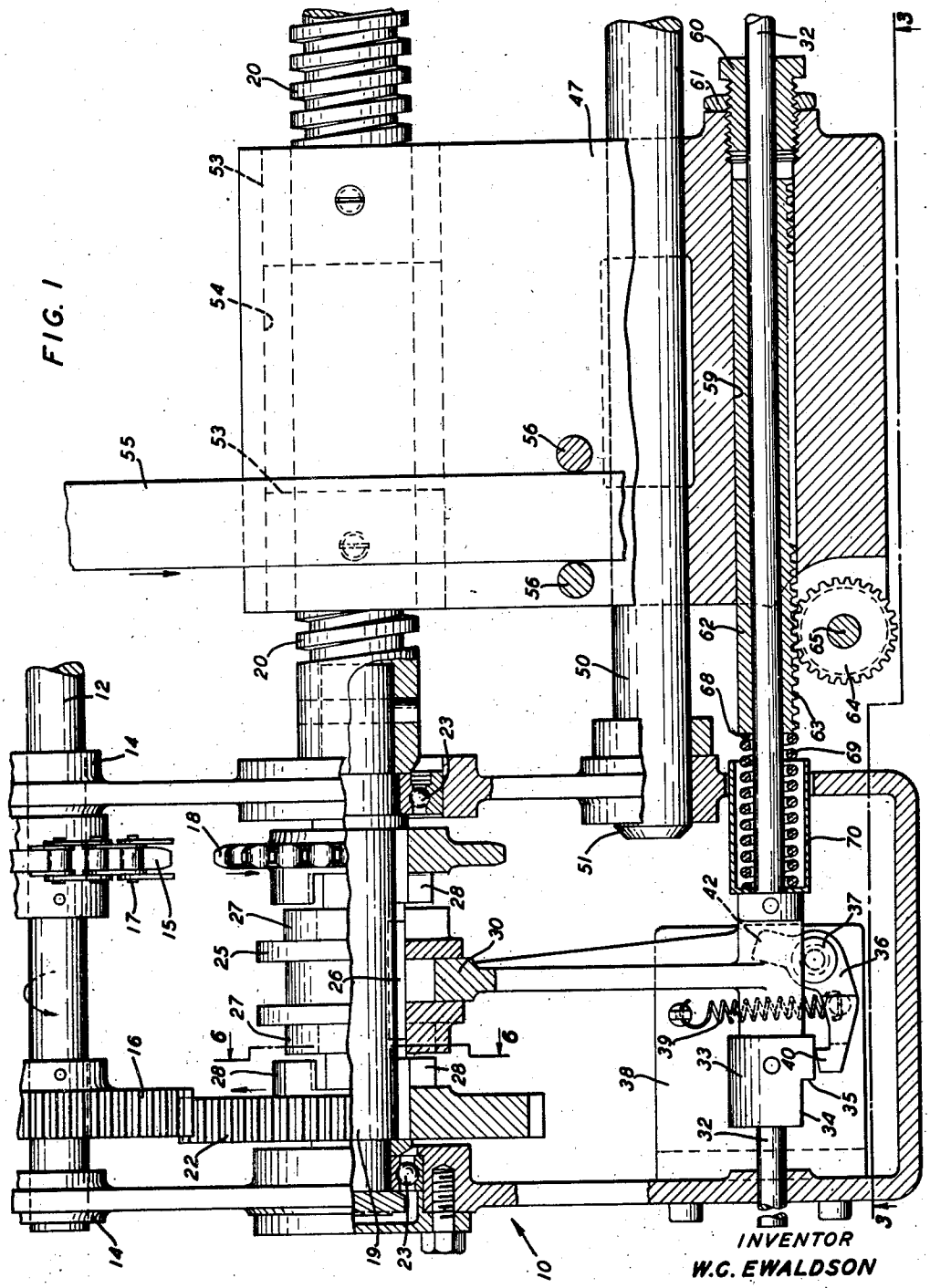
Sept. 10, 1946. W. C. EWALDSON 2,407,542

