

W. F. HOSFORD.
REELING MACHINE.
APPLICATION FILED JAN. 3, 1918.

1,393,286.

Patented Oct. 11, 1921.

5 SHEETS—SHEET 1.

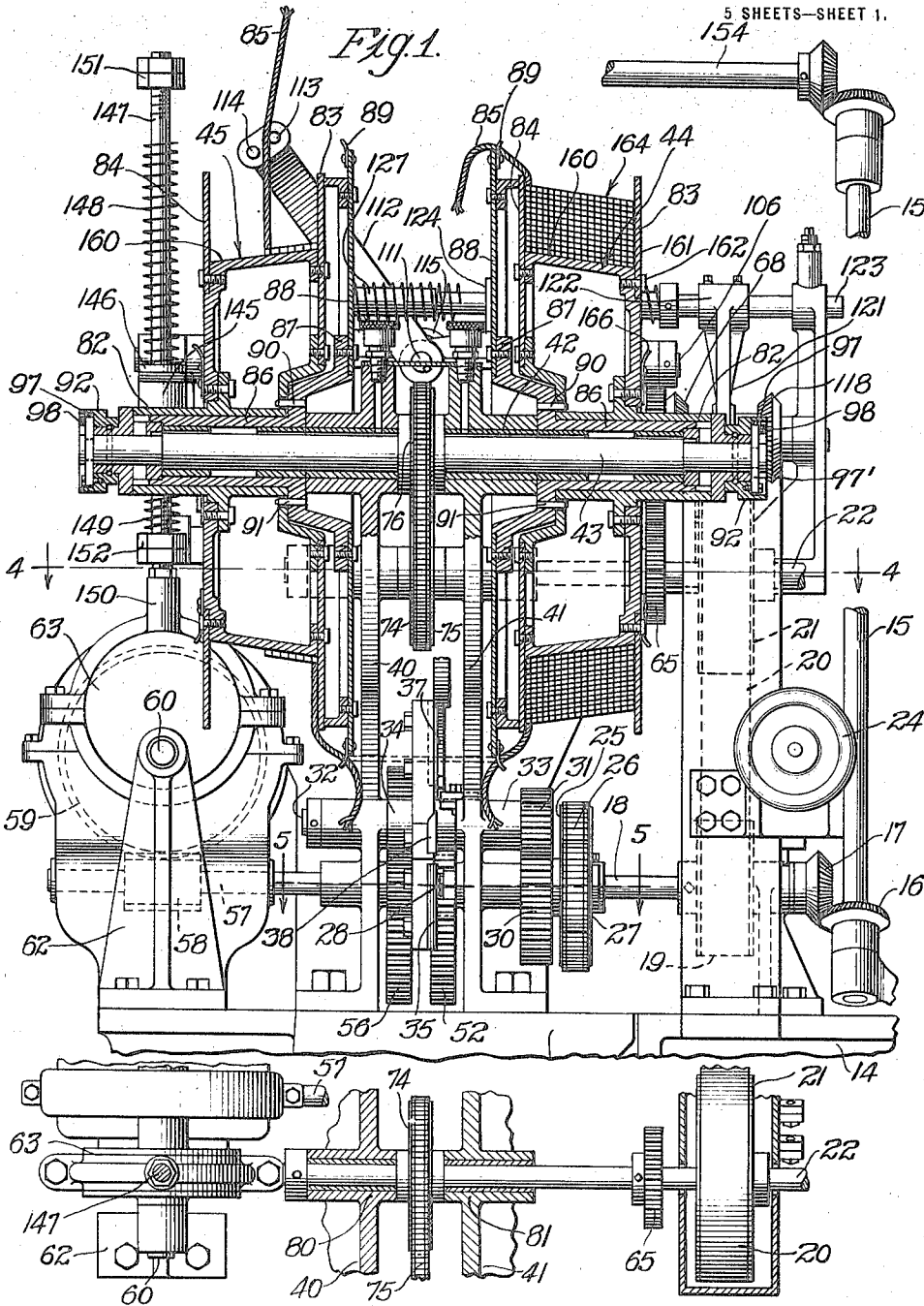


Fig. 4.

