Dec. 11, 1956 C. O. BRUESTLE 2,773,391

REELING DISTRIBUTOR

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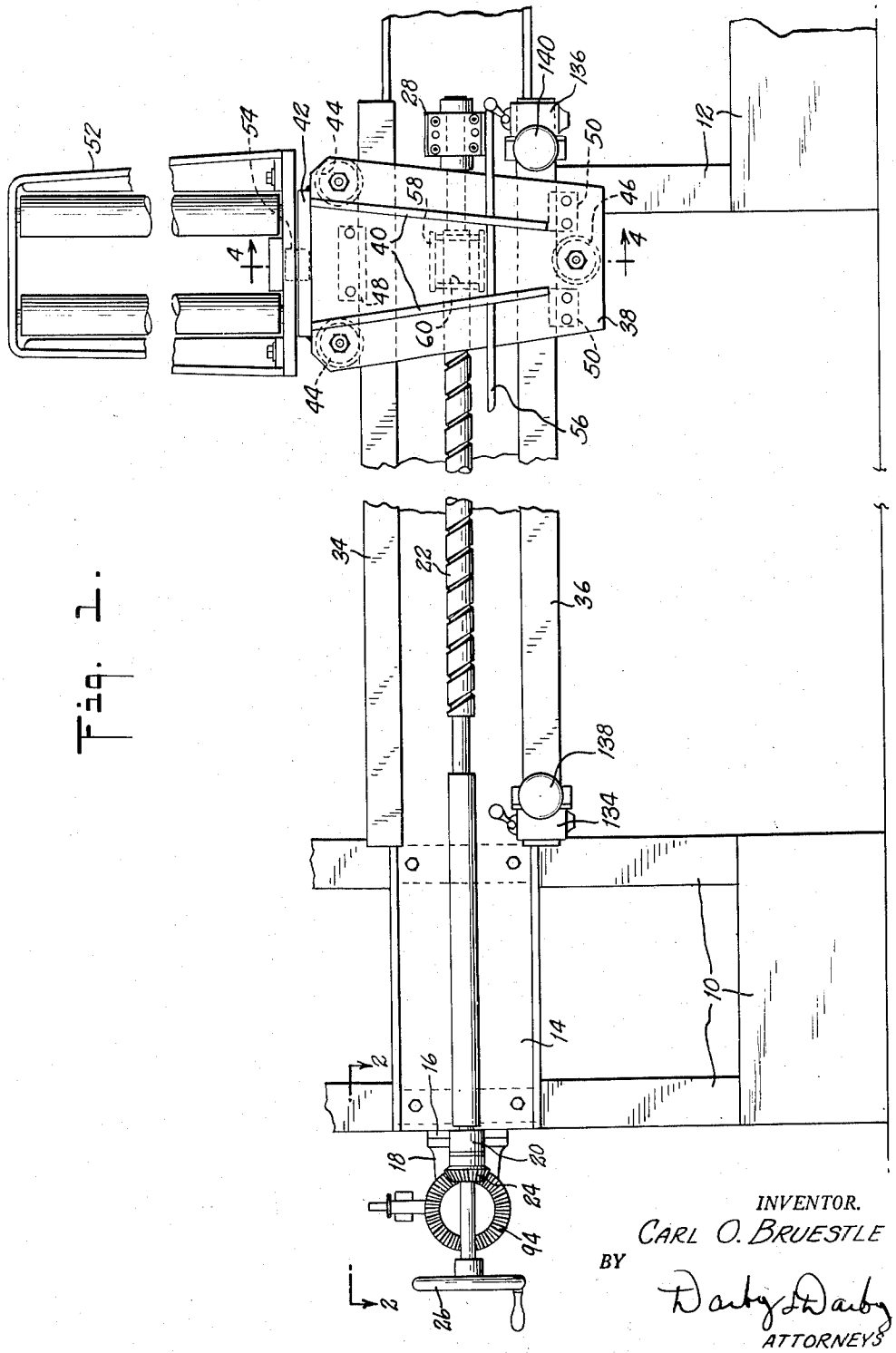


Fig. 1.

