May 24, 1949. E. BERTALAN ET AL 2,471,299

CABLE FORMING MACHINE

Original Filed March 31, 1942 3 Sheets-Sheet 1

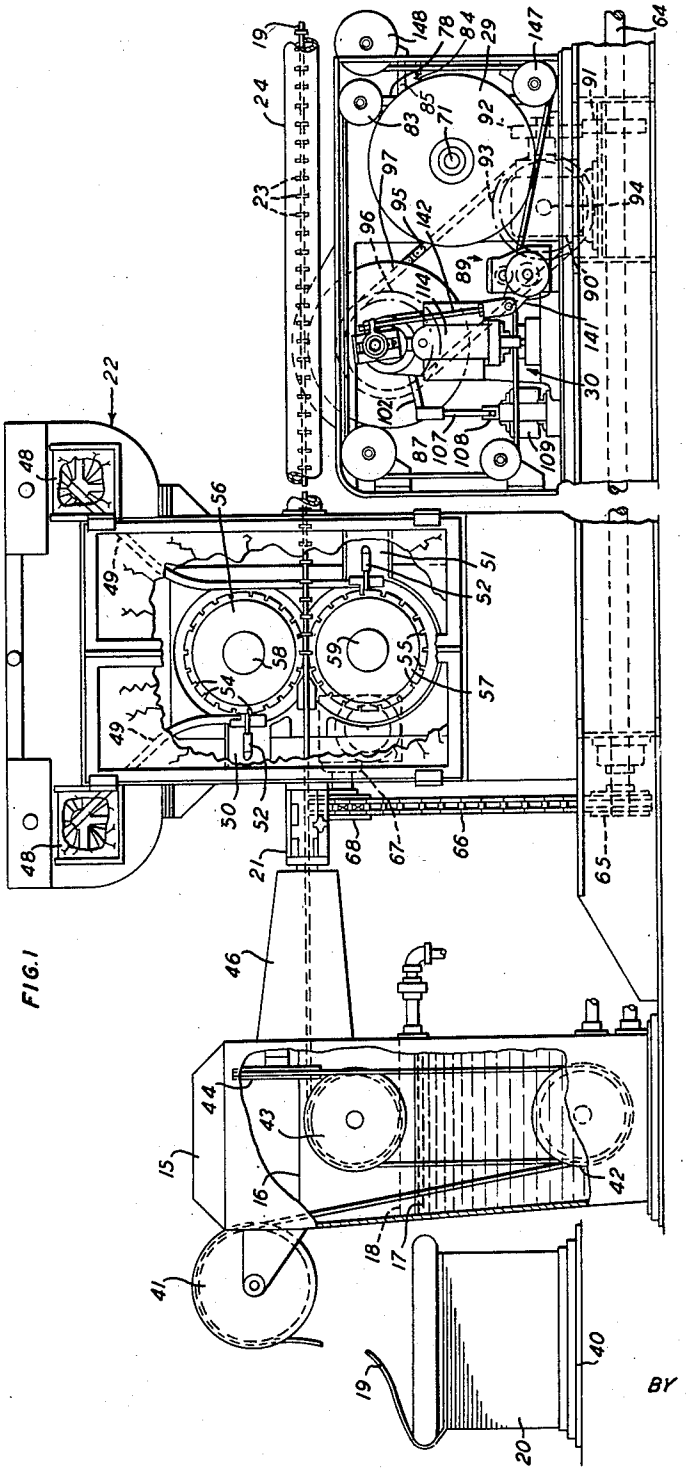


FIG. 1

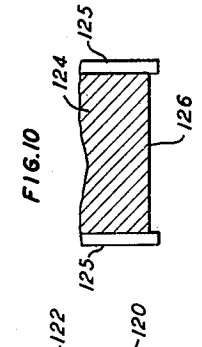


FIG. 10

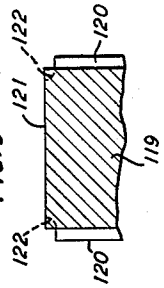


FIG. 9

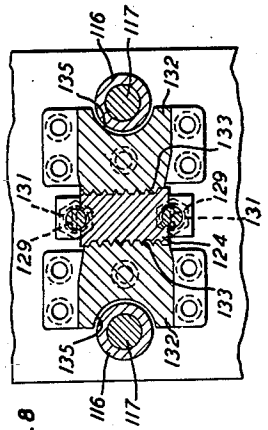


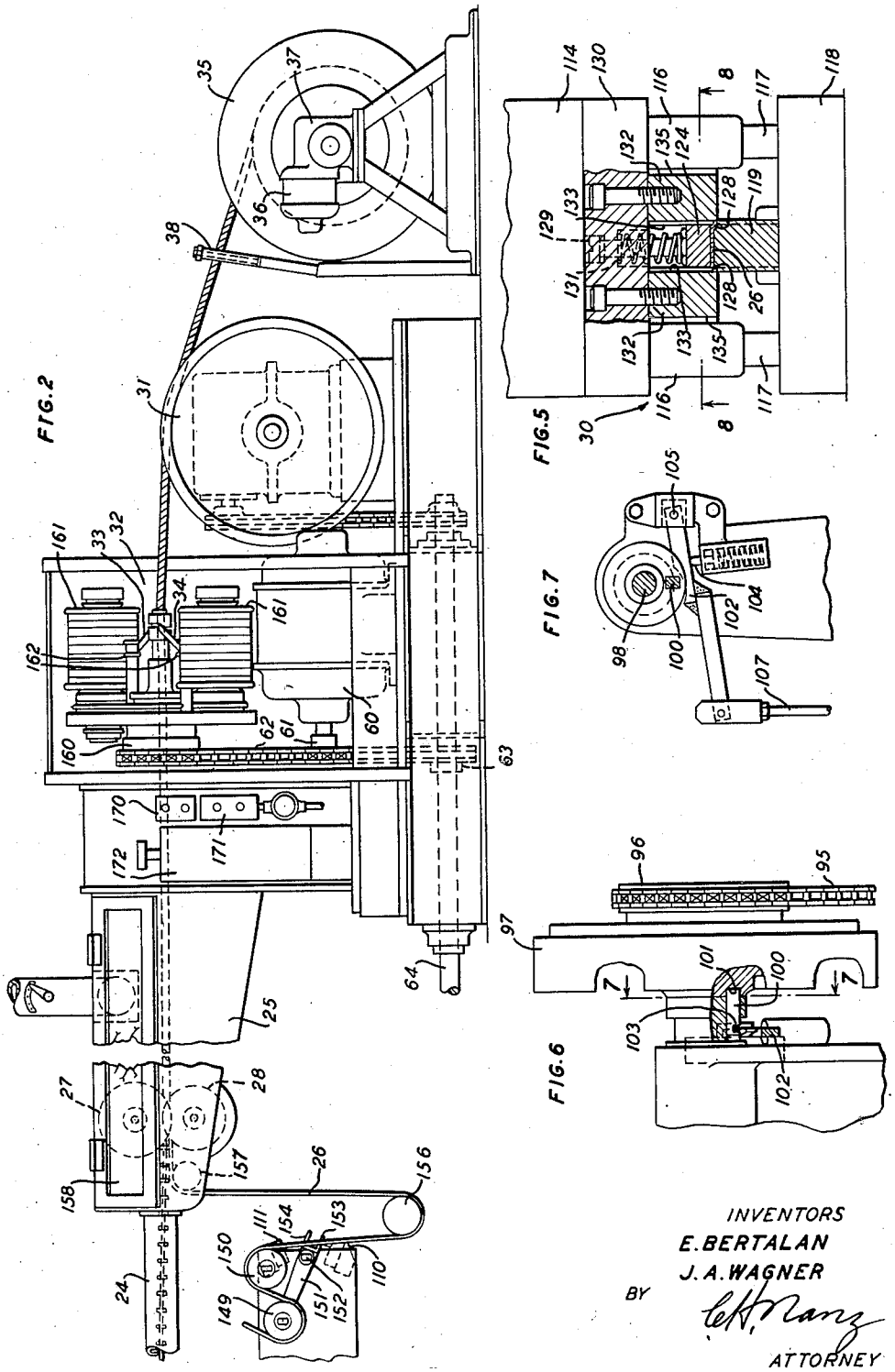
FIG. 8

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FIG. 3

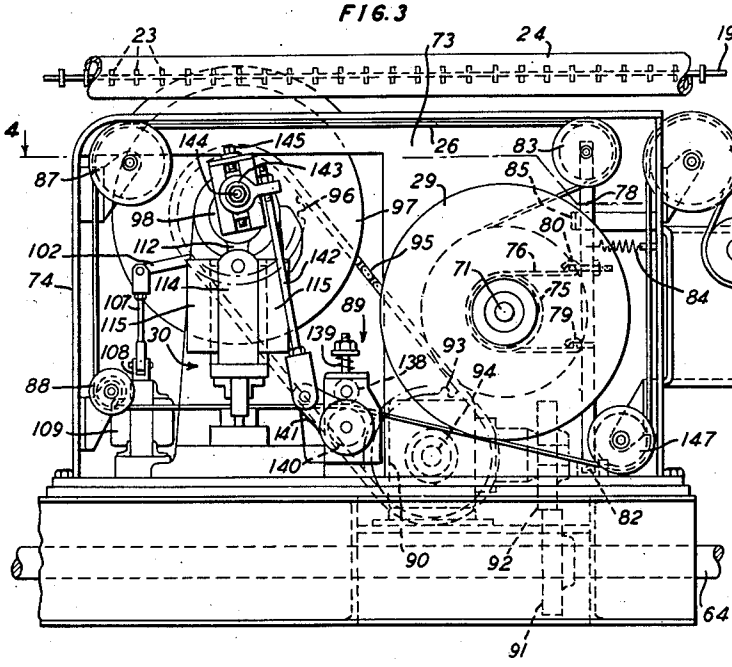


FIG. 11

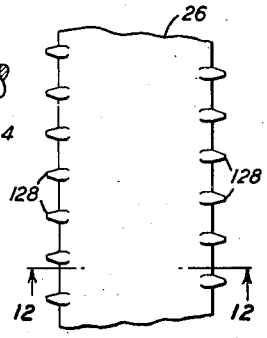


FIG. 4

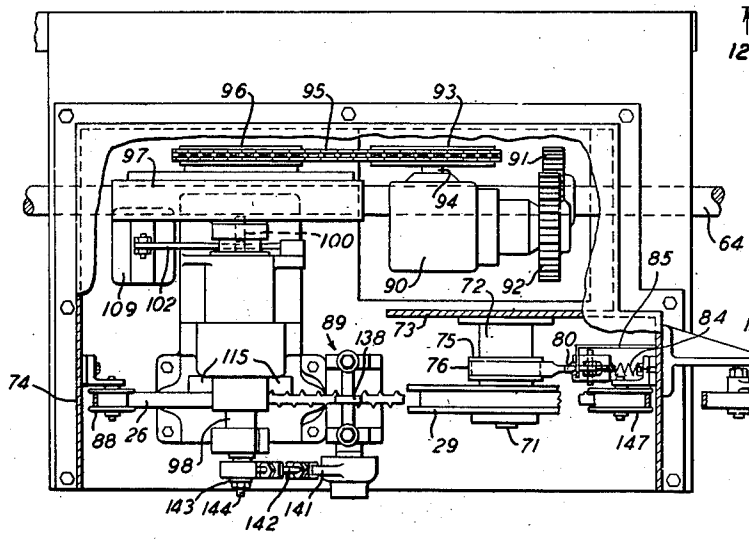


FIG. 12

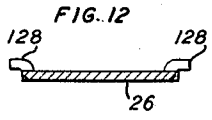
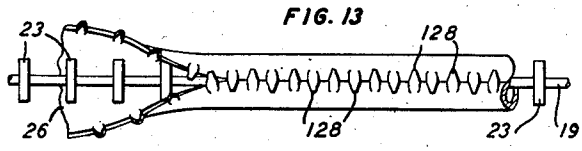


FIG. 13



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UNITED STATES PATENT OFFICE

2,471,299

CABLE FORMING MACHINE

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Original application March 31, 1942, Serial No. 436,988. Divided and this application March 21, 1945, Serial No. 583,918

5 Claims. (Cl. 113—33)

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This invention relates to cable forming machines, and more particularly to machines for forming coaxial cables.