DISTRIBUTING APPARATUS

Filed May 12, 1945 4 Sheets-Sheet 1

FIG. 1



Sept. 10, 1946. W. C. EWALDSON 2,407,542

DISTRIBUTING APPARATUS

Filed May 12, 1945 4 Sheets-Sheet 2

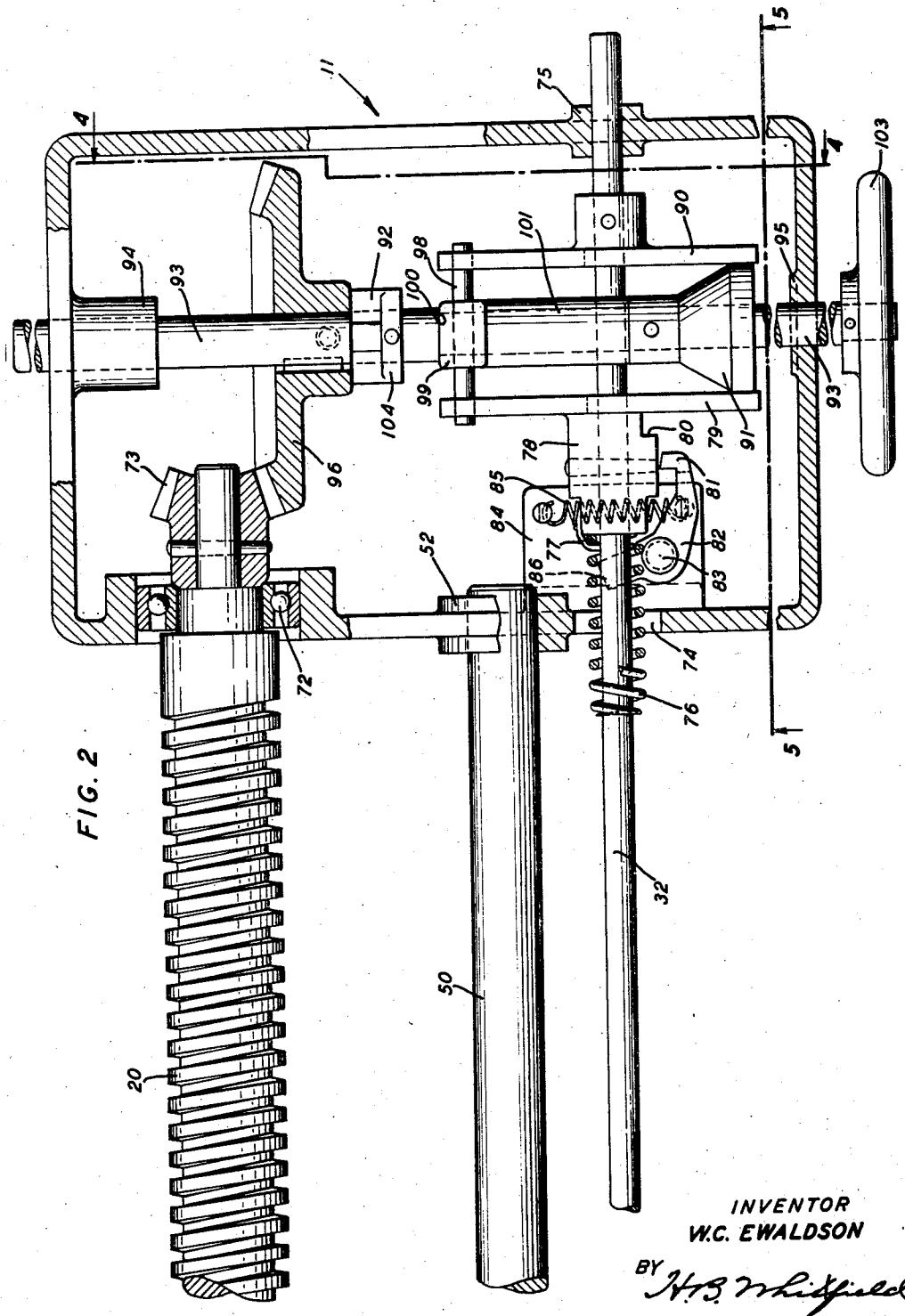


FIG. 2

INVENTOR