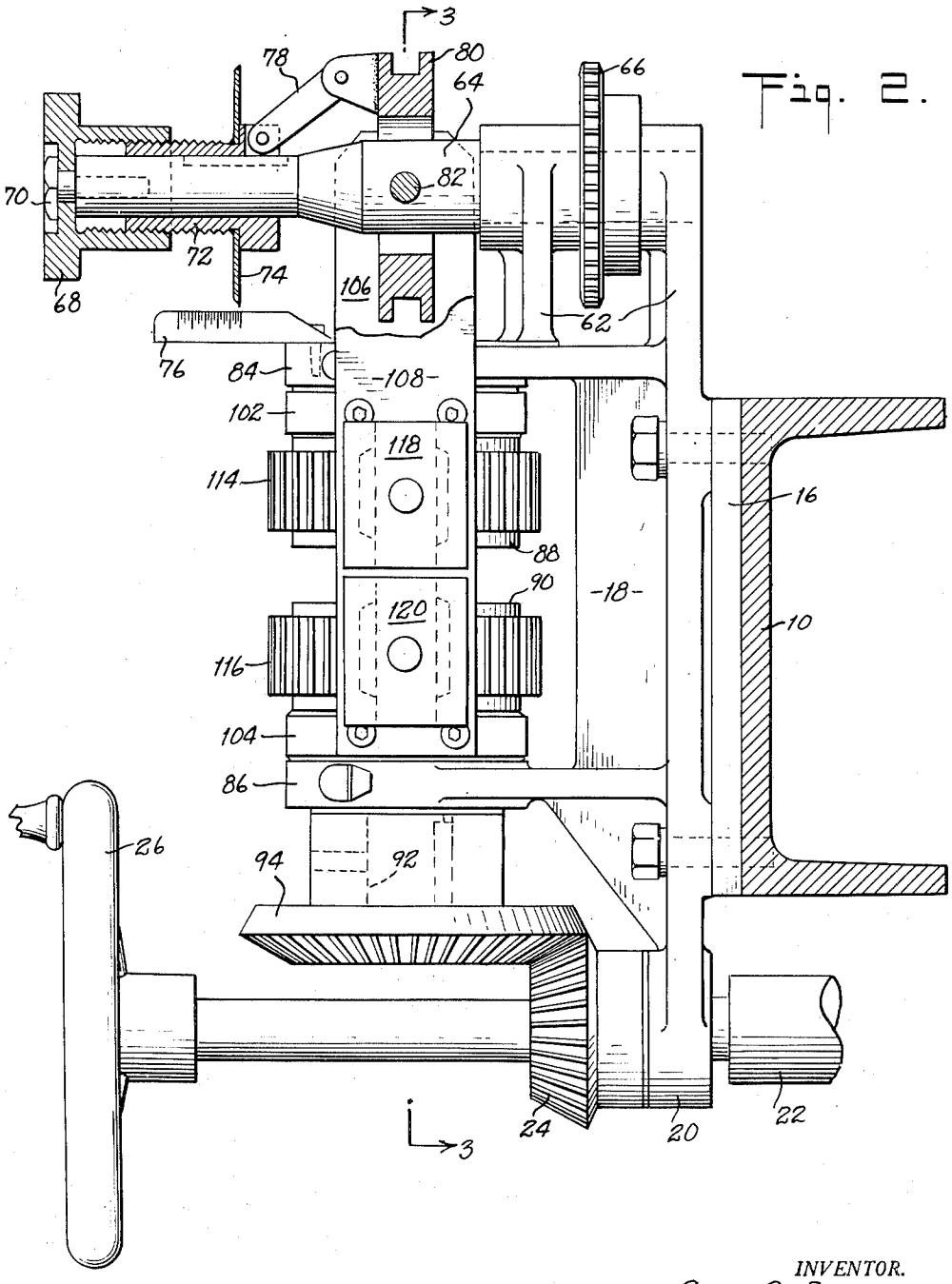
INVENTOR.
CARL O. BRUESTLE
BY
Darby & Darby
ATTORNEYS

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Fig. 2.



INVENTOR.
CARL O. BRUESTLE
BY Darby & Darby
ATTORNEYS

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Fig. 3.