This application is a division of copending application Serial No. 436,988, filed March 31, 1942 for "Cable forming machines," and now abandoned.

A coaxial cable in general includes an inner conductor which is supported coaxially in a hollow outer conductor by dielectric washers. The high degree of efficiency of such cables depends greatly upon the freeing of the parts of foreign particles and the accuracy in which the parts are assembled to eliminate dielectric and other losses and to seal the parts in assembly.

An object of the invention is to provide a machine which is highly efficient in preparing material for a coaxial cable, forming the cable of the materials, and maintaining the materials free of foreign substances during the forming operations.

With this and other objects in view, the invention comprises a cable forming machine including mechanisms operable to form a coaxial cable of a central conductor with spaced dielectric washers and an outer conductor with locking tabs bent around the washer bearing conductor during advancement of the latter.

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 side elevational view of approximately one half of the machine;

Fig. 2 is a side elevational view of the remaining portion of the machine;

Fig. 3 is an enlarged detailed view of the tape or outer conductor feeding and forming mechanism;

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

Fig. 5 is a fragmentary detailed view of a portion of the forming mechanism shown in Figs. 3 and 4, portions thereof being shown in section;

Fig. 6 is a fragmentary detailed view of the fly wheel and clutch for the forming mechanism;

Fig. 7 is a fragmentary sectional view taken along the line 7—7 of Fig. 6;

Fig. 8 is a horizontal sectional view of the forming mechanism, this view being taken along the line 8—8 of Fig. 5;

Fig. 9 is a fragmentary vertical sectional view of the lower forming die;

Fig. 10 is a fragmentary sectional view of the upper forming die;

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Fig. 11 is a fragmentary top plan view of the tape after it has passed through the forming mechanism;

Fig. 12 is a sectional view of the tape, this view being taken along the line 12—12 of Fig. 11, and

Fig. 13 is a top plan view of the cable structure as it appears adjacent the forming rolls which form the tape about the washer bearing conductor.