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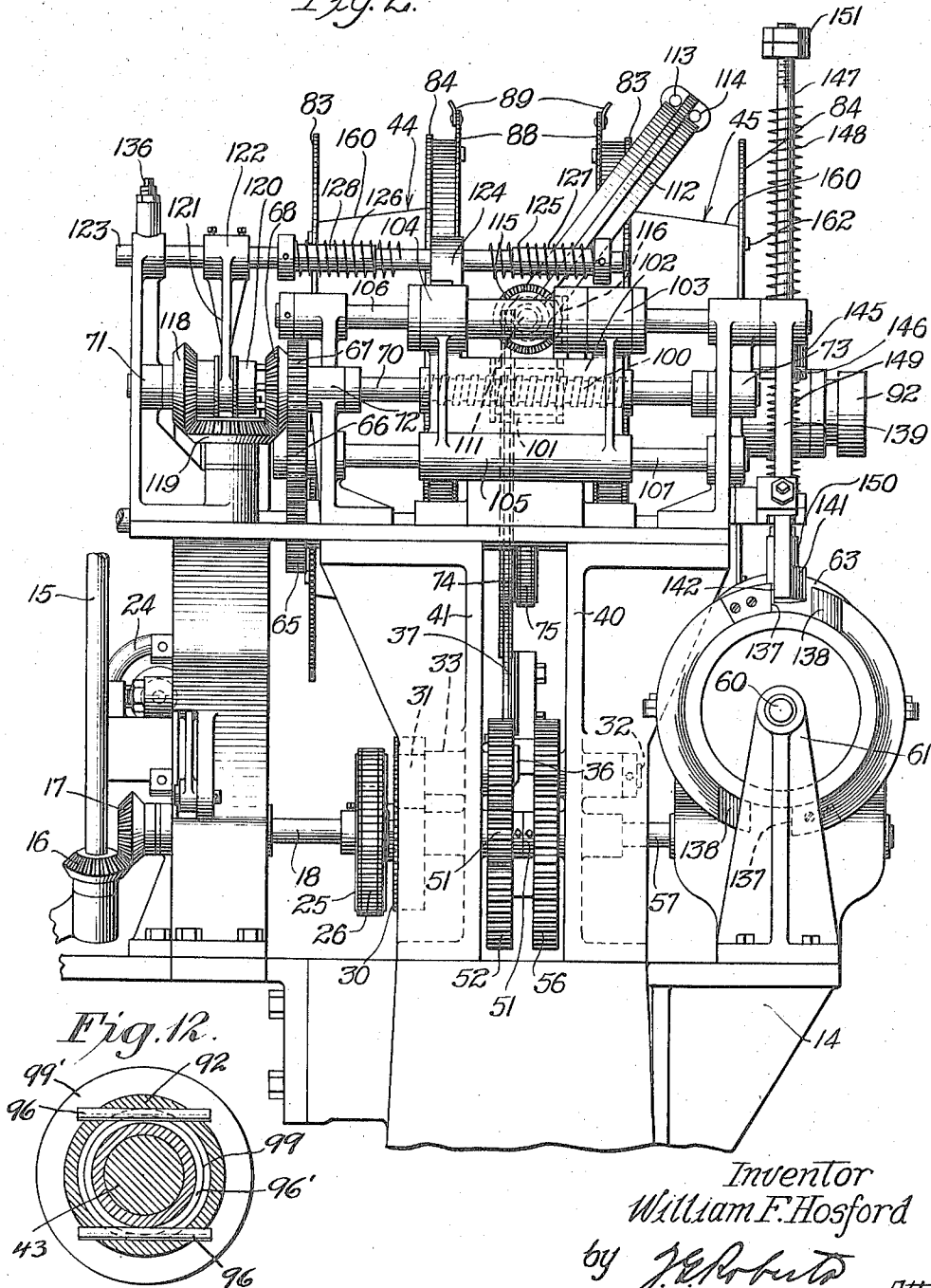
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5 SHEETS—SHEET 2.