W.C. EWALDSON

BY H.B. Whitfield.
ATTORNEY

Sept. 10, 1946. W. C. EWALDSON 2,407,542

DISTRIBUTING APPARATUS

Filed May 12, 1945 4 Sheets-Sheet 3

FIG. 3

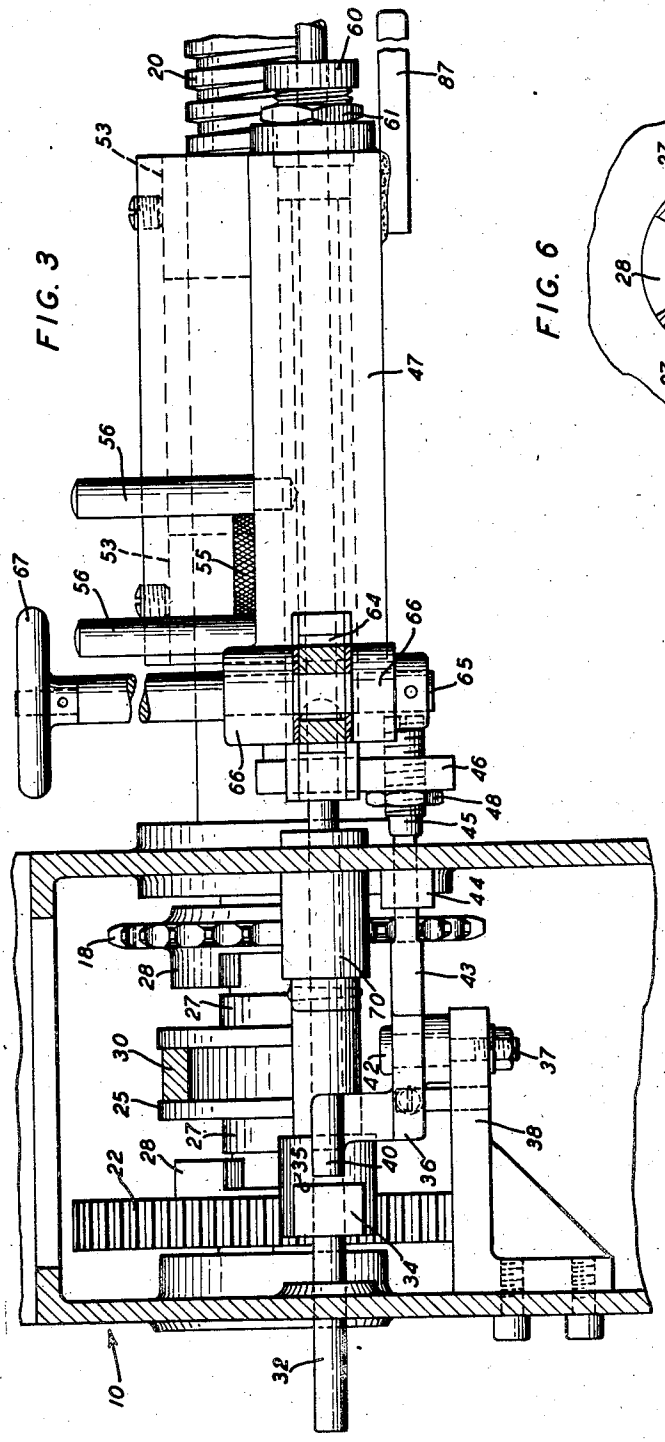
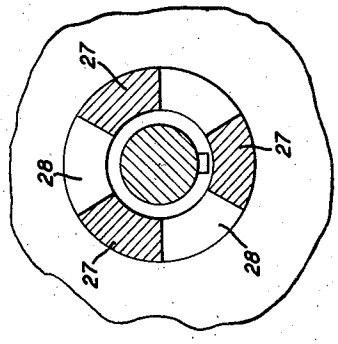


