a which is under the control of the electric eye 140; the electric eye including the usual elements needed to step up current between the photoelectric cell and the switch 140a. The microswitch 140a controls the several solenoid valves for the air motors 135 and 137 through additional microswitches. It is connected through a line 154 to a microswitch 155 which is set closed, and through a line 156 with a microswitch 157 which is set closed. There are solenoid valve systems, indicated generally at 158 and 159 which control, respectively, the admission of air to the controlled speed air motor 135 and to the reciprocating air motor 137; the valve system 158 having an "advance" valve solenoid 158a and a "retract" valve solenoid 158b, both of which are grounded at 158c; and the valve system 159 having an "advance" solenoid 159a and a "retract" solenoid 159b, both grounded at 159c. The "advance" solenoids 158a and 159a are wired through the normally closed microswitch 155 by leads 160 and 161, respectively; while the "retract" solenoid 158b is wired through normally closed switch 157 through line 162 and the "retract" solenoid 159b is wired through a line 163 and a normally open switch 164 which is mounted on one of the rails 122. The solenoid 158a for controlling the advance of the table from the battery position of Fig. 1 to a return position adjacent the electric eye unit 140 and the solenoid 158b to control return of the table are both energized when the microswitch 140a of the electric eye unit is closed, the solenoid 158a through the switch 155 and the solenoid 158b through the switch 157. Thus, at this point the traverse table 123 can neither advance nor retract because both valves are held open by their respective solenoids. The solenoid 159a to control the advance of the reciprocating air cylinder 137 is also activated at this time, and operates the air cylinder 137 to pivot the cutter member 129 toward the stock. Upon

initial movement of the cutter member the normally closed microswitch 157 opens, cutting the circuit 162 to the solenoid 158b for the retracting valve of the controlled speed air motor 135 and permitting the motor to advance the traverse table 123 parallel to and at the same speed as the stock S.

At the end of a cut the traverse table 123 strikes a plunger for the normally open microswitch 164. This closes the circuit 163 to the reverse solenoid 159b of the reciprocating air motor 137. The normally closed switch 155 is on the traverse table, and is opened at the "return" position of the table to deactivate the solenoids 158a and 159a which control the advance movement of the traverse table and of the cutoff member, permitting retraction of the cutoff member. However, since the switch 157 is still closed the table cannot retract at this time. On full retraction of the cutter member it again closes the microswitch 157 which activates the solenoid 158b to retract the constant speed air motor 135 and return the traverse table to its battery position as seen in Fig. 1, ready for another cut. Return of the table 123 closes the switch 155. Removal of the severed cover section S1 by the operator restores the microswitch 140a to its normal position, cutting the flow of current through the switches 155 and 157.

The operation of the entire unit is believed to be clear from the foregoing description. An operator positioned ahead of the primary core feeder C1 uses successive core lengths 17a and connector pieces 18 to set up a continuous core which is advanced and rotated by the positive core feeder C1. The rotor head 78 and needle drive wheels 82 advance and rotate the continuous core 17 through the adhesive applying well 89 of the adhesive apparatus D, where it passes through a mass of liquid adhesive, the rotating extruding die 95 serving to give proper distribution of the adhesive on the continuous core 17 as the core is pushed through the die.

The adhesive coated core 17 advances past the cover strip feed E where the continuous strip 19 of cover material is spirally wound onto the core 17 so that it adheres to the adhesive. An operator stationed at the strip guide tensioning device 109 controls the width of the strip 19 by varying the tension on the clamping member 115 to vary the width of the strip 19 where it is initially rolled onto the core, so as to obtain perfect abutment between the adjacent margins of the last laid layer 19a and the oncoming layer 19b of the strip.

The auxiliary cover stock feeder C2 picks up the continuous cover stock and advances and rotates it by means of the rotor head 46 and frictional drive wheels 68, and from the frictional feeder C2 the cover stock passes to the cutter unit F.

