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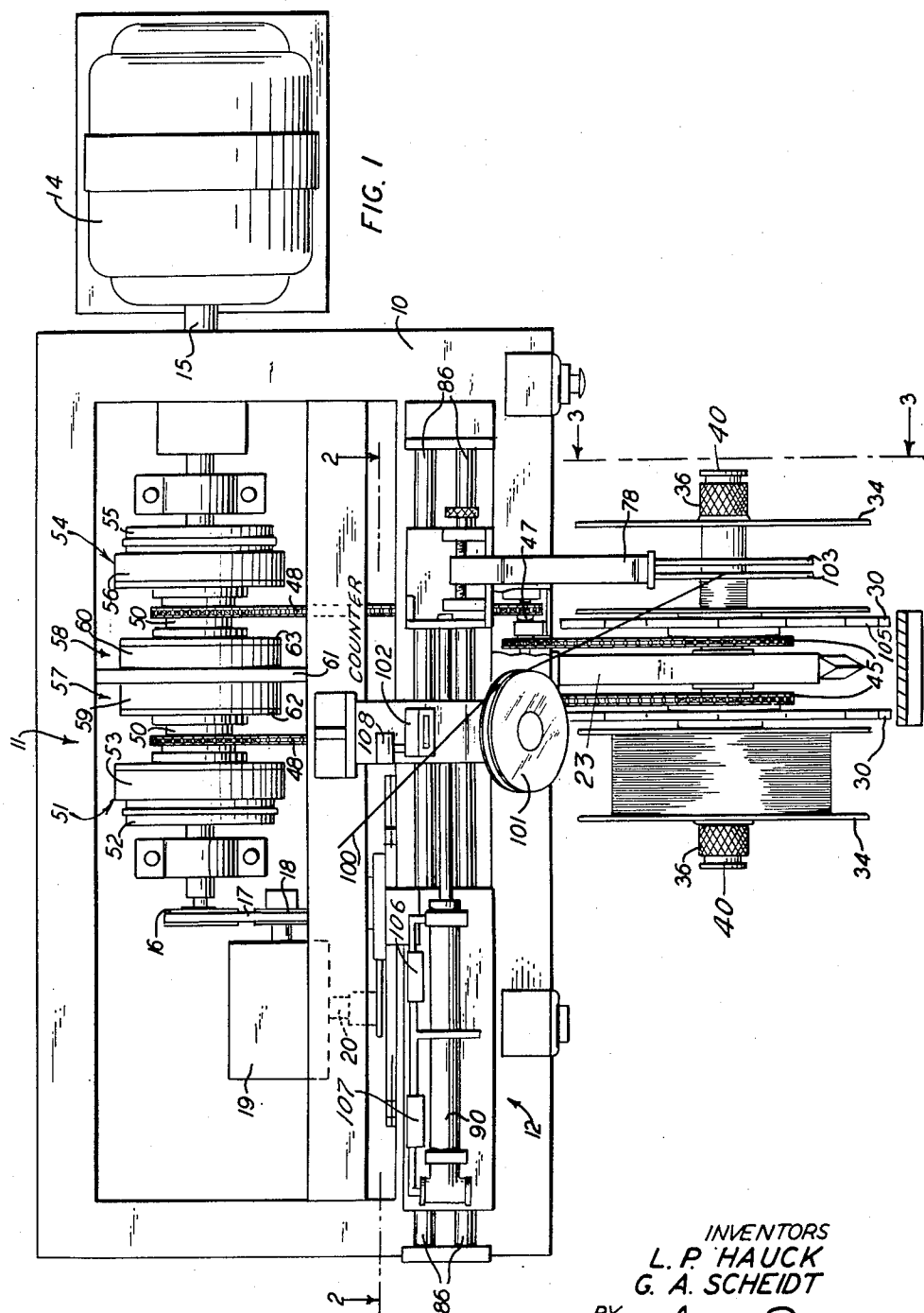
L. P. HAUCK ET AL