Fig. 2.



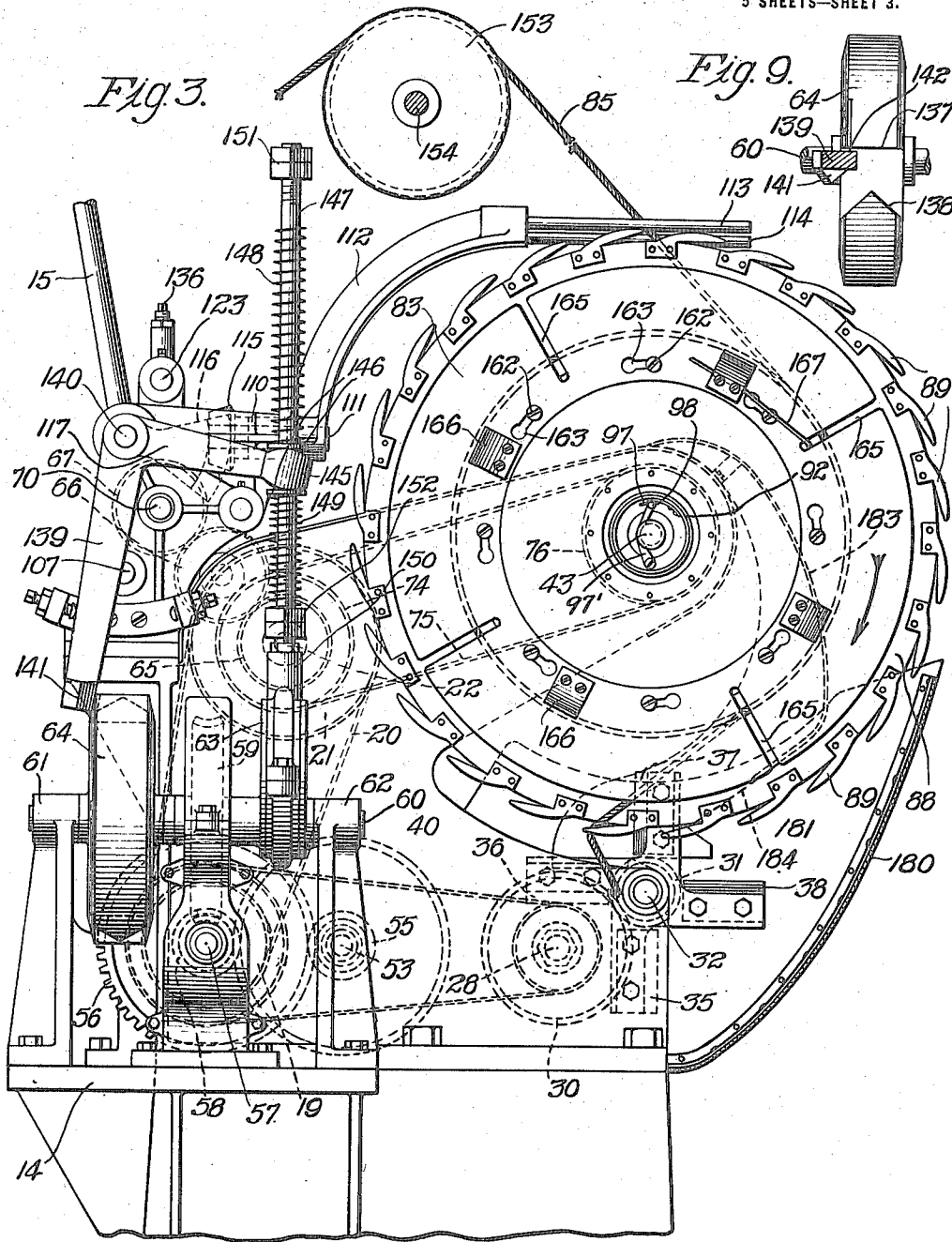
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5 SHEETS—SHEET 4.