FIG. 6



INVENTOR
W.C. EWALDSON
BY H.B. Whitfield
ATTORNEY

Sept. 10, 1946. W. C. EWALDSON 2,407,542

DISTRIBUTING APPARATUS

Filed May 12, 1945 4 Sheets-Sheet 4

FIG. 4

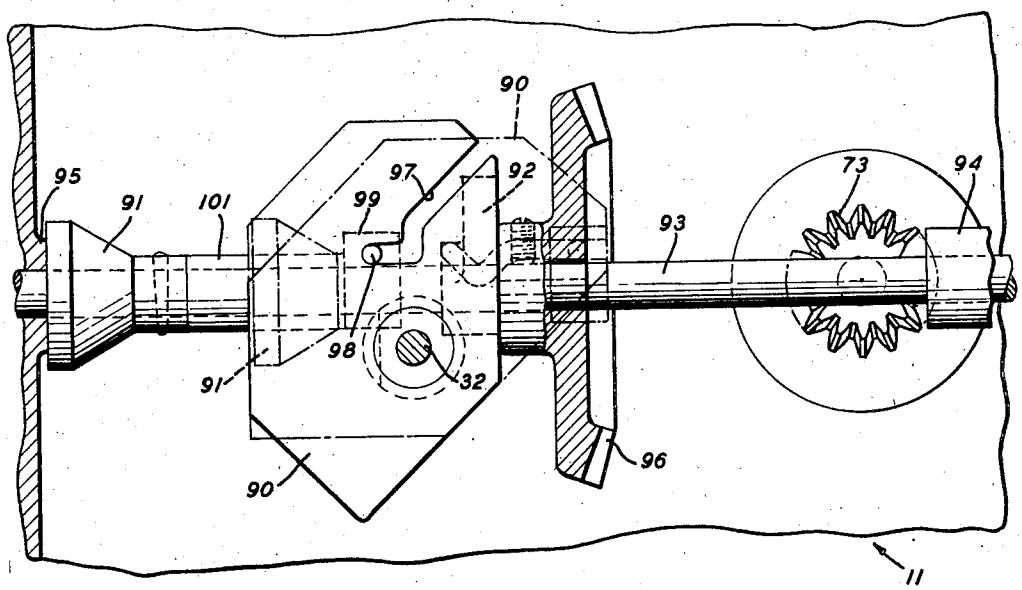
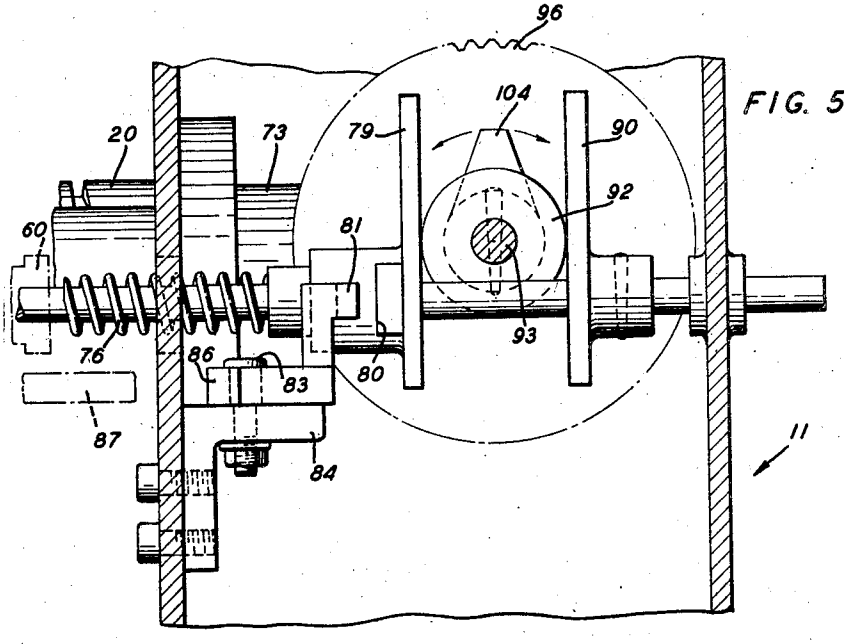


FIG. 5



INVENTOR
W.C. EWALDSON

BY H.B. Whitfield

ATTORNEY

Patented Sept. 10, 1946

2,407,542

UNITED STATES PATENT OFFICE

2,407,542

DISTRIBUTING APPARATUS

Waldemar C. Ewaldson, Millington, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application May 12, 1945, Serial No. 593,506

12 Claims. (Cl. 242—158)

1

This invention relates to distributing apparatus, and more particularly to apparatus for distributing strands on reels.

In distributing strands, for example, switchboard cable or the like on takeup reels, various conditions arise making it desirable to vary the distributing limits of the strands and to make other adjustments in the lay of the strands on the reels while the strands are advancing to compensate for these varying conditions. For example, reels of various widths or distances between their heads may be used in taking up strands or cable, and in such instances, it is desirable to vary the distributing limits of the strand or cable. Furthermore, although the material being distributed may be presumed to be of a given diameter or width, there may exist certain variations in these dimensions, making it desirable to further vary the distributing means to assure uniform laying of the material on the takeup reel.