2,779,545

CONTINUOUS STRAND REELING APPARATUS

Filed March 30, 1955

4 Sheets-Sheet 1



INVENTORS
L. P. HAUCK
G. A. SCHEIDT
BY *W. E. Parnell*
ATTORNEY

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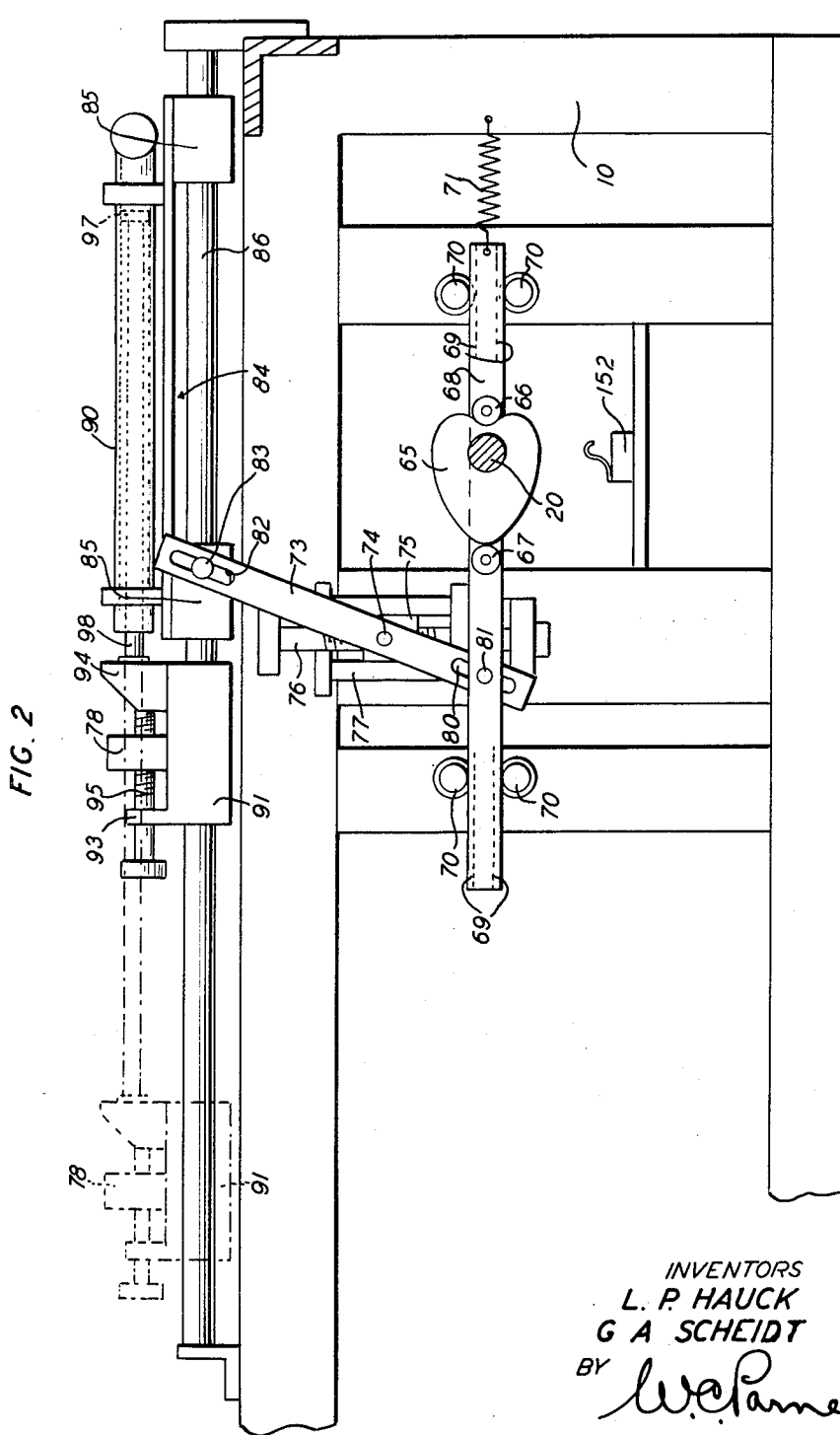
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INVENTORS
L. P. HAUCK
G A SCHEIDT
BY *W. C. Parnell*
ATTORNEY