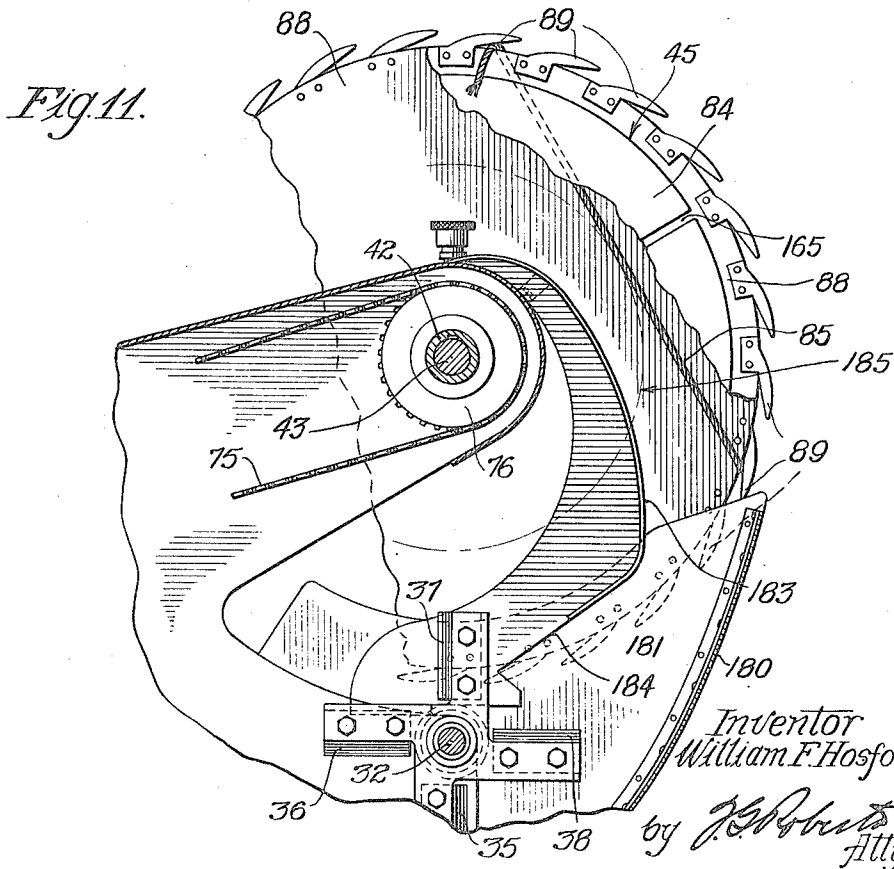
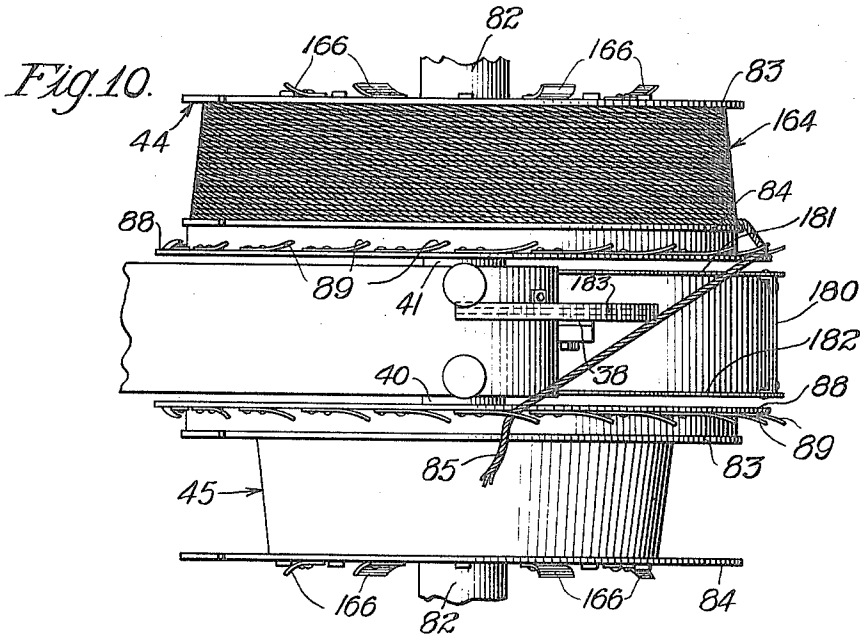
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5 SHEETS—SHEET 5.