An object of the invention is to provide a distributing apparatus for strand material or the like which is simple in structure, efficient in operation, and highly variable.

With this and other objects in view, the invention comprises a distributing apparatus, having a carriage supporting material guiding elements, the carriage having an element driven automatically in reverse directions alternately during predetermined limits of time and between predetermined limits relative to a takeup reel to cause distribution of the material thereon, including also means to vary the limits of the carriage and to render the driven element inoperative automatically and operative manually.

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

Figs. 1 and 2 combined, illustrate a top plan view of the apparatus, portions thereof being shown in section;

Fig. 3 is a fragmentary sectional view taken along the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary sectional view taken along the line 4—4 of Fig. 2, illustrating the mechanism therein in one position, opposite that shown in Fig. 2, and

Fig. 5 is a fragmentary sectional view taken along the line 5—5 of Fig. 2.

Referring now to the drawings, the apparatus includes housings, indicated generally at 10 and 11, spaced from each other as shown in Figs. 1 and 2, and suitably mounted upon a base not

2

shown. The housing 10 has a main drive shaft 12 extending therethrough and supported in suitable bearings 14 in the walls thereof. A sprocket 15 and a gear 16 are fixedly mounted on a shaft at spaced positions as shown in Fig. 1. A chain 17 connects the sprocket 15 with a sprocket 18, the latter being rotatably mounted upon a reduced portion 19 of a threaded shaft 20. The gear 16 interengages a gear 22, the latter being rotatably mounted upon the reduced portion 19 of the threaded shaft 20.

The adjacent end of the threaded shaft 20, particularly the reduced portion 19 thereof, is journalled in suitable bearings 23, the latter being disposed in apertures in the walls of the housing 10. A clutch element 25 interposed between the sprocket 18 and the gear 22 is slidably mounted upon the shaft portion 19 and is keyed thereto as at 26. The clutch element 25, at each side thereof, is provided with teeth or projecting portions 27 for interengagement with similar teeth or projecting portions 28 of the sprocket 18 and the gear 22. It will therefore be apparent that the threaded shaft 20, through the aid of the clutch element 25, may be operatively connected to the main shaft 12, either through the sprocket and chain connection to be driven in one direction thereby, or through the connection of the gears to be driven in the opposite direction.

A portion of the clutch shifting mechanism includes a yoke 30 which is fixedly mounted upon a shift rod 32 in the housing 10. A collar 33 is mounted upon the shift rod 32, this collar being cylindrical in contour with a cutaway portion 34 providing a shoulder 35. A latch 36 pivotally supported at 37 upon a bracket 38 is normally urged clockwise by a spring 39 to engage the shoulder 35 when the rod 32 is moved to the right to lock the rod against movement to the left until the latch is actuated against the force of its spring. The means for accomplishing this result will hereinafter be described. Returning for a moment to the latch 36, attention is directed to its contour shown in Fig. 3 where the end 40 thereof positioned to engage the shoulder 35 is offset from the portion adjacent the pivot 37 and also an outwardly projecting portion 42 which is positioned to be engaged by a plunger 43. The plunger 43 is movably supported in a bearing 44 and projects outside the housing as illustrated in Fig. 3. An adjustable element 45 threadedly disposed in an arm 46 of a carriage 47 and held in adjusted position by a nut 48 will strike the outer end of the plunger 43 when the carriage

is moved to the left to cause the plunger to operate the latch 36.

The carriage 47 is mounted for reciprocation upon a rod 50, the ends of the rod being supported at 51 in the housing 10 and at 52 in the housing 11. Threaded elements 53 mounted in the ends of the aperture 54 of the carriage provide the operative connection between the threaded shaft 20 and the carriage. The purpose of the carriage in the present instance is to distribute strand material such as cable 55 upon a takeup reel (not shown). To accomplish this result, parallel guide pins 56 are mounted at spaced positions upon the carriage, their distances apart being equal to, or slightly greater than, the width of the cable 55. An aperture 59 is formed in the carriage, one end of the aperture being threaded to receive an adjustable bushing 60, the latter being held in any selected adjusted position by the aid of a lock nut 61. The bushing 60 is for the shift rod 32, the latter extending through the carriage and also through a tubular rack 62 which is slidably disposed in the aperture 59. The teeth 63 of the rack 62 are engaged by a pinion 64, the latter being mounted upon a shaft 65 which extends upwardly through suitable bearings 66 in the carriage and has a hand wheel 67 mounted upon the upper end thereof as shown in Fig. 3. Through the aid of this mechanism, the rack 62 may be adjusted in the carriage to position its outer end 68 a desired distance from the left side of the carriage. A compression spring 69, disposed concentric with the rod 32 in a housing 70 therefor, may be engaged by the rack 62 and compressed to create a force necessary for the shifting of the yoke 30 to the left to cause the clutch element to connect the gear 22 to the threaded shaft 20.