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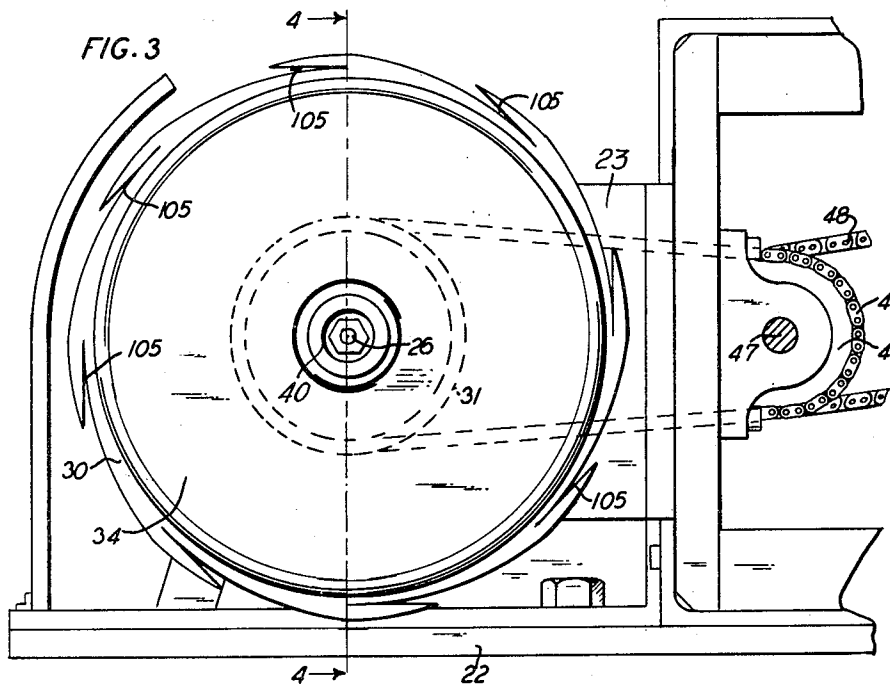
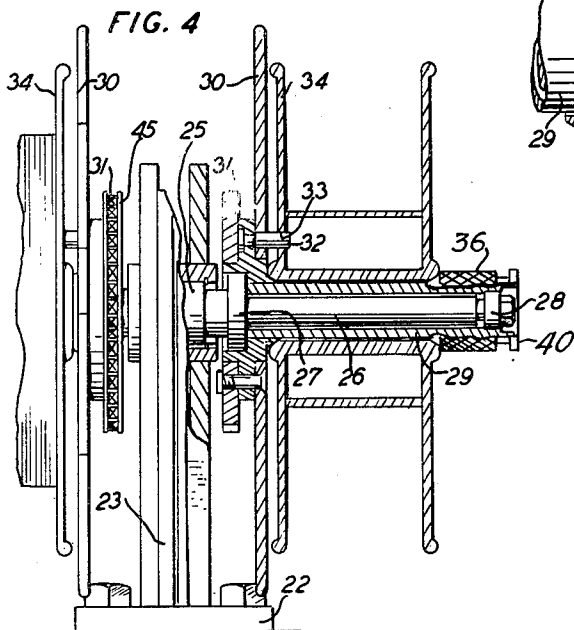
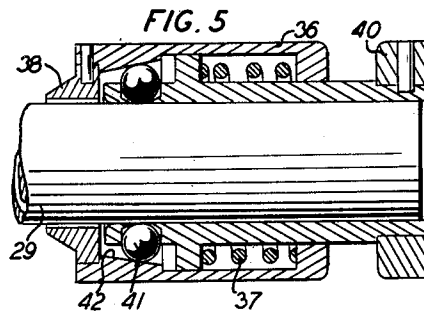
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INVENTORS
L. P. HAUCK
G. A. SCHEIDT

BY

W. Parnell

ATTORNEY

Jan. 29, 1957

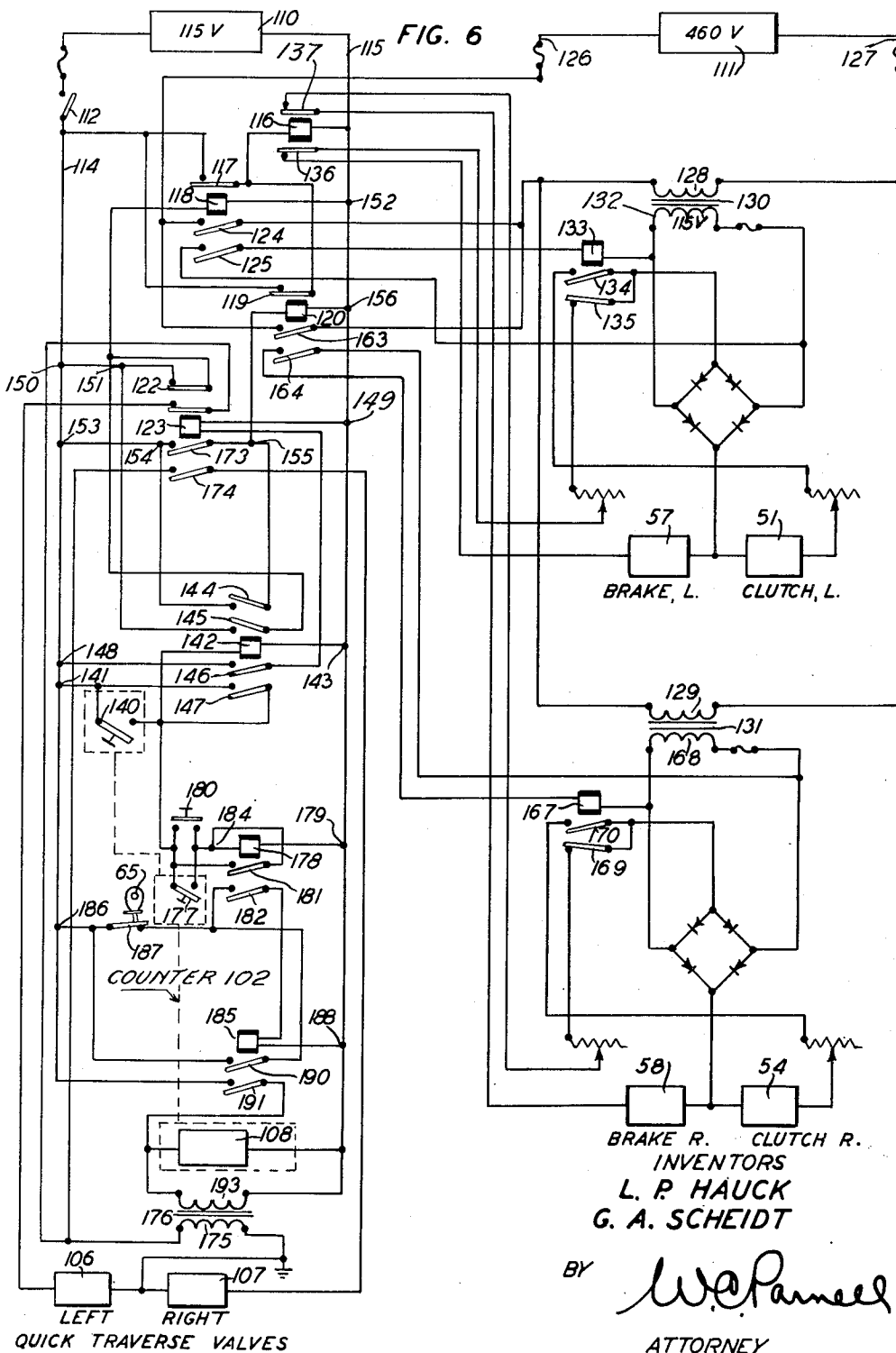
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CONTINUOUS STRAND REELING APPARATUS