UNITED STATES PATENT OFFICE.

WILLIAM F. HOSFORD, OF OAK PARK, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

REELING-MACHINE.

1,393,286.

Specification of Letters Patent.

Patented Oct. 11, 1921.

Application filed January 3, 1918. Serial No. 210,135.

To all whom it may concern:

Be it known that I, WILLIAM F. HOSFORD, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Reeling-Machines, of which the following is a full, clear, concise, and exact description.

This invention relates to a reeling machine, and more particularly to a continuously running reeling or take-up mechanism.

One of the objects of this invention consists in producing an improved reeling machine which is provided with means for automatically transferring the cord which is being wound, from a take-up reel which has been filled to an empty take-up reel without stopping the machine.

Another object resides in the production of means for automatically measuring the length of cord that has been wound, and of means for automatically severing the cord and transferring it to another take-up reel when the desired length of cord has been wound on one of the reels.

A further object consists in providing an improved reel rotating mechanism and in general improving the reeling machine construction, whereby the reeling operation can be performed with greater speed and efficiency.

Other objects will become apparent from the following description and the appended claims.

In the preferred embodiment of the invention herein described, the reeling machine is adapted to the reeling of twisted wires and is particularly applicable for use with the wire twisting machine illustrated and described in Patent No. 1,263,405, issued April 23, 1918. Obviously, however, the invention is not limited to this particular use, but may be used for reeling any kind of material.

The invention is illustrated in the accompanying drawings, in which:

Figure 1 illustrates a front elevation of the machine partly in section;

Fig. 2 shows a rear elevation of the machine;

Fig. 3 is a side elevation;

Fig. 4 is a sectional plan view taken on the line 4—4, Fig. 1, shown partly in section;

Fig. 5 is a sectional plan view taken on

the line 5—5, Fig. 1, shown partly in section;

Fig. 6 is an enlarged detailed sectional view of the means utilized for holding the shaft which controls the reversing mechanism;

Fig. 7 is a sectional view illustrating the means used for attaching the reel to the rotating shaft;

Fig. 8 illustrates the means used to insert tie cords into the reel for binding the completely wound reels;

Fig. 9 is a plan view of the timing wheel and its cooperating arm;

Fig. 10 is a plan view of the reels and the associated mechanism used in guiding the cord or wire in transferring it from one reel to the other, and

Fig. 11 is an end elevation partly in section thereof;

Fig. 12 is a vertical sectional view on a reduced scale taken on the line 12—12 of Fig. 7.

As illustrated in the drawings, the machine consists of a base 14 which carries the various standards for mounting the bearings which carry the shafts on which are mounted the various operating parts of the machine. Power for operating the machine is derived from the shaft 15. This shaft carries a bevel gear 16 that meshes with the bevel gear 17 rigidly secured to the horizontal shaft 18. The horizontal shaft 18 carries a pulley 19 on which is fitted a belt 20 cooperating with a pulley 21 rigidly secured to a second horizontal shaft 22. The belt 20 is fitted with any belt tightening means controlled by the handle 24. As illustrated in Fig. 5, the shaft 18 has rigidly secured thereto a sprocket wheel 25 carrying a chain 26 that cooperates with a second sprocket wheel 27 rigidly secured to a shaft 28 journaled in a bearing 29. The shaft 28 carries a spur gear 30 cooperating with a pinion 31 (Figs. 1 and 2) secured to a shaft 32 journaled in a bearing 33. The shaft 32 has secured thereto a sleeve 34 which carries the four cutting knives 35, 36, 37, and 38. Consequently whenever the shaft 18 is rotated, the sleeve 34 containing the cutting knives will also be rotated through the power transmission mechanism just described.