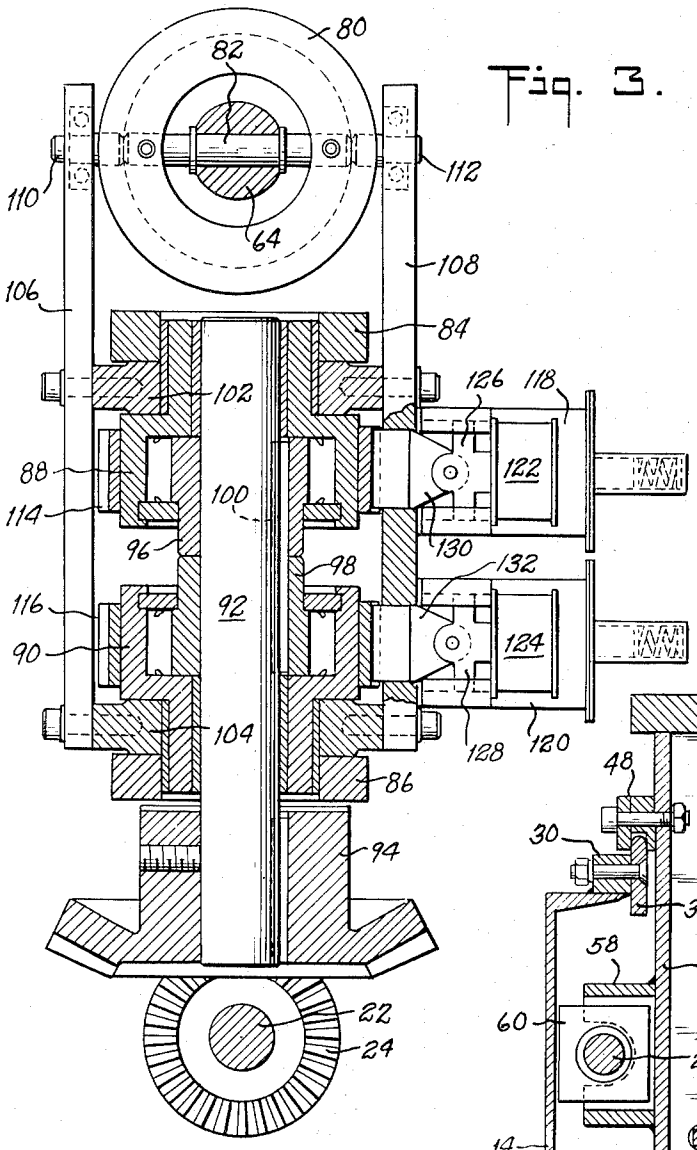
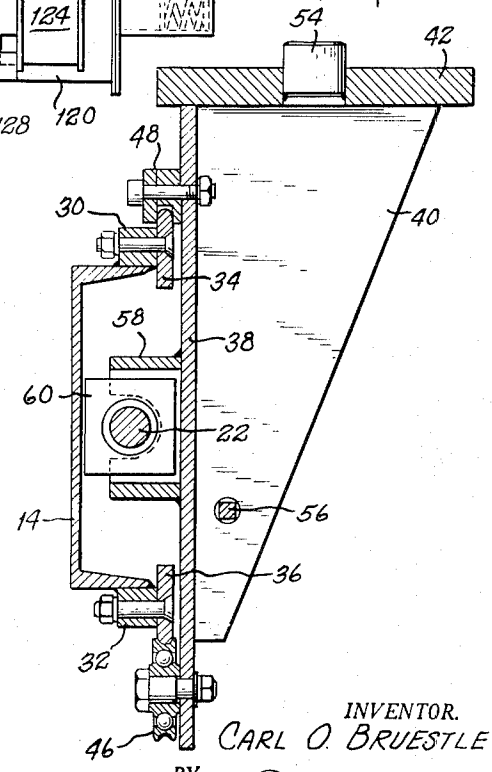


Fig. 4.



INVENTOR.
CARL O. BRUESTLE

BY

Darby & Darby

ATTORNEYS

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2,773,391

REELING DISTRIBUTOR

Carl O. Bruestle, Metuchen, N. J., assignor to Syncro Machine Company, Perth Amboy, N. J., a corporation of New Jersey

Application August 24, 1955, Serial No. 530,247

8 Claims. (Cl. 74—89)

This invention consists of improvements in a distributing device used to lay the turns of strands being reeled in a smooth even layer.

The structure herein disclosed is especially adapted for the handling of very large strands such as heavy rope and large insulated electrical conductors. It will be apparent, however, to those skilled in the art that the subject matter of this invention does not have a size limitation.

The main object of the invention is to provide an improved smoother acting device of this type in which the ratchet acting mechanism commonly used to traverse the strand guide has been replaced by a pair of oppositely acting one-way clutches.

An important object of the invention is to provide a more rugged mechanism of different type especially adapted for the handling of very heavy cable and rope.