Referring now to the drawings, attention is first directed to Figs. 1 and 2. In general the machine consists of a cleaning unit 15 containing two compartments, separated by a partition 16, for a cleaning fluid 17 and a rinsing fluid 18. A central conductor 19 is fed from a supply 20 through the fluids 17 and 18, after which the wire passes through a wiping unit 21, where the excess material is wiped free of the conductor. The conductor then passes through a washer assembling unit, indicated generally at 22, where dielectric washers 23 are mounted upon the conductor at definite spaced positions. From this unit the washer bearing conductor passes through a tube 24 which, if desired, may be made transparent so that the operator may observe the spacing of the washers during the travel of the conductors with the washers therethrough. Within this tube or associated therewith, may be other means (not shown) for testing the accuracy in the placing of washers on the conductor. When the washer bearing conductor leaves the tube 24, it enters a chamber 25 which is sealed and conditioned to remove any possible existing moisture present on the materials forming the cable. Adjacent the entrance end of the chamber 25, a tape 26, which is to form the outer conductor, is fed through forming rolls 27 and 28 to bend the tape longitudinally about the washer bearing conductor. However, prior to the time the tape reaches the forming rolls, the tape, which is originally received from a supply reel 29, passes through a forming unit or punch indicated generally at 30, where tabs are formed at the sides of the tape. The cable adjacent the forming rolls 27 and 28 is of the structure illustrated in Fig. 3, including the central conductor with the spaced dielectric washers thereon and the formed outer conductor. This structure is advanced at a constant speed, by a driven capstan 31 (Fig. 2), through a serving head indicated generally at 32, where spiral windings of metallic tapes 33 and 34 are wound on the outer conductor. This completes the cable as formed by this machine, it being finally wound on a take-up reel 35, which is driven by a motor 36 and a suitable speed reduction mechanism 37,

assisted by a suitable distributing element 38. With this general description of the machine, the more specific detailed structure may be more clearly understood.

Starting again at the left of the machine, that is the left of Fig. 1, the supply 20 may be in the form of a supply reel, filled with the conductor material, mounted upon a suitable insulating base 40. The conductor 19, upon leaving the supply 20, passes over a sheave 41 and enters one side of the cleaning unit 15, where it passes around one portion of a lower sheave 42. The conductor then passes around an upper sheave 43, downwardly again around the lower sheave 42, and upwardly around a sheave 44, the axis of the latter being disposed at right angles to the axes of the sheaves 42 and 43. During the travel of the conductor thus far, it has passed repeatedly through the cleaning fluid 17 to remove any substances present on the conductor, which substances are generally wire drawing compounds. The conductor 19 upon passing around the sheave 44, leaves the cleaning compartment, wherein the cleaning fluid 17 is disposed, and enters the rinsing compartment on the other side of the partition 16, where the rinsing fluid 18 is disposed. The conductor then passes downwardly into the rinsing fluid about a sheave (not shown) similar to the sheave 42 and mounted upon the same axis, and passes upwardly about a sheave (not shown) similar to the sheave 43 and mounted on the same axis, after which the conductor passes through a hollow portion 46 to the wiping unit 21. In the wiping unit there may be disposed suitable wiping dies (not shown) to effectively remove any fluid or other substances remaining on the conductor. The fluid which is removed by the wiping dies, may return to the rinsing compartment. The conductor then enters the washer assembling unit 22.

The washer assembling unit 22 includes two hoppers 48 in which supplies of the washers 23 may be disposed. The hoppers include suitable agitating or other mechanisms necessary for the feeding of the washers to chutes 49. The washers may be of the split type illustrated in the Patent 2,092,487 to W. K. Weston issued September 7, 1937, and may be fed through the the chutes which, in turn, may be equipped with suitable means to assure accurate positioning of the washers, or the slits therein, with respect to ejecting units 50 and 51 at the exit ends of the chutes. The ejecting units 50 and 51 may be identical in structure and include reciprocable elements 52 actuable through suitable means (not shown) to eject their respective washers into alternate notches 54 and 55 of assembling wheels 56 and 57, respectively. The wheels 56 and 57 are mounted for rotation on their respective shafts 58 and 59 and are driven in synchronism so that their notches will register one with the other as they arrive at an assembling position tangent with the conductor 19. The mounting of the washers in alternate notches of the wheels results in the wheels alternately presenting a washer at the assembling position, the wheel presenting the washer being assisted by the other wheel, whose notch at this position is vacant, to assure accurate mounting of the washer on the conductor.

Attention is now directed to the driving means for the wheels 56 and 57 as well as the means for actuating the ejecting units 50 and 51, for causing reciprocation of their elements 52. Thus attention is directed to Fig. 2, where a motor 60

constitutes the main power means, this motor driving a sprocket 61 which in turn drives a chain 62. A sprocket 63, mounted upon a main shaft 64, is driven by the chain 62. By aligning Figs. 1 and 2, the main shaft 64 may be found in Fig. 1, which extends through suitable bearings and has a sprocket 65 mounted upon the end thereof. A chain 66 operatively connects the main shaft 64, through its sprocket 65, to a driving mechanism 67, through a sprocket 68. A complete detailed showing of the mechanism 67 is not believed necessary to clearly illustrate the invention, it being understood that through this mechanism the shafts 58 and 59 for the wheels 56 and 57 are rotated and in synchronism therewith the ejecting elements 52 of the units 50 and 51 are actuated to feed washers from their respective chutes to alternate notches of the wheels. Therefore, with this mechanism, the dielectric washers 23 are mounted at accurately spaced positions on the conductor during the constant advancement of the conductor, through the driving means of the capstan 31.