By placing Figs. 1 and 2 in correct alignment, attention is directed particularly to the mechanism in the housing 11. It will be noted that the right end of the threaded shaft 20 is journalled in a bearing 72 and has a pinion 73 mounted upon the reduced end thereof. The rod 32 extends through an aperture 74 in the inner wall of the housing 11 and is slidably disposed in a bearing 75 in the outer wall of the housing. A compression spring 76 is disposed concentric with the rod 32 and is positioned to be engaged by the bushing 60 during movement of the carriage 47 to the right. The inner end of the spring 76 is held by a clip 77 adjacent a hub or supporting portion 78 of a control element 79. The portion 78 is cylindrical in general contour and is notched at 80 to receive the end 81 of a latch 82. The latch 82 is pivotally supported at 83 upon a bracket 84. the latter being mounted upon the inner wall of the housing 11. A spring 85 normally urges the latch counterclockwise to urge the end 81 thereof toward the rod 32 for engagement with the notch 80 in the support 78. The general contour of the latch is best observed by viewing Fig. 5 with Fig. 2. which illustrate the portion or end 81 offset from the main portion of the latch supported by the pivot 83. The upper end 86 of the latch is positioned to be engaged by a finger 87 mounted upon the carriage 47 to move the latch 82 into its open position at the end of the movement of the carriage in this direction.

Another control element 90 similar in structure to the control element 79 is mounted upon the rod 32, these control elements being disposed a given distance apart so that they may be under the control of cams 91 and 92. The cams 91 and 92 are fixedly mounted upon a shaft 93, the latter being mounted for rotation as well as axial movement in suitable bearings 94 and 95, the latter being formed in the housing 11. A gear 96, although positioned out of engagement with the pinion 73 during the automatic operation of the apparatus, may be manually moved into engagement with the pinion for selective adjustment or manual actuation of the carriage in either direction. During the time the gear 96 engages the pinion 73, the cam 92 is disposed away from the control elements 79 and 90, while the cam 91 is positioned between the control elements to maintain the clutch element 25 in its neutral position.

By viewing Fig. 4, it will be noted that the control elements 79 and 90, which are identical in structure with the exception of the variation in the contour of their supporting portions, have slots 97 therein to cooperate with a pin 98, the ends of which ride in the slots. The pin 98 is carried by a collar 99, the latter being mounted concentric with the shaft 93 so that the shaft may rotate relative thereto, but movable axially with the shaft due to a shoulder 100 of the shaft at one side of the collar and a sleeve 101 interposed between the collar and the cam 91. One of the purposes of this structure is to impart a partial rotary movement to the rod 32 during the movement of the control elements from the solid line position (Fig. 4) to the dotted line position therein to move either notch 34 or 80 from its latch 36 or 82 to facilitate disconnection of the power means from the threaded shaft 20. The slots 97, therefore, serve as cams cooperating with the ends of the pin 98 during the axial movement of the shaft 93 to bring about rocking of the rod 32 when it is desirable to convert the apparatus from the automatic power drive operation to the manual operation. The cam 91 functions in cooperation with the control elements 79 and 90 to shift the rod 32 and the clutch element 25 into the neutral position. A hand wheel 103 mounted upon the outer end of the shaft 93 enables the operator to bring about the desired movements of the shaft. The cam 92 is positioned between the elements 79 and 90 when the apparatus is set for the automatic operation as illustrated in Fig. 4 so that by rotating the shaft 93, either clockwise or counterclockwise, the operator may connect the clutch element 25 with either the sprocket 18 or the gear 22, the high portion 104 of the cam 92 engaging either of the control elements 90 or 79 to bring about this result.