Still another object of this invention is to provide a mechanism of this type in which adjustment can be easily effected by a single control for the handling of a wide range of strand diameter.

Other and more detailed objects of the invention will be apparent from the following disclosure of the embodiment thereof illustrated in the attached drawings.

In the drawings,

Figure 1 is a front elevational view of the mechanism of the invention with parts broken away to facilitate illustration;

Figure 2 is an enlarged cross-sectional view on the line 2—2 of Figure 1;

Figure 3 is a cross-sectional view taken on the line 3—3 of Figure 2; and

Figure 4 is a cross-sectional view taken on the line 4—4 of Figure 1.

The traversing guide mechanism of this invention as illustrated is adapted to be associated with a strand reeling machine and is interposed between the point of strand supply and the reel position. The purpose, of course, is to deliver strands of various sizes to the reel or cable drum along a helical path adjusted as to pitch so that the strand will be laid onto the core of cable drum in smooth layers comprising contiguous convolutions. This, of course, is well understood in this art but the purpose of reference thereto is to emphasize that the structure herein disclosed can be adjusted by a single control to effect these results with a wide range of strand diameters.

As illustrated, the mechanism includes suitable supporting frameworks **10** and **12** preferably built up of U-beams and plates secured together as by welding for example. These frameworks **10** and **12** are positioned in the same vertical plane and are separated by sufficient space to accommodate them to the reel dimensions encountered in practice. Extending between these frameworks is a heavy U-channel **14** which is secured thereto as, for example, by bolts as shown.

Secured to the outside face of the left-hand U-beam of the framework **10** is a base plate **16** onto which is bolted

a frame **18**. As shown in Figure 2, this frame has a forwardly projecting arm **20** providing a bearing journal for one end of the lead screw shaft **22**. The other end of this shaft is journalled in a bearing assembly **28** secured to the beam **14**. Any suitable bearing structures including the necessary thrust bearings will be used in accordance with good engineering practice. Secured near the left-hand end of the shaft **22** is a bevel gear **24** which meshes with a bevel gear **94**. On the extreme left-hand end of shaft **22** is a hand wheel **26**.

Referring to Figure 4, it will be seen that there is secured along the top and bottom flanges of the U-channel **14** as by welding a pair of support bars **30** and **32**. Secured to the vertical faces of these bars so as to lie in the same plane are a pair of rails **34** and **36** in the form of bars. A plate **38** forms the base for the carriage which supports the strand guide proper. Plate **38** is provided with a pair of reinforcing gussets **40** which are welded to the plate and to another plate **42** which lies horizontal as shown. The plates **38** and **42** and reinforcing gussets **40** provide the carriage assembly which is supported on the rails **34** and **36** by an upper pair of trolley wheels **44** and a lower trolley wheel **46** (see Figures 1 and 4). To further aid in holding this carriage on the rails, there is provided an upper sliding guide assembly **48** and a pair of lower sliding guide assemblies **50**. Secured to the plate **38** and pitched in position to have sliding engagement with the upper and lower rails **34** and **36** respectively the plate **42** is provided with a pivot bearing support **54** on which the strand guide assembly **52** is pivotally mounted in accordance with known constructions. Briefly, this guide assembly includes a pair of parallel rollers mounted on vertical axes in spaced relation so that they can be turned to various positions in a vertical plane to effectively vary the width of the space through which the strand being guided passes so as to constrain it to move along the correct axial path.

Secured adjacent the opposite ends of the lower rail **36** are a pair of limit switch assemblies **134** and **136** having operating levers aligned to be alternately engaged by the ends of a camming bar **56** mounted on the carriage (see Figures 1 and 4). As shown, the limit switches **134** and **136** are part of clamp assemblies which can be moved to various positions along the rail **36** and locked thereat by means of the thumb screws **138** and **140**. The limit switches **134** and **136** are spring biased so as to be in the position shown in the case of switch **134** when not engaged by the camming bar **56**. They are moved to actuated position by the camming bar against the spring biasing as indicated in the case of switch **136**.

Secured to the face of plate **38** adjacent the lead screw shaft **22** is a cage **58** which confines a threaded nut **60** engaging the lead screw shaft **22**. It will be easily understood that when the shaft **22** revolves the nut **60** will travel along it in a direction depending upon the direction of rotation of the shaft **22** thereby causing the guide carriage to move axially of the shaft **22** in one or the other direction.