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CONTINUOUS STRAND REELING APPARATUS

Leon P. Hauck, Tonawanda, and Gerald A. Scheidt, Buffalo, N. Y., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

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11 Claims. (Cl. 242—25)

This invention relates to continuous strand reeling apparatus and particularly to the drive controlling means thereof.

As shown in the early patent to W. F. Hosford 1,393,286, apparatus has been designed to provide continuous takeup for strands wherein aligned spindles, for removably supporting takeup reels, are driven so that a strand may be distributed upon one reel until it is filled and then transferred to the other reel. In machines of this type, means have been provided adjacent the inner heads of each reel to grip and hold the ends of the portion of the strand traversing the area between the reels, prior to this portion being severed, thereby holding the trailing end of the strand of the filled reel and the leading end of the strand as it starts winding upon the empty reel.

In recent years, high speed plastic extruders have been developed requiring continuous takeup apparatus but it has been found that the speed of this supply, that is, the travel of the plastic covered strands from the high speed plastic extruders require more rapid action of the take-up means than is possible with present or former structures as shown in the Hosford patent. In these structures it would be possible to increase the speed of their take-up reels to receive strands from high speed supplies but with both takeup reels mounted on opposite ends of a continuously driven spindle, without clutches and brakes to disconnect and stop high speed reels and depending solely upon the operator to grab a retaining cap of a connecting means and actuate a handle therein to disconnect the shaft and reel while rotating at the high speed, it is obvious that such structures do not provide the solution to the problem of providing efficient continuous takeups for the present high speed extruders.

It is recognized that storage delay devices for strands between constant speed capstans associated with extruders and the driving means for a takeup reel are provided in the form of dancer rolls and associated rheostats in the circuit of the driving means for the continuous takeup but such storage delay devices are not the answer to the problem of stopping the filled reels controlling the constant high speed strands during the interval in a continuous take-up apparatus when the strand is shifted from a full reel to an empty reel. Furthermore, while the full reel was being filled with the strand from a constant supply, the speed of the takeup reel was decreased as the diameter of the area on which the strand was wound increased. If it were possible to bring about an effective transfer of the strand from a full reel to an empty reel with the empty reel traveling so that the circumferential speed of the hub thereof would be coincident with the linear speed of the strand there would be little need for the use of a storage delay device but it would not be considered possible to effectively bring about the transfer of the strand, sever the portion between the reels and assure connection of the trailing end adjacent the filled reel and the leading end adjacent the empty reel. It has been found advantageous, however, to start rotation of the empty reel prior

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to the transfer interval to make possible the solution to the problem of taking up a strand continuously from a high speed extruder.

The object of the present invention is a continuous strand reeling apparatus automatic in its action for efficiently taking up a strand continuously from a high speed extruder.

Broadly, the invention embodied in the continuous strand reeling apparatus with its axially aligned spindles for two takeup reels served successively by a distributor arm for the strand, is under the control of a power means and a counter whereby the drive means for one reel spindle may be started or operated prior to the filling of the other reel.