The sleeve 34 carrying the knives is mounted substantially in the central part of the machine between the vertical up-

rights 40 and 41. These uprights act as a supporting means for the bearing 42 in which is journaled the shaft 43 that carries the reels 44 and 45 on which the wire is wound.

Referring again to Fig. 5, it will be noted that the shaft 18 ends at 50 and has secured to this end the spur gear 51 meshing with a second spur gear 52 secured to a shaft 53 journaled in the bearings 54. The shaft 53 carries a spur gear 55 meshing with the gear 56 secured to a shaft 57. The shaft 57 carries a worm 58 meshing with a worm wheel 59 secured to a shaft 60 journaled in the bearings 61 and 62 (Figs. 1 and 2). The shaft 60 carries an eccentric 63 and the timing wheel 64, to be hereinafter described.

The shaft 22, as illustrated in Figs. 1, 2, and 4, has rigidly attached thereto a spur gear 65 which, through an intermediate spur gear 66, meshes with the spur gear 67 of the compound spur and bevel gear 68. This compound gear 68 is loosely mounted on the shaft 70 journaled in the bearings 71, 72, and 73. A sprocket wheel 74 carrying a chain 75 is also rigidly attached to the shaft 22, the chain 75 cooperating with a second sprocket wheel 76 rigidly secured to the shaft 43, and rotates said shaft and the cooperating reels 44 and 45. The shaft 22 is journaled in the bearings 80 and 81 secured to the upright walls 40 and 41.

The reels 44 and 45 may be of any construction, being preferably made of sheet steel and may be given any desired shape. The reels are loosely mounted on the shaft 43 and are secured thereto for the purpose of rotation by means of the mechanism illustrated in Fig. 7. Referring to Figs. 1 and 7, the reels are each equipped with an elongated sleeve 82 which carries the upright walls 83 and 84, between which the wire 85 is wound. This sleeve 82 rides on a sleeve 86 equipped with a flange 87 carrying the disk 88 which carries a plurality of circumferential fingers 89 utilized for catching the wire in the operation of the machine. The flange is equipped with pins 90 and 91 which fit into perforations in the reels when the reels are slid in position on the shaft over the sleeve 86.

As hereinbefore stated, the sleeves 82 and 86 are loosely mounted on the shaft 43 and are secured to said shaft for the purpose of rotating the reel and disk containing the fingers 89 by the mechanism illustrated in detail in Fig. 7. This mechanism consists of a cap 92 mounted on a cooperating disk 99'. This disk 99' is fitted at one end with a series of projecting teeth 93 cooperating with corresponding teeth 94 and 95 in the shaft 43 and the sleeve 86. The cap 92 is rotatably held on the disk 99' by pins 96, which ride in a groove 96' of the disk 99'. A spring

97 which normally holds an arm 97' in a groove of the shaft 43, holds the disk 99' and its associated cap 92 in rotatable relation with the shaft 43. The operator, to remove a reel which has been wound, holds the cap 92 which is rotatably loose on the disk 99' and then depresses the spring 97 by means of a handle 98 on the arm 97' so as to displace said arm 97' from said groove, the cap 92 and disk 99' can be then withdrawn from the shaft. Obviously when the cap 92 is placed in the position shown in Fig. 7, the teeth 93, cooperating with the teeth 94 of the shaft 43 and the teeth 95 of the sleeve 86, will connect the reel and the associated disk 88 with the shaft and cause them to rotate therewith.