Attention is now directed to the tape feeding and forming mechanism shown more in detail in Figs. 3 to 10, inclusive. The tape 26 may be of any suitable conductive material, such as copper, bronze or the like. The supply of tape material is wound on the supply reel 29, which is fixedly mounted on a shaft 71 suitably supported by a bearing bracket 72, the latter being mounted upon a wall 73 of a housing 74 for the tape feeding and forming mechanism. A brake drum 75 is also fixedly mounted upon the shaft 71 to rotate therewith during the rotation of the supply reel resulting from the removal of the tape therefrom. A brake band 76 extends around the brake drum 75 and has its ends secured to a brake lever 78 by suitable means, as indicated at 79 and 80, the latter being of an adjustable type to vary the braking force of the brake band on the brake drum. The lever 78 is pivotally supported, at 82, adjacent its lower end, its upper end supporting a sheave 83. A spring 84 functions to normally urge the lever 78 clockwise (Fig. 3), to cause application of maximum braking force to the brake drum through the brake band. A stop 85 is rigidly mounted and adapted to limit the counterclockwise movement of the lever 78 should the tape passing around the sheave 83 become taut.

The tape 26 upon leaving the sheave 83, passes to the left (Fig. 3) and about a sheave 87, from where the tape is directed downwardly to another sheave 88. Upon leaving the sheave 88, the material passes horizontally through the forming unit 30, to a feeding unit indicated generally at 89.

Considering the forming unit 30, attention is first directed to the main shaft 64 which is operatively connected to a speed reducing mechanism 90 through gears 91 and 92, mounted on the main shaft and the inlet end of the speed reducing mechanism respectively. A sprocket 93 is mounted upon the outlet end or shaft 94 of the mechanism 90, this sprocket being operatively connected, through the aid of a chain 95, to a sprocket 96. The sprocket 96 is mounted on a fly wheel 97 which is rotatably mounted on a crank shaft 98 of the forming unit 30. The fly wheel is operatively connected to the crank shaft through a clutch mechanism illustrated in Figs. 3, 6 and 7. This clutch mechanism includes a clutch pin 100 receivable in a recess 101 in the fly wheel, to operatively connect the fly wheel to the crank

shaft through the aid of a lever 102 functioning, through a notch 103 in the pin 100, to urge the pin into the recess 101. A spring pressed plunger 104 provides the necessary pressure to normally urge the lever 102 about its supporting pivot 105, to bring about the actuation of the clutch pin and the connection of the fly wheel with the crank shaft. Automatic means is provided to release the clutch mechanism, this means including a link 107 operatively connecting the lever 102 with a core 108 of a solenoid 109, the latter being under the control of switches 110 and 111 (Fig. 2), whose functions will hereinafter be described.

At the opposite end of the crank shaft 98, a connecting rod 112 operatively connects the crank shaft with a ram 114. The ram 114 is mounted for movement in stationary guides 115 and carries sleeves 116 (Figs. 5 and 8) which are slidably disposed on guide pins 117. The guide pins 117 are supported by a base 118 which, in turn, supports a forming die 119. The die 119 is rectangular in cross section excepting for the contour of the sides, where series of equally spaced fins 120 (Fig. 9) are disposed and extend vertically, terminating short of an upper or tape engaging surface 121 of the die. The upper ends of the fins cooperate with recesses 122 in the upper surface of the die, to complete tab forming portions.

A cooperating die 124 (Fig. 10), is similar in general contour to the die 119, excepting that integral fins 125, which are spaced along the sides thereof in alignment with their respective fins 120 and project beyond a tape engaging surface 126 to cooperate with the recesses 122 and the fins 120 in forming the aforementioned tabs 128 (Figs. 11 and 12) from the material of the sides of the tape. Attention is directed to the staggered arrangement of the fins on the opposite sides of the dies to form staggered tabs 128 on the tape.

The die 124 is supported at its ends by bolts 129 (Figs. 5 and 8), the latter being supported by a plate 130 mounted upon the lower end of the ram 114. The bolts 129 do not mount the die 124 rigidly on the plate 130 but support the die for movement to the plate under the control of springs 131. Guide blocks 132 are supported by the plate 130 upon each side of the die and have inner faces 133 of contours conforming to the contours of their adjacent sides of the die 124, such contours being illustrated in Fig. 8. These blocks 132 are also arcuately recessed, as at 135, at their outer sides, to allow for the sleeves 116.