More specifically, the drive means for each reel spindle includes an electrically controlled clutch and an electrically controlled brake subject to electrical circuits, some of which are controlled by a foot counter so that the driving means for either reel, when empty, may be energized to start the empty reel prior to the other reel becoming filled so that both reels will be driven at the same speed to facilitate rapid transfer of the strand from one reel to the other and to minimize the differences between the speed of the empty reel when first receiving the strand and the speed required thereof to take up the strand.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings, wherein:

Fig. 1 is a top plan view of the apparatus;

Fig. 2 is a vertical sectional view taken substantially along the line 2—2 of Fig. 1 illustrating the distributing mechanism;

Fig. 3 is an enlarged fragmentary side elevational view taken substantially along the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary vertical sectional view taken along the line 4—4 of Fig. 3;

Fig. 5 is an enlarged sectional view of one of the reel holding chucks, and

Fig. 6 is a schematic wiring diagram of the control means for the apparatus.

Referring now to Fig. 1 of the drawings, the apparatus includes a main frame 10 housing and supporting the drive means, indicated generally at 11, and the distributing means indicated generally at 12. The drive means 11 is provided with a power means including a motor 14. A shaft 15 driven by the motor extends through the drive means 11 and has a pulley 16 mounted thereon and connected by a belt 17 to a pulley 18 of a gear reduction unit 19. An output shaft 20 of the unit 19 begins the drive for the distributor mechanism 12.

With reference to Figs. 1, 3 and 4, an extension 22 of the main frame 10 and a vertical bracket 23 mounted thereon serve to support bearings 25 for axially aligned spindles 26, only one of which is shown. The spindles 26 have shoulders 27 cooperating with retaining means 28 (Fig. 4) for securing hollow shafts 29 on their respective spindles 26. The shafts 29 have elements 30 and sprocket wheels 31 fixed thereto as illustrated in Fig. 4. Pins 32 mounted singly on the spindles 29 are adapted to enter the conventional aperture 33 in a head of a reel 34 to cause positive connection between the reel and the shaft 29. A unit 36 of the type shown in Fig. 5, is a conventional chuck, under the action of its spring 37, to hold a conical member 38 locked on the shaft 29 in close engagement with the adjacent hub of the reel. Movement to the right of a handle 40 to compress the spring 37 and move the ball members 41 longitudinally of the inclined surface 42 will free the unit 36 from the shaft 29 to permit removal of a full reel and the mounting of an empty reel on either shaft 29.

The individual sprockets 31 for the spindles 26 have

chains 45 (Figs. 3 and 4) connecting the sprockets 31 to sprockets 46 mounted on individual stub shafts 47 only one of which is shown. The individual stub shafts 47 have sprocket wheels (not shown) fixedly mounted thereon for connection through chains 48 to sprockets (not shown) mounted on intermediate members 50. The intermediate members are disposed between their respective clutch members and brake members. Hereinafter, with reference to Fig. 1, the reels, clutches, brakes and any of their associated means will be identified according to their positions at the left or at the right of the center of this mechanism. For example, the left reel 34 will be under the control of a left clutch indicated generally at 51 having a portion 52 fixed to the shaft 15 and a portion 53 fixed to its respective intermediate member 50. In a similar manner the right reel 34 is under the control of a right clutch indicated generally at 54 having a member 55 fixed to the shaft 15 and a member 56 fixed to its respective intermediate member 50. Also the left and right reels and their left and right clutches 51 and 54 are under the control of their respective left and right brakes indicated generally at 57 and 58 including members 59 and 60 respectively secured to a stationary member 61 of the frame 10 and members 62 and 63 connected respectively to their intermediate members 50.

The distributing mechanism shown in Figs. 1 and 2 includes a heart-shaped cam 65 mounted on the output shaft 20 of the speed reduction unit 19 and positioned to engage rollers 66 and 67 of a reciprocating bar 68. The bar 68 has parallel longitudinal grooves 69 in the ends thereof for interengagement with rollers 70 which support the bar in its longitudinal movement. A spring 71, having one end connected to the frame 10 and the other end connected to the bar 68, normally urges the bar to the right (Fig. 2). A rocking lever 73 is pivotally supported at 74 on a block 75, carried by an adjusting screw 76 in a supporting unit 77 mounted in the frame 10, to adjust the stroke imparted to a distributor 78 by the driving means. The lower end of the rocking lever 73 has an elongate opening 80 therein for interengagement with a pin 81 fixed to the bar 68. An elongate aperture 82 in the upper end of the rocking lever 73 receives a pin 83 carried by a slide 84. The slide 84 is in the form of a carriage having spaced end portions 85 apertured for sliding movement on spaced parallel rods 86. Connecting member 87 of the slide or carriage 84 is supported by the end members 88 and adapted to support an air cylinder 90.