As hereinbefore described, the shaft 70 is rotated by a suitable train of gearing from the shaft 22. This shaft carries a thread 100 cooperating with a sleeve 101 which is integral with a casting 102 fitted with the sleeves 103, 104, and 105 slidably mounted on the rods 106 and 107 respectively. The casting 102 is fitted with a bearing 110 (see Fig. 3) and carries a shaft 111 to which is rigidly secured a curved arm 112 carrying the wire guiding fingers 113 and 114. On the other end of the shaft 111 is mounted a bevel gear 115. This bevel gear 115 meshes with a geared sector 116 secured to the end of one arm of the rocker arm 117. The casting 102 is reciprocated to and fro on the rods 106 and 107 by means of the threaded portion 100 of the shaft 70 and its cooperating member 101. This reciprocation is accomplished by reversing the direction of rotation of the shaft 70 as the nut 101 approaches either end of the thread 100. In this reciprocation the fingers 113 and 114 distribute the wire on the reels from one face to the other so as to lay the wire on the reels in smooth even layers. The reversal of the rotation of the shaft 70 is accomplished by the gears 68 and 118, the gear 118 being driven from the gear 68 through the bevel gear 119 which meshes with these two gears. Slidably mounted on the shaft 70, but rotating therewith, is the sliding member 120 of a clutch which will engage cooperating clutch members attached to the gears 68 and 118 as the slidable member 120 of the clutch is reciprocated to and fro. The rotation of these gears, which are in a reverse direction, will consequently be transmitted to the shaft 70 through the medium of the slidable member 120.

The slidable member 120 of the clutch contains the upwardly extending arm 121 which carries a sleeve 122 secured to a rod 123. The casting 102 carries an upwardly extending arm 124 which carries a perforation in which is loosely fitted the rod 123. As the casting 102 is reciprocated by means of the thread 100 and its associated nut 101, the arm 124 comes in contact with the end

of either one of the springs 125 or 126, depending upon the direction of the reciprocation. The arm 124 consequently contacts with either one of these springs, compressing the spring until it strikes the raised portions 127 and 128 on the rod 123, one under each one of these springs. These raised portions are of a greater diameter than the perforation in the arm 124, and consequently the side of this arm will move the rod 123 either to the right or to the left, depending upon the direction of the reciprocation.

Vibration and movement of the rod 123, due to jarring of the machine, is prevented by the mechanism illustrated in detail in Fig. 6. Thus it will be noted that the rod 123 contains the V-shaped slots 130 and 131 in which a ball 132 rides, the ball being spring pressed by means of the spiral spring 133 fitted in a housing 134 in an upright extending lug 135. The upper portion of the lug is drilled and tapped to receive a screw 136 for regulating the tension of the spring 133. The pressure which the ball exerts in the V-shaped slots 130 and 131 can consequently be adjusted so that the rod 123 will be held in position against the compression of either of the springs 125 and 126. However, when the arm 124 strikes either of the raised portions 127 or 128 of the rod 123, then said rod will be moved either to the right or left, depending upon the direction of the reciprocation, and the ball 132 will be raised out of the slot. The compressed spring, either 125 or 126, will then move the rod 123 along until the ball 132 rides in the other slot. When this rod is thus moved it will disengage the slidable clutch member 120 which will be moved to engage the other face of the clutch, thereby reversing the rotation of the shaft 70. The upwardly extending rod 112 and its associated fingers 113 and 114 will consequently feed the wire to the reel in even smooth layers, due to the control of the reciprocation of this arm by the reciprocating and reversing mechanism just described.

When one of the reels has been filled with wire it becomes essential to shift the arm 112 to the other reel, cut the wire, secure the wire in a suitable manner for winding it on the second reel, and then reciprocate the arm 112 and its associated fingers to and fro in such a manner as to evenly distribute the oncoming wire onto the second reel. This action is controlled by the eccentric 63, the timing mechanism 64, the rocker arm 117 and their associated mechanisms.

The eccentric and the timing mechanisms are secured to the shaft 60 which is rotated by suitable gearing and shafting, as hereinbefore described. The timing mechanism consists (see Figs. 2 and 9) of a solid wheel equipped with two diametrically opposed circumferential slots. Each of these slots

has one face 137 cut at right angles to the side face of the wheel, whereas the other face 138 is V-shaped. Coöperating with the slots in this timing wheel (see Figs. 2, 3, and 9) is an arm 139 of the rocker arm 117 pivoted at 140, which carries a triangular projection 141 at its extreme end. One side of this arm 139 rides on the side face of the timing wheel, and the arm is so mounted in connection with the timing wheel that as the timing wheel revolves and the flat face 142 of the end of the arm reaches the face 137 of the notch in the wheel, the arm 139 will be free to swing through the circumferential notch in said wheel. The side face of the arm 139 is forcibly held against either one face or the other of the timing wheel 64 by means of the other arm of the rocker arm 117, the end of which terminates in a sleeve loosely fitted on a rod 147 between two washers 146 which contact with spiral springs 148 and 149 inclosing said rod. The rod 147 is secured to an eccentric collar coöperating with the eccentric 63.