With this structure, movement of the ram downwardly will move the die 124 into engagement with the tape 26, which is then present on the surface 121 of the die 119, the fins 125 of the upper die engaging spaced portions of the edges of the tape, forcing the material at these portions downwardly under the control of the recesses 122 and the fins 120 to form the tabs 28 as illustrated in Figs. 5, 11 and 12. During this operation the die 124 moves in advance of the blocks 132 until it engages the tape on the lower die, and with further downward movement to compress the springs 131 sufficient force is applied to the upper die to effect forming of the tabs in the edges of the tape. During the closing of the dies 119 and 124, the lower portion of the latter at the fins 125 will engage portions of the edges of the tape, force these portions into their companion recesses 122, and by pressure squeeze these portions into the form of the tabs shown. The material of the tabs may be thinner than the body of the tape but they have sufficient rigidity to serve their purpose. Also, the upper surfaces of the tabs, when formed, are in a plane with the under or lower surface of the tape.

A plurality of such tabs is formed during each cycle of operation of the forming unit. It is thus necessary that predetermined lengths of the tape be fed to the forming unit at intermittent intervals to effect forming of the tabs uniformly at the edges of the tape. The feeding means includes the feeding unit 89 (Figs. 3 and 4), which has an idler roll 138 normally urged downwardly under variable pressure by a spring 139. A driving roll 140 is rotated intermittently a predetermined distance in cooperation with the idler roll 138, to advance the tape, passing between the rolls, a given distance during each cycle of operation of the forming unit 30 to present a desired length of material to the forming unit. The means to cause the rotation of the driving roll includes a suitable ratchet and pawl mechanism (not shown), under the control of a rocking arm 141 connected, through a link 142, to a variable eccentric 143, the latter being mounted for rotation with the crank shaft 98. The center 144 of the eccentric 143 may be moved relative to the center of the crank shaft 98 through the aid of an adjusting screw 145; thus through this adjustment the length of the material fed to the forming unit during each cycle of operation of the latter may be varied. Although the feeding unit 89 pulls the tape through the forming unit and the tape, when it reaches the feeding unit, is provided with the tabs 128, the rolls 138 and 140 may be sufficiently narrow in width or otherwise formed so that they will not disturb the contour of the tabs.

The tape 26 upon leaving the feeding unit 89, passes to the right and around a sheave 147, then upwardly over a sheave 148, down around a weighted roll 149, and eventually over a sheave 150. The sheaves 147, 148 and 150 are rotatably supported by suitable stationary brackets, while the roll 149 is rotatably mounted at one end of an arm 151, which is pivotally supported at 152. The other end of the arm 151 has projections 153 and 154 adapted to actuate the starting switch 110 and the stop switch 111 respectively, depending upon the position of the arm 151. As illustrated in Fig. 3, the roll 149 rides in a loop of the tape 26, which loop may vary in size during the operation of the machine. The forming unit is designed to form the tape, that is, to form the tabs 128 at the sides thereof, at a greater speed than is necessary to supply the tape constantly to the feeding rolls during the advancement of the tape at this point by the capstan 31. Thus the weighted roll 149 oscillates slightly, to aid in translating the intermittent movement of the tape into a constant movement necessary for the further operations on the tape and its advancement through the remaining portion of the machine. Therefore, at intervals, a loop supporting the weighted roll 149 may become sufficiently large to allow counterclockwise movement of the arm 151, to cause the projection 154 to actuate the switch 111 to effect closing an electrical circuit (not shown) including the solenoid 109. Upon energization of the solenoid, the clutch mechanism will be actuated through the movement of the link 107 and lever 102, to render the forming unit inoperative. An electrical locking circuit (not shown) for the solenoid may be closed after the closing of the switch 111 and

until the switch 110 is closed, to maintain the forming and feeding units 30 and 89 inoperative during this interval of time. The forming unit thus remains inoperative until the slack in the tape is taken up sufficiently to move the weighted roll 149 upwardly, to move the arm 151 clockwise with the projection 153 to actuate the starting switch 110. The starting switch 110 may be in an electrical circuit (not shown) including a relay adapted to open a contact of aforementioned locking circuit, to effectively open the circuit to the solenoid and cause deenergization thereof. This results in the operation of the clutch mechanism through the spring pressed plunger 104 (Fig. 7), to again set into operation the forming unit 30 and the feeding unit 89.

After the tape leaves the sheave 150 (Fig. 2) it passes around a sheave 156 and upwardly into the chamber 25, where it passes over a roll 157 and is then fed to the forming rolls 27 and 28. The chamber 25 may be sealed from the atmosphere and may be internally heated and, if desired, connected with a vacuum system to condense and remove all existing moisture which may be present on the materials entering the chamber. A suitable transparent door 158 is provided so that the operator may observe the function of the forming rolls. The forming rolls 27 and 28 are of the grooved type and function to bend or form the tape 26 about the washers 23 on the conductor 19 in a manner illustrated in Fig. 13. During this forming operation the tape is bent circularly about the washers, this circular formation being applied also to the tabs 128, which extend over the abutting edges of the tape and alternately engage their opposing sides of the tape to hold the tape in its circular formation. After the metal tapes 33 and 34 have been wound on the tape 26, it will be apparent that the tabs 128 resting on the opposing sides of the tape 26 will thus hold their respective sides against collapsing. From the illustration shown in Fig. 12, it will be apparent that the tabs are disposed beyond the edges of the tape so that the edges of the tape may abut and lie in close engagement with each other.