Before the apparatus is put into operation after being idle, an operator first closes the manual switch 143 in the control mechanism G to give the photoelectric cell of the electric eye unit 140 about a half minute to warm up. After the electric eye unit is warmed, the manual switch 147 may be closed to start the motor 130 of the cutter member 129, and supply current to the microswitch 140a of the electric eye unit 140 through the transformer 148. The drive mechanism B may then be started by means of a conventional electric push button switch (not shown) which controls current to the motor 32.

When the end of the advancing and rotating cover stock S severs the light beam in the electric eye 140 the control sequence previously described takes place. First the cutter 129 starts to rock toward cutting engagement with the cover stock S, which opens the microswitch 157 to deactivate the solenoid 158b of the controlled speed air motor 135 and permit the traverse table 123 to advance from its battery position along the rails 122 at the same speed as the advancing cover stock S, so that when the rotary cutting blade 131 of the cutter member 129 contacts the stock S it makes a straight, clean cut therethrough. This severs a cover section S1, which may

be removed by an operator who places it in suitable cover section conveying apparatus for removal to a recutting unit where it may be cut into five 7 inch paint roller covers and have connector pieces 18 removed from the core.

When the traverse table 123 reaches its return position it closes the microswitch 164 and opens the microswitch 155 to permit the reciprocating air motor 137 to return the cutter member 129 from its cutting position. Return of the cutter member 129 closes the microswitch 147 to return the traverse table to its battery position. The switch 155 closes, the switch 164 opens, and the cutter unit is again ready to operate when the end of the continuously advancing cover stock S next cuts the light beam in the electric eye mechanism 140.

The foregoing detailed description is given for clearness of understanding only and no unnecessary limitations are to be understood therefrom, as some modifications will be obvious to those skilled in the art.

We claim:

1. Apparatus for producing continuous paint roller cover stock which may be cut into paint roller covers, comprising: a rotating annular drive head through which a continuous tubular cardboard core may pass longitudinally; a plurality of spaced, radially disposed driven wheels mounted on said drive head, said driven wheels having a plurality of peripheral needles which penetrate a continuous cardboard core passing through the drive head to positively longitudinally advance and axially rotate said core; an adhesive pot having an open core receiving passage in its lower portion which is aligned with the axis of the drive head; an extruding die at the exit side of said passage through which the advancing and rotating core passes, said extruding die being constructed and arranged to control the distribution of adhesive on the core; and a cover strip guide member adjacent the path of the adhesive coated core, said guide member being inclined in the direction of travel of the core so that a continuous strip of cover material may pass through said guide member and be spirally wrapped on the advancing and rotating core to completely cover said core.

2. Apparatus for the continuous production of paint roller cover sections of predetermined length, comprising: a rotating annular drive head through which a continuous tubular cardboard core may pass longitudinally; a plurality of spaced, radially disposed driven wheels mounted on said drive head, said driven wheels having a plurality of peripheral needles which penetrate a continuous cardboard core passing through the drive head to positively longitudinally advance and axially rotate said core; an adhesive pot having an open core receiving passage in its lower portion which is aligned with the axis of the drive head; an extruding die at the exit side of said passage through which the advancing and rotating core passes, said extruding die being constructed and arranged to control the distribution of adhesive on the core; a cover strip guide member adjacent the path of the adhesive coated core, said guide member being inclined in the direction of travel of the core so that a continuous strip of cover material may pass through said guide member and be spirally wrapped on the advancing and rotating core; cutter means having a blade for cutting the advancing and rotating wrapped core; means for reciprocating said blade into and out of cutting engagement with said wrapped core; driving means for advancing the cutter means bodily with the wrapped core; and control means for controlling said reciprocating and said driving means to make a cut only when a predetermined length of the wrapped core has passed the cutter means and only when the cutter means is advancing bodily with the wrapped core.