Considering now the operation of the apparatus, let it be assumed that the carriage 47 has been stopped adjacent the center of the threaded shaft 20 and that the operator is desirous of starting the operation to distribute the cable or material 55 near the head of a takeup reel. The operator will then force the shaft 93 inwardly causing first rotation of the rod 32 through the action of the pin 98 in the cam slots 97 of the elements 79 and 90 to disengage whatever latch 36 or 82 is engaged after which the cam 90 will be moved into engagement with either locating elements 79 or 90, depending upon which direction the rod 32 had previously been shifted, to move the rod into the neutral position shown and finally move the gear 96 into engagement with the pinion 73. This having been accomplished, the apparatus is in condition for manual operation thereof through rotation of the shaft 93 to impart rotary movement to the threaded shaft

20 and move the carriage 47 in the desired direction to that position where it is to start the automatic operation for the distribution of the material on the reel. The operator then pulls the shaft 93 outwardly to disengage the gear 96 from the pinion 73, to position the notches 34 and 80 for engagement with their respective latches 36 and 82 to remove the cam 91 from between the elements 79 and 90 and position the cam 92 between these elements whereby the operator may, upon rotation of the shaft 93, through the aid of the hand wheel 103, condition the apparatus so that the initial movement of the carriage under the automatic operation will be in the desired direction. Assuming that the carriage is to start its movement toward the right, the operator will rotate the shaft 93 counterclockwise to move the rod 32 to the left to cause the clutch element 25 to engage with the gear 22. Upon rotation of the main drive shaft 12, the gear 22 will be driven in the direction of the arrow to cause the threaded shaft 20 to move the carriage to the right. This movement of the carriage will continue so as to distribute the cable onto the reel in this direction until the bushing has engaged and compressed the spring 76 and the finger 87 has engaged the end 86 of the latch 82 and forced the latch, particularly the end 81 thereof, out of the notch 80. The force created in the spring 76 will at this time shift the rod 32 to the right causing disengagement of the clutch element 25 with the gear 22 and engagement of the clutch element with the sprocket 18 to reverse the direction of rotation of the threaded shaft 20 and cause the carriage to move to the left. The shifting of the rod 32 to the right also positions the shoulder 35 of the notch 34 to be engaged by the end 40 of the latch 36 so as to maintain this connection between the clutch element and the sprocket until the end of the movement of the carriage to the left. As the carriage approaches the end of its travel to the left, the end 68 of the rack 62 will engage the spring 69 and compress the spring before the plunger 43 disengages the latch 36 from the shoulder 35 so that the force created in the spring will shift the rod 32 and with it the yoke 30 to shift the clutch element 25 out of engagement with the sprocket 18 and into engagement with the gear 22.

This operation may continue until the reel has been filled or until the desired length of cable has been distributed thereon, after which the apparatus may be stopped and a new reel disposed in place of the filled reel. The apparatus may then again be readily adjusted to start distribution of the cable upon the empty reel through the mechanism illustrated, particularly in Figs. 2, 4 and 5. Although the function of the manual control means has been described for use prior to the starting of the automatic operation, it can also be used to interrupt the operation to make other adjustments if desirable. The travel of the carriage is between two variable limiting means, one including the bushing 69 with its lock nut 61 to vary the time of operation of the latch 82. The other limiting means includes the rack 62 and a mechanism for moving the rack relative to the carriage to vary the position of the end 68 with respect to the left side of the carriage to control the releasing of the latch 36 and the shifting of the clutch element depending upon the desired position of the carriage. This adjustment is made, through the rotation of the shaft 65 aided by the hand wheel 67, to rotate the pinion 64 to move the rack in either direction with respect to the carriage and can be made, if so desired, during the automatic operation of the apparatus.

Although specific improvements 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. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, means under the control of the distributor to alternately move the unit into operating positions at the said given limits, means to disconnect the unit from either driving means, and auxiliary means movable into operative engagement with the threaded shaft to rotate the shaft in either direction for adjustment of the distributor.

2. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, means under the control of the distributor to alternately move the unit into operating positions at the said given limits, means to disconnect the unit from either driving means, auxiliary means movable into operative engagement with the threaded shaft to rotate the shaft in either direction for adjustment of the distributor, and means actuable to move the unit into either operative position.

3. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, means under the control of the distributor to alternately move the unit into operating positions at the said given limits, means to disconnect the unit from either driving means, auxiliary means movable into operative engagement with the threaded shaft to rotate the shaft in either direction for adjustment of the distributor, and means to vary one of the said limits relative to the other.

4. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, means under the control of the distributor to alternately move the unit

into operating positions at the said given limits, means to disconnect the unit from either driving means, auxiliary means movable into operative engagement with the threaded shaft to rotate the shaft in either direction for adjustment of the distributor, and means to vary one of the said limits relative to the other during movement of the distributor.

5. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, a reciprocable rod operatively connected to the unit to move the unit into its various positions, means under the control of the distributor to alternately move the rod in opposite directions when the distributor is moved adjacent the said limits to alternately move the unit into the operating positions, means to move the rod to move the unit into its neutral position, and auxiliary means movable into operative engagement with the threaded shaft to rotate the shaft in either direction for adjustment of the distributor.

6. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternatly in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, a reciprocable rod operatively connected to the unit to move the unit into its various positions, separate latches adjacent the said limits to releasably hold the unit singly in the operating positions. means carried by the distributor to alternately release the latches, and means controlled by the distributor to move the rod when released to move the unit into the other operating position.

7. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, a reciprocable rod operatively connected to the unit to move the unit into its various positions, separate latches adjacent the said limits to releasably hold the unit singly in the operating positions, means carried by the distributor to alternately release the latches, means controlled by the distributor to move the rod when released to move the unit into the other operating position, means actuatable to release either latch, means to move the rod to move the unit into its neutral position, and means movable into operative engagement with the threaded shaft to cause movement of the distributor in either direction.

8. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate

driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, a reciprocable rod operatively connected to the unit to move the unit into its various positions, separate latches adjacent the said limits to releasably hold the unit singly in the operating positions, means carried by the distributor to alternately release the latches, means controlled by the distributor to move the rod when released to move the unit into the other operating position, means to rotate the rod to release either latch, means to move the rod to move the unit into its neutral position, and means movable into operative engagement with the threaded shatf to cause movement of the distributor in either direction.

9. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, a reciprocable rod operatively connected to the unit to move the unit into its various positions, separate latches adjacent the said limits to releasably hold the unit singly in the operating positions, means carried by the distributor to alternately release the latches, means controlled by the distributor to move the rod when released to move the unit into the other operating position, means actuatable to release either latch during movement of the distributor in either direction, means to move the rod to move the unit into its neutral position, and means movable into operative engagement with the threaded shaft to cause movement of the distributor in either direction.

10. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, a reciprocable rod operatively connected to the unit to move the unit into its various positions, separate latches adjacent the said limits to releasably hold the unit singly in the operating positions, means carried by the distributor to alternately release the latches, means controlled by the distributor to move the rod when released to move the unit into the other operating position, means actuatable to release either latch, means to move the rod to move the unit into its neutral position, means movable into operative engagement with the threaded shaft to cause movement of the distributor in either direction, and means to move the rod in either direction to selectively move the unit into either operative position.

11. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position,

movable into either operating position to connect either driving means to the shaft, a reciprocable rod operatively connected to the unit to move the unit into its various positions, separate latches adjacent the said limits to releasably hold the unit singly in the operating positions, means carried by the distributor to alternately release the latches, means controlled by the distributor to move the rod when released to move the unit into the other operating position, means actuatable to release either latch, means to move the rod to move the unit into its neutral position, means movable into operative engagement with the threaded shaft to cause movement of the distributor in either direction and means to move the rod in either direction to selectively move the unit into either operative position and condition the respective latch to hold the unit in the selective position.

12. An apparatus for distributing material comprising a reciprocable distributor for material, a threaded shaft rotatable in reverse directions to support the distributor and move it alternately in reverse directions between given limits, means to vary the said limits, separate driving means to singly rotate the shaft in reverse directions when operatively connected to the shaft, a unit, having a neutral position, movable into either operating position to connect either driving means to the shaft, a reciprocable rod operatively connected to the unit to move the unit into its various positions, means under the control of the distributor to alternately move the rod in opposite directions when the distributor is moved adjacent the said limits to alternately move the unit into the operating positions, means to move the rod to move the unit into its neutral position, and auxiliary means movable into operative engagement with the threaded shaft to rotate the shaft in either direction for adjustment of the distributor.

WALDEMAR C. EWALDSON.