After the cable thus formed leaves the chamber 25 (Fig. 2), it passes through the serving head 32. The serving head is rotatably mounted in a suitable manner (not shown) and is driven by the chain 62 travelling over a suitable sprocket 160. A desired number of supply reels 161 is rotatably supported by the serving head to supply materials, such as the metallic tapes 33 and 34, which are fed to the cable structure thus far completed, through suitable guides 162. The cable structure entering the serving head passes axially thereof and at the exit end of the serving head the metallic tapes 33 and 34 are wound spirally around the structure during the rotation of the serving head. Therefore, at this point in the formation of the cable, the cable includes the central conductor 19, the dielectric washers, the formed tape 26 with its locking tabs 128, and the spiral windings of the metallic tapes 33 and 34. The cable then passes spirally about the capstan 31, in the groove thereof, and is then advanced to the take-up reel 35, upon which it is distributed through the distributing element 38.

In reviewing the operation of the apparatus, the central conductor 19 (Fig. 1) is fed from the supply spool over the sheave 41 and for several trips through the cleaning fluid 17 in the cleaning unit 15 where the conductor is cleaned.

From the cleaning fluid the conductor passes around the sheave 44 and into the rinsing fluid 18 where any cleaning fluid remaining on the conductor is removed, after which the conductor passes through the wiping dies in the unit 21 and is ready to receive the washers in the unit 22. Here the dielectric washers 23, which have previously passed from the hoppers 48 through the chutes 49 to their respective ejecting units 50 and 51, have been disposed in the alternate recesses of their respective wheels 56 and 57, and are thus transported to the feeding point where the washers from the wheels are alternately mounted on the conductor, the wheels alternately assisting each other in this operation. The washer bearing conductor then continues in its travel under a constant speed resulting from the rotation of the capstan 31 (Fig. 2), during which time the forming unit 30 (Fig. 1) and the feeding unit 89 function to intermittently advance and form the tape, that is, form the equally spaced staggered tabs 128 at the edges of the tape.

The advancement of the tape intermittently remains under the control of the weighted roll 149 (Fig. 2) and its actuation of the starting switch 110 or the stop switch 111, depending upon the size of the loop or the supply of the formed tape with respect to the advancement of the conductor. This mechanism controls the tape feeding and forming units 89 and 30 so that the formed tape will be sufficient for the constant supply thereof to the forming rolls 27 and 28, where the tape is formed about the washer bearing conductor in the conditioning chamber 25. The cable thus formed is advanced through the serving head 32, where it receives the outer spiral wrappings of the metallic tapes 33 and 34, completing the formation of the coaxial cable which is then advanced, through the aid of the capstan 31, and distributed upon the take-up reel 35. Suitable switches 170 and 171, disposed in electrical circuits including the motors 60 and 36, and other means, such as a speed control unit or a rheostat 172, may be employed to control the starting, stopping and speed of the machine.

It will be apparent by reviewing the drawings, particularly Figs. 1 and 2, that the materials forming the cable are conditioned prior to their being assembled with each other, to remove foreign particles, the cable parts remaining enclosed throughout the forming operation to eliminate the presence of disturbing substances in the cable.

Although specific embodiments of the invention have been shown and described it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claims.

What is claimed is:

1. In a cable unit forming machine having a tube-forming means for forming a tape having tabs thereon into a tube over washers applied to a central conductor to form a coaxial cable unit and means for advancing a cable unit thus formed at a predetermined rate of speed, the combination of a reciprocable press for forming tabs on the tape, means for actuating the press, means for driving the actuating means, a clutch serving to connect and disconnect the actuating means to and from the driving means, means driven by the actuating means for intermittently advancing the tape through the press in synchronization with the press at an average rate of speed greater than that at which the tape is ad-

vanced through the tube-forming means, means for operating the clutch to connect the driving means to the actuating means when the slack in the portion of the tape between the tape-advancing means and the tube-forming means is less than a predetermined amount, and means for operating the clutch to disconnect the driving means from the actuating means when the slack in said portion is greater than a predetermined amount.

2. In a cable unit forming machine having a tube-forming means for forming a tape having tabs thereon into a tube over washers positioned on a central conductor to form a coaxial cable unit and means for advancing a cable unit thus formed at a uniform rate of speed, the combination of a reciprocable press for forming tabs upon the tape, means for actuating the press, means for driving the actuating means, a clutch serving to connect and disconnect the press-actuating means to and from the driving means, means driven by the actuating means for intermittently advancing the tape through the press in synchronization with the reciprocations of the press at an average rate of speed greater than that at which the tape is advanced through the tube-forming means, means engaging the portion of the tape between the tape-advancing means and the tube-forming means, means operable by the tape-engaging means for actuating the clutch to connect the actuating means with the driving means when the slack in said portion of the tape is less than a predetermined amount, and means operable by the tape-engaging means for actuating the clutch to disconnect the actuating means from the driving means when the slack in said portion of the tape is greater than a predetermined amount.