Another slide carriage 91, apertured for movement longitudinally on the spaced parallel bars 86, supports the distributor arm 78 and has vertical members 93 and 94 for an adjusting screw 95 which is threaded, connected with the distributor arm for adjusting the arm laterally of the reels 34. A piston 97 disposed in the cylinder 90 has its rod 98 connected to the member 94 of the slide 91, thus completing the rapid transversing means for the slide 91 and the distributor arm 78 to shift the distributor arm and the strand from one reel to another.

In the present embodiment of the invention, the strand indicated at 100 is produced by drawing a conductor rapidly through a high speed plastic extruder and directing the strand about a grooved wheel 101 of a counter unit 102 which may be known as a footage counter. The strand, upon leaving the counter reel 101, travels between fingers 103 of the distributor 78 to the reel 34 upon which it is to be wound. Initially the leading end of the strand may be connected to any one of the strand receiving grooves 105 of the element 30, for the reel upon which the strand is to be wound, while subsequently the strand receiving grooves 105 function to grip and firmly hold the ends of a portion of the strand, as shown in Fig. 1, being moved from the filled reel to the empty reel so that when this portion is severed, both ends of the strand will be fixed to their respective reels.

Before considering the function of the circuits as shown

in Fig. 6, a general understanding of the function of the apparatus is thought advisable. The apparatus, and the controlling means therefor, are arranged to start with the left reel (Fig. 1). Let it be assumed, therefore, that the leading end of the strand is connected to the left reel or its member 30 and suitable means is operated to start the extruder and the continuous reeling apparatus. The conventional means is employed for controlling the speed of rotation of the left reel after it has been started through operation of means to connect clutch 51 and disconnect brake 57. The apparatus continues in its operation with the clutch 51 connecting the driving means to the left reel and the distributor with the carriage 91 shown in the solid line position (Fig. 2) distributing the strand to the left reel. When the counter 102 registers 19,000 feet of wire having been distributed on the left reel, certain means is actuated to release brake 58 and operate clutch 54 to connect the driving means to the right reel to drive it at a speed equal that of the left reel. When 20,000 feet of strand has been recorded on the counter 102, other means are operated when the distributor 78 is adjacent the center of the area of the left reel to move it rapidly across elements 30 where a portion will have its ends wedged in notches 105 of each element to firmly hold it until it is severed in the conventional manner, leaving the trailing end of the wire on the filled reel connected to its element 30 and the new leading end of the wire extending from the counter connected to the member 30 of the right reel to start winding of the strand on the right reel. The same action takes place regarding the left reel at the time of transferring the strand from the right to the left reel.

The right reel is driven at the same speed the left reel is driven during the transfer of the strand but, after this takes place, the speed of the right reel is increased and the driving means for the left reel is de-energized allowing the filled reel to stop, be removed from the apparatus and an empty reel put in its place before the 19,000 feet have been wound on the right reel. This action continues automatically, requiring only the removal of the full reel in each instance and mounting of an empty reel.

This automatic action is under the control of the circuits shown in Fig. 6 which illustrates the left clutch 51, the left brake 57, the right clutch 54, the right brake 58 and three other units including quick traverse valves 106 and 107 together with a resetting cylinder solenoid valve 108 for the counter 102. The schematic wiring diagram illustrates a 115 volt supply 110 and a 460 volt supply 111. A main switch 112 may be in the main machine control circuit for the supply 110 which includes lines 114 and 115. When switch 112 is closed, relay 116 is energized through a normally closed contact 117 of a relay 118 and also a normally closed contact 119 of a relay 120. Relay 118 is energized through a top closed contact 122 of relay 123 opening normally closed contact 117 and closing contacts 124 and 125. Contact 124 acts as a main switch in line 126 of the 460 volt supply 111, the other line being identified as 127. In this manner, circuits may be completed through primary windings 128 and 129 of transformers 130 and 131. Closing of contact 125 of relay 118 energizes relay 133 to close its top contact 134 and open its bottom contact 135. Opening of the normally closed contact 135 opens the circuit from a secondary winding 132 of the transformer 130 to the left brake 57, the circuit including also a bottom normally closed contact 136 of relay 116. Top contact 137 in a circuit with the right brake is also opened. Closing of the normally open contact 134 of relay 133 completes a circuit through the left clutch 51 and, as the left brake 57 has been released, the power means for the left spindle and reel have been completed. The power means, namely the motor 14, may be presumed to be driven continuously and at the present time, with the left brake 57 released and the left clutch 51 engaged, the left reel will be driven to wind the strand 100 thereon.