3. Apparatus for the continuous production of paint roller cover sections of predetermined length, comprising: a rotating annular drive head through which a continuous tubular core may pass longitudinally; driven means on

said drive head adapted to positively engage a continuous cardboard core passing through the drive head to longitudinally advance and axially rotate said core; means for continuously applying adhesive to the surface of said advancing and rotating core; means for spiral wrapping a strip of cover material continuously on said advancing and rotating core; a second rotating annular drive head through which the wrapped core may pass longitudinally; driven means on said head to frictionally engage the wrapped core to longitudinally advance and axially rotate it; and means for cutting the wrapped core into cover sections of predetermined length.

4. In apparatus for producing continuous paint roller cover stock, means for longitudinally advancing and axially rotating a continuous tubular cardboard core, comprising: a rotating annular drive head through which a continuous tubular cardboard core may pass longitudinally; a plurality of spaced, radially disposed driven wheels mounted on said drive head, said driven wheels having a plurality of peripheral needles which penetrate a continuous cardboard core passing through the drive head; and resilient means urging said driven wheels into engagement with a core passing through the drive head.

5. In apparatus for producing continuous paint roller cover stock, means for wrapping a continuous strip of stretchy cover material spirally on a rotating and longitudinally advancing cylindrical core, comprising: means for guiding a strip of material onto the core at a predetermined angle; tensioning means which frictionally grips the strip as it approaches the core; and means for selectively varying the grip of the tensioning means on the strip as it is wrapped, whereby the width of the strip may be varied to produce abutment between the margins of adjacent layers of the material on the core.

6. In apparatus for producing continuous paint roller cover stock, means for wrapping a continuous strip of stretchy cover material spirally on a rotating and longitudinally advancing cylindrical core, comprising: a strip guide member adjacent the advancing core, said guide member being so positioned that a strip of material passing through it is directed onto the core at a predetermined angle; resilient clamp means for frictionally gripping in a strip of material passing through the guide member to modify the width of the strip by stretching it longitudinally; and means for selectively varying the grip of the clamp means on the strip, whereby the width of the strip of material may be varied as it passes through the guide member to produce abutment between the margins of adjacent layers of the material on the core.

7. The device of claim 6 which includes a spring loaded clamp lever, screw means for adjusting the tension of the spring, and a finger piece on the lever for manually varying the spring tension independently of the screw means.

8. In apparatus for producing continuous paint roller cover stock, means for wrapping a continuous strip of pile surfaced cover material on a rotating and longitudinally advancing, adhesive coated continuous cylindrical core, comprising: a strip guide member adjacent the advancing core, said guide member being so positioned that a strip of fabric passing through it is directed onto the core at a predetermined angle; and an air nozzle adjacent the core to deflect the pile of the last layer of material on the core away from the strip margin against which the next adjacent layer of material abuts.

9. In apparatus for producing continuous paint roller cover stock, means for wrapping a continuous strip of stretchy, pile surfaced cover material on a rotating and longitudinally advancing adhesive coated continuous cylindrical core, comprising: a strip guide member adjacent the advancing core, said guide member being so positioned that a strip of material passing through it is directed onto the core at a predetermined angle; resilient clamp means for producing tension in a strip of material passing through the guide member to modify the width of the material by stretching it longitudinally; means

for changing the tension produced by the clamp means, whereby the width of the strip of material may be varied as it passes through the guide member to produce abutment between the margins of adjacent layers of the material on the core; and an air nozzle adjacent the core to deflect the pile of the last layer of material on the core away from the strip margin against which the next adjacent layer of material is adhered to the core.

10. In the production of continuous paint roller cover stock, the method of spiral wrapping a continuous strip of stretchy cover material on a rotating and longitudinally advancing adhesive coated continuous cylindrical core, comprising: laying the end portion of a strip of cover material on the adhesive coated core at a desired angle to lay the strip spirally on the core and cover the entire core; placing tension on the strip to firmly set it in the adhesive as the core rotates and advances; and selectively changing the tension on the strip as it is wrapped on the core so as to vary the width of the strip by stretching or relaxing it, whereby the margins of adjacent layers of the material are positioned in abutment.

11. The method of claim 10 in which the material is pile surfaced, and the pile of the last layer of material on the core is deflected away from the strip margin against which the next adjacent layer of material abuts by directing an air stream against it.

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