3. In a cable unit forming machine having a tube-forming means serving to form a tape having tabs on the edges thereof into a tube over a core unit consisting of a central conductor and a plurality of insulating discs positioned on the conductor and a capstan for advancing such a core unit and such a tape being formed thereover through the tube-forming means at a predetermined rate of speed, the combination of a stationary die, a reciprocable die, means for reciprocating the reciprocable die toward and away from the stationary die to form the tabs on the tape, means for advancing the tape between the dies, means for actuating the tape-advancing means at times when the reciporable die is moved away from the stationary die, means for driving the reciprocating means and the actuating means, a clutch serving when actuated to disconnect the driving means from the reciprocating means and the actuating means, said driving means serving when connected to the reciprocating means and the actuating means to drive the tape-advancing means and the reciprocable die at a rate of speed at which the tape is advanced at an average rate of speed greater than that at which the tape is advanced through the tube-forming means by the capstan, a floating roller engaging the portion of the tape between the tape-advancing means and the tube-forming means, and means operable by the floating roller when the amount of slack of said portion of the tape is greater than a predetermined amount to actuate the clutch to disconnect the driving means from the reciprocating means and the actuating means and operable by the floating roller when the amount of slack of said portion of the tape is less than a predetermined amount to actuate the clutch to connect the last-mentioned driving means with the reciprocating means and the actuating means.

4. In a cable unit forming machine having a tube-forming means serving to form a tape having tabs on the edges thereof into a tube over a core unit consisting of a conductor and a plurality of insulating discs positioned thereon and to press the tabs over the edges of the tape to secure the edges together and a capstan for advancing such a core unit and tape through the tube-forming means at a predetermined rate of speed, whereby the tape is formed into a tube over the core unit, the combination of a stationary die, a reciprocable die complementary to the stationary die for forming tabs on the edges of the tape when in engagement with the stationary die, means for advancing the tape between the reciprocable die and the stationary die, means for reciprocating the reciprocable die toward and away from the stationary die, means for actuating the tape-advancing means intermittently, a cam shaft serving to drive coordinately the reciprocating means and the actuating means, whereby the actuating means actuates the tape-advancing means only when the reciprocable die is not in engagement with the stationary die, means for driving the cam shaft, a clutch interposed between the driving means and the cam shaft, means for actuating the clutch to connect the cam shaft with the driving means, a solenoid for rendering the clutch-actuating means inoperative when energized, whereby the cam shaft is disconnected from the driving means, said tape-advancing means serving when the cam shaft is connected to the driving means to advance the tape at an average rate of speed greater than that at which the tape is advanced by the capstan through the tube-forming means, a floating roller engaging the portion of the tape being advanced from the tape-advancing means to the tube-forming means, a switch for energizing the solenoid when actuated, a second switch for deenergizing the solenoid when actuated, and means associated with the floating roller serving to actuate the first-mentioned switch when the slack in said portion of the tape is greater than a predetermined amount, and to actuate the second switch when the slack in said portion of the tape is less than a predetermined amount, whereby the operations of the dies and the tape-advancing means are coordinated with the operation of the capstan.

5. In a cable unit forming machine having a tube-forming means serving to form a tape having tabs on the edges thereof into a tube over a core unit consisting of a central conductor and a plurality of insulating discs positioned on the conductor and a capstan for advancing such a core unit and such a tape being formed thereover through the tube-forming means at a predetermined rate of speed, the combination of a stationary die, a reciprocable die, means for reciprocating the reciprocable die toward and away from the stationary die to form the tabs on the tape, means for advancing the tape between the dies, means for actuating the tape-advancing means at times when the reciprocable die is moved away from the stationary die, means for driving the reciprocating means and the actuating means, means for connecting the driving means to the reciprocating means and the actuating means and disconnecting the driving means from the reciprocating means and the actuating means, said driving means serving when connected to the reciprocating means and the actuating means to drive the tape-advancing means

and the reciprocable die at a rate of speed at which the tape is advanced at an average rate of speed greater than that at which the tape is advanced through the tube-forming means by the capstan, a floating roller engaging the portion of the tape between the tape-advancing means and the tube-forming means, and means operable by the floating roller when the amount of slack of said portion of the tape is greater than a predetermined amount to actuate the connecting and disconnecting means to disconnect the driving means from the reciprocating means and the actuating means and operable by the floating roller when the amount of slack of said portion of the tape is less than a predetermined amount to actuate the connecting and disconnecting means to connect the last-mentioned driving means with the reciprocating means and the actuating means.

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