The left reel continues to take up the strand and the counter unit 102 registers the length of strand wound upon the left reel. When 19,000 feet of strand have passed through the counter, a microswitch 140 is closed completing a circuit from line 114 at connection 141, through switch 140, relay 142 to line 115 at connection 143. Energization of relay 142 will close its contacts 144, 145, 146 and 147. Contact 147 when closed, completes a locking circuit for its relay 142. Contact 146 when closed, completes a circuit for relay 123 from line 114 at connection 148 to line 115 at connection 149. Contact 145 when closed, will complete a circuit from line 114 at connection 150, through connection 151, contact 145, relay 118 to line 115 at connection 152. Relay 118, initially energized by closing of switch 112 and including normally closed contact 122 of relay 123, remains energized by energization of relay 123 and opening of contact 122. Closing of contact 144 completes a circuit from line 114 at connection 153, through connection 154, contact 144, connection 155, relay 120 to connection 156 and line 115. When relay 120 is energized, its normally closed contact 119 is opened and its contacts 163 and 164 are closed. An auxiliary circuit is closed to the 460 volt supply in line 126 with closing of contact 163 while contact 164, when closed, completes a circuit through relay 167, including a secondary winding 168 of the transformer 131. Energization of the relay 167 will open its normally closed contact 169 to open a circuit to the right brake 58 through normally closed contact 137 of relay 116, while closing a normally open contact 170 to complete a circuit through the right clutch 54 to operatively connect the power means or shaft 15 through the clutch 58 to the driving means for the right reel and spindle.

Relay 123 when energized will open contact 172 with contact 122 and close contacts 173 and 174. Contacts 122 and 173 are in circuits to relays 118 and 120 respectively and at present have no effect thereon as both relays are being held energized by contacts 145 and 144 respectively of energized relay 142. Contacts 172 and 174 respectively, open a circuit to the left quick traverse valve 106 and close a circuit to the right quick traverse valve 107. These circuits include a secondary winding 175 of a transformer 176. These circuits are of no effect at this time but are made ready for quick action of the distributor when 20,000 feet of strand have passed through the counter unit.

When 20,000 feet of strand have passed through the counter microswitch 177 of the counter unit 102 is closed completing a circuit through relay 178. This circuit may be traced from line 114 at connection 141, through closed contact 147, switch 177, relay 178 to line 115 at connection 179. This circuit may be closed at other intervals, if desired, by closing hand switch 180. Energization of relay 178 closes contacts 181 and 182. Contact 181 when closed completes a holding circuit for its relay between connections 183 and 184. Contact 182, when closed, conditions a circuit for a relay 185 which may be traced from line 114 at connection 186, through a microswitch 187 when closed, contact 182, relay 185 to line 115 at connection 188. Microswitch 187 is under the control of the distributor, for example, the cam 65 thereof as shown also in Fig. 2, so that the microswitch will be closed when the distributor is adjacent the center of its stroke. This assures rapid shifting of the strand with the distributor arm from the center of the distributing area of the filled reel to the center of the distributing area of the empty reel. When relay 185 is energized its normally open contacts 190 and 191 are closed. Contact 190 completes a holding circuit with closed contact 182 of relay 178 for relay 185. Contact 191 when closed, completes circuits for counter reset cylinder solenoid valve 108 and a primary winding 193 of transformer 176. At this time, the counter unit is reset and the circuit through the right quick traverse valve 107, conditioned

previously by closing of contact 174 of relay 123, causes rapid shifting of the distributor.

The control now is for the right spindle and the right reel which is taking up the strand or wire, it being under the control of the counter unit 102, including the microswitches 140 and 177 thereof, and also under the control of the distributor unit including the cam operated switch 187. In this manner, the controlling means for the apparatus is completely automatic starting initially with the left spindle and reel mounted thereon but continuing automatically, starting rotation of each empty reel and bringing its speed up to the other reel prior to the filling of the other reel and not only shifting the distributing mechanism when a measured amount of wire or strand has been wound upon one reel but causing the transfer of the strand from one reel to another when the distributor arm is adjacent the center of its distributing area. Furthermore, the action of the distributor continues undisturbed regardless of the area in which it is disposed, that is, for the right or left reel and the quick acting mechanism embodied in the valves for operating the piston function under the control of the distributing means assuring transfer of the distributing mechanism when the arm is adjacent the center of its stroke.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, means actuable to operate one of the clutches to cause driving of the first spindle and reel, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, and means under the control of the counter unit to operate the clutch for the drive means of the second spindle prior to the reel of the first spindle receiving a maximum measured amount of the strand.

2. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, means actuable to operate one of the clutches to cause driving of the first spindle and reel, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, means under the control of the counter unit to operate the clutch for the drive means of the second spindle prior to the reel of the first spindle receiving a maximum measured amount of the strand, and means responsive to the counter unit when the reel on the first spindle has received the maximum measured amount of the strand to cause the clutch for the first spindle to disconnect its spindle and reel from the drive means therefor.

3. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to

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the power means, means actuable to operate one of the clutches to cause driving of the first spindle and reel, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, a distributor having spaced carriages with a strand guide supported by one of the carriages, means operable to alternately vary the spacing between the carriages to cause the guide to distribute the strand back and forth on each reel, and means under the control of the counter unit to operate the clutch for the drive means of the second spindle prior to the reel of the first spindle receiving a maximum measured amount of the strand.

4. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, means actuable to operate one of the clutches to cause driving of the first spindle and reel, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, a distributor having spaced carriages with a strand guide supported by one of the carriages, means operable to reciprocate the carriages to cause the guide to distribute the strand in the area of the reel of the first spindle, means under the control of the counter unit to operate the clutch for the drive means of the second spindle prior to the reel of the first spindle receiving a maximum measured amount of the strand, and means under the control of the counter unit rendered effective when a maximum measured amount of the strand is received by the reel of the first spindle to disengage its clutch.

5. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, means actuable to operate one of the clutches to cause driving of the first spindle and reel, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, a distributor having spaced carriages with a strand guide supported by one of the carriages, means operable to reciprocate the carriages to cause the guide to distribute the strand in the area of the reel of the first spindle, means under the control of the counter unit to operate the clutch for the drive means of the second spindle prior to the reel of the first spindle receiving a maximum measured amount of the strand, means under the control of the counter unit rendered effective when a maximum measured amount of the strand is received by the reel of the first spindle to disengage its clutch, and means under the control of the counter unit to cause relative movement of the carriages to shift the strand guide to the area of the reel of the second spindle.

6. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, means actuable to operate one of the clutches to cause driving of the first spindle and reel, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, a distributor having spaced carriages with a strand guide supported by one of the carriages, means operable to reciprocate

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the carriages to cause the guide to distribute the strand in the area of the reel of the first spindle, means under the control of the counter unit to operate the clutch for the drive means of the second spindle prior to the reel of the first spindle receiving a maximum measured amount of the strand, means under the control of the counter unit rendered effective when a maximum measured amount of the strand is received by the reel of the first spindle to disengage its clutch, means under the control of the counter unit to cause relative movement of the carriages to shift the strand guide to the area of the reel of the second spindle, and means adapted to hold said last named means ineffective until the strand guide is adjacent the center of the area of the reel of the first spindle whereby the strand guide will shift to a position adjacent the center of the area of the reel of the second spindle.

7. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, and means under the control of the counter unit to cause alternate operations of the clutches with overlapping operating intervals to cause driving of an empty reel on one spindle prior to a reel on the other spindle receiving its maximum amount of strand.

8. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, means under the control of the counter unit to cause alternate operations of the clutches with overlapping operating intervals to cause driving of an empty reel on one spindle prior to a reel on the other spindle receiving its maximum amount of strand, and means under the control of the counter unit to disengage the clutch of each spindle when its reel receives its maximum amount of strand.

9. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, a strand guide actuable to distribute the strand in the area of the reels on the spindles and supported to be shifted from one area to the other, means under the control of the counter unit to cause alternate operations of the clutches with overlapping operating intervals to cause driving of an empty reel on one spindle prior to a reel on the other spindle receiving its maximum amount of strand, and means under the control of the counter unit to shift the strand guide to the area of an empty reel on one of the spindles when the reel on the other spindle has received its maximum amount of strand.

10. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an element for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when

transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, a strand guide actuable to distribute the strand in the area of the reels on the spindles and supported to be shifted from one area to the other, means under the control of the counter unit to cause alternate operations of the clutches with overlapping operating intervals to cause driving of an empty reel on one spindle prior to a reel on the other spindle receiving its maximum amount of strand, means under the control of the counter unit to shift the strand guide to the area of an empty reel on one of the spindles when the reel on the other spindle has received its maximum amount of strand, and means under the control of the strand guide to render said last named means effective only when the strand guide is adjacent the center of its distributing stroke.

11. The combination with a continuous strand reeling apparatus having aligned first and second spindles for removably supporting takeup reels for a strand and an ele-

ment for each spindle with peripheral strand gripping members to jointly hold a portion of the strand when transferred from one reel to the other, of a power means, drive means for each spindle, clutches therefor operable to connect their respective drive means and spindles to the power means, a counter unit driven by the strand to register the length of strand fed to the reel of the first spindle, means under the control of the counter unit to cause alternate operations of the clutches with overlapping operating intervals to cause driving of an empty reel on one spindle prior to a reel on the other spindle receiving its maximum amount of strand, and means actuable to reset the counter when the strand guide is shifted from one reel area to the other.

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