Returning to Figure 2, the bracket **18** is provided at the rear with a pair of parallel extensions **62** providing bearing journals for a stub shaft **64**. Secured to this shaft between the brackets **62** is a driving sprocket wheel **66**. Threadedly mounted on the free end of the shaft **64** is an adjusting knob **68** which is confined against axial movement on the shaft by means of a bolt **70** which permits rotation of the knob **68**. Slidably mounted on the shaft **64** is a sleeve **72** threadedly engaging the knob **68** and prevented from turning on the shaft by means of a key. It will be seen that the sleeve **72** can thus be caused to move axially of shaft **64** in either direction by proper directional rotation of the knob **68**. Secured to the sleeve **72** is a pointer disc **74** arranged to cooperate

with a suitably calibrated scale on the indicator arm **76**. This indicator arm is secured to another bracket **84** on the fixture **18**. Sleeve **72** is provided with a flange having a radial notch in which one end of a link **78** is pivotally mounted. The other end of this link is pivotally connected to a grooved disc **80** which, as will be seen later, serves as a wobble plate. The disc **80** has a simple passage so that it can be telescoped on the shaft **64** and is connected thereto by means of a pivot pin **82**.

In addition to the arm **84**, fixture **18** has a parallel lower arm **86**. Journalled in these arms are the hubs of the housings **88** and **90** of a pair of one-way clutches. These clutches may take many forms and are available in commerce in widely different forms. They are sometimes termed overrunning clutches and are of the type that will drive in one direction of rotation but are overrunning or non-driving in the opposite direction. In the assembly of this mechanism this pair of clutches are of the type which will have their driving function in opposite rotational directions. Journalled in the housings **88** and **90** is a shaft **92**, to the lower end of which is secured the bevel gear **94** previously mentioned. As will appear later, the housings **88** and **90** are the driving portions of the clutches and the driven portions **96** and **98**, respectively, are keyed to the shaft **92** by means of the key **100**. Secured to or formed on the peripheries of the housings **88** and **90** are a pair of notched rings **114** and **116**. These rings are like gears with square teeth and provide a series of uniform and uniformly spaced circumferential notches.

A pair of sleeves **102** and **104** lie between the arms **84** and **86** and the shoulders of the housings **88** and **90** and are unconnected to these housings. Bolted at diametrically opposed points on the sleeves **102** and **104** are a pair of parallel plates **106** and **108** which are positioned on opposite sides of the wobble plate **80**. The adjacent ends of these plates are provided with pins **110** and **112** which engage in the peripheral groove of the plate **80**, but, of course, are not connected to the pin **82** which supports the plate **80**.

Secured to the outer face of the plate **108** are a pair of brackets or housings **118** and **120** in which are respectively mounted a pair of solenoids **122** and **124**. These solenoids are provided with spring-loaded plungers **126** and **128**, urged by the springs left (Figure 3) and are pivotally connected respectively to the latches **130** and **132**. These latches project through complementary shaped openings in the plate **108** so as to be engageable with the notched rings **114** and **116**.

A description of the operation of this mechanism will clarify the construction and function of this device.

Sprocket wheel **66** is driven from any part of the cable reeling machine, that is, the machine which rotates the cable drum, at a constant and properly proportioned speed of rotation as will be understood in the art. Sprocket wheel **66** of course causes shaft **64** to rotate with it. If the knob **68** has adjusted wobble plate **80** to a vertical position as shown in Figure 2, it is apparent that its rotation will not have any effect on the remainder of the mechanism because the pins **110** and **112** will ride in the groove in the plate without any reaction on those pins. However, if knob **68** is adjusted to some other position along the scale on the indicator **76**, wobble plate **80** will be tipped on the axis of pin **80** and hence its peripheral groove will travel in a path which is for one-half of its revolution at one side of the vertical axis and for the other half at the other side. Pins **110** and **112** will be given a similar rocking movement with the result that the framework comprising the plates **106** and **108** and the sleeves **102** and **104** will oscillate on the axis of shaft **92**. Assuming that one of the latches **130** and **132** is engaged with its associated tooth ring **114** and **116** and the other is disengaged, it will be apparent that for one direction of oscillation of this frame the connected housing of the related clutch will be similarly oscillated. Simply for purposes of illustration, it is assumed that latch **130** engages ring **114** and latch **132** is disengaged from ring **116**. Assuming further that the frame which includes plate **108** is being oscillated towards the observer out of the plane of Figure 3 it is apparent that the connected clutch housing **88** will move with it. If this particular clutch engages for that range of rotation it follows shaft **92** and hence double gear **94** will be similarly rotated. It follows, therefore, that the lead shaft **22** will be driven through the bevel pinions **24**. The rotation of lead screw **22** will cause nut **60** to move, for example, from the right towards the left (Figure 1) carrying the carriage and guide assembly **52** with it. This action will continue until the camming bar **56** on the carriage strikes the operating lever of the left-hand limit switch **134**. The guide assembly **52** will, therefore, guide the cable which passes therethrough into a series of contiguous convolutions from a layer on the drum of the cable reel. It is assumed, of course, that knob **68** has been properly adjusted for the particular size of cable being reeled.

When the carriage reaches the extreme limit of its travel to the left, limit switch **134** will be actuating to energize solenoid **122** and withdraw latch **130** from engagement with the toothed ring **114**. Simultaneously and by means of a support obvious to one skilled in this art, solenoid **124** which has been energized throughout the previously described operation will be de-energized and the spring loading on plunger **128** will cause latch **132** to engage the notched ring **116**. As soon as this happens, the lower clutch will begin to oscillate shaft **92** in the opposite direction with the result that lead screw **22** will cause the carriage to travel from its extreme left-hand position back to its extreme right-hand position. When the carriage reaches that position which is illustrated in Figure 1, limit switch **136** will be actuated to reverse the circuit connections to render the lower clutch inoperative and the upper clutch active again. Thus as the cable is reeled up on the drum, the carriage oscillates back and forth to lay layer after layer in smooth contiguous convolution.

It is apparent that the carriage will be caused to have a very uniform step-by-step movement traversely of the cable path, first in one direction and then in the opposite direction. The rate at which the carriage traverses the cable path is very simply determined by the degree to which the wobble plate is tipped. If desired, the scale on the indicator **76** can be directly calibrated in cable sizes so that even an unskilled operator can be used.

In order to move the cable guide assembly to some particular position for any reason, there needs only to be provided an auxiliary circuit to energize both of the solenoids **122** and **124** independently of the limit switches so as to release shaft **92** for free movement in either direction whereupon the lead screw **22** can be rotated by the hand wheel **26**.

It is, of course, apparent that by mounting the limit switch assemblies in the manner described they can be adjusted to any desired positions traversely of the cable path to adapt the operation of the mechanism to cable drums of varying width.

From the above description, it will be apparent that mechanics skilled in this art will readily think of many variations in the details of the construction of the device disclosed and since the particular details are for illustrative purposes only it is intended that the scope of the invention not be limited to those illustrated.

What is claimed is:

1. In a traversing mechanism of the type described a rotatably supported lead-screw shaft, means forming a guideway, a carriage movable on said guideway means and a driving connection between said shaft and carriage in combination with means for rotating said shaft in either direction comprising a power driven wobble plate, a pair

of oppositely acting clutches having a driving connection with said shaft and means for selectively connecting said clutches to said wobble plate.

2. In the combination of claim 1, said means for rotating said shaft including an oscillatable frame and said selecting means including a pair of electromagnetically operative latches for connecting said clutches respectively to said frame.

3. In the combination of claim 1, said means for rotating said shaft including an oscillatable frame and said selecting means including a pair of electromagnetically operative latches for connecting said clutches respectively to said frame, said frame having a driving connection with said wobble plate.

4. In the combination of claim 1, said last means including control devices actuated by said carriage.

5. In the combination of claim 1, said means for rotating said shaft including means for adjusting the stroke of said wobble plate.

6. In the combination of claim 1, a power driven shaft arranged axially of said wobble plate and means for changing the angular position of the wobble plate with regard to said shaft to vary the rate of rotation of said lead-screw shaft.

7. In a traversing mechanism of the type described in the combination with a reciprocal carriage and a rotatable lead-screw shaft operatively connected to said carriage, means for rotating said lead-screw shaft in adjustable increments in either direction comprising a drive shaft coupled to said lead-screw shaft, a cage oscillator on the axis of said drive shaft, a pair of oppositely acting clutches for selectively rotating said drive shaft in either direction and means for oscillating said cage including the power driven wobble plate.

8. In the combination of claim 7, means for adjusting the stroke of said wobble plate.

No references cited.