Secured to either end of the rod 147 are the nuts 151 and 152 respectively. The gearing and transmission which rotates the shaft 60 is so timed that it will rotate the timing wheel 64 through a half revolution during the period required to completely fill a take-up spool or reel with wire. The rate of rotation of the timing wheel to accomplish this purpose can be readily determined by the rate of rotation of the capstan 153 to which the wire is first fed. Thus, for example, if the circumference of the capstan measures two feet, in order to wind 1000 feet of wire on the reel for a half rotation of the timing device, it would be necessary to so time the gearing between the capstan and the timing device that the capstan would make 500 revolutions for a half revolution of the timing wheel. To simplify the drawing, the gearing used to rotate the capstan 153 has not been shown, any type of gearing and shafting being obviously satisfactory for this purpose. Likewise the wire 85 has been severed and the capstan 153, which feeds the wire to the reels, has been placed directly above and between these reels. In the preferred form of the invention the capstan is placed at some distance above the reels, and the shaft 154 on which the capstan 153 is mounted is driven by any suitable means, and the main driving shaft 15 of the reeling machine is driven by suitable gearing from the shaft 154.

Returning now to the operation of the timing device 64 and the eccentric 63, it will be noted that as the shaft 60 revolves, the eccentric will raise and lower the rod 147. The eccentric is so located on the shaft that it will be in either its extreme upper or

lower position at the moment that the face 142 of the arm 139 of the rocker arm 117 just clears the face 137 in one of the notches of the timing wheel. In either one of these positions the sleeve 146 sliding on the rod 147 will be moved by the upper arm of the rocker arm 117 to its extreme upper or lower position, depending upon the position of the high point of the eccentric 63. When the high point of the eccentric is at the top of the shaft 60, the spring 149 will be compressed between the washer 146 and the nut 152, thereby exerting a pressure on the rocker arm 117, which will force the arm 139 of the rocker arm against the side face of the timing wheel 64. Consequently when the flat face 142 of the rocker arm clears the face 137 in the notch of the timing wheel, the spring 149 will rock the arm 117 upwardly and throw the arm 139 of the rocker arm into contact with the other face of the timing wheel. Likewise when the high point of the eccentric is in the diametrically opposed position the spring 148 will be compressed in a like manner to that described for the spring 149, and the arm 139 will be oscillated through the other notch in the timing wheel back to its original position.

The rocking of this arm will turn the rod 106 which carries the tooth sector 116 meshing with the gear 115, thereby rotating the shaft 111 and shifting the arm 112 through an angular position equal to the movement of the rocker arm. This will serve to throw the arm 112 from the reel on one side of the machine, as shown in Figs. 1, 2, and 3, to a corresponding position with respect to the reel on the other side of the machine, thereby moving the wire from one reel to the other. In this movement of the wire from one reel to the other, the wire is first carried over the disks 88 containing the projecting fingers 89, and since these disks are rotating, the wire in sliding over them will be caught by one of these fingers on each disk and tightly held.

As hereinbefore described, the shaft 43, carrying the reels 44 and 45 and the disks 88 on which the projecting fingers 89 are mounted, is driven from the pulley 19 by a belt 20 through the coöperation of the pulley 21, shaft 22, sprocket wheel 74, chain 75, and second sprocket wheel 76 on the shaft 43. This belt 20 constitutes a frictional drive for the shaft 43. The wire being fed to the reels at a constant speed and the circumference of the coil on the reel being increased for every revolution thereof as the coil is built up, it is necessary to gradually decrease the speed of the shaft 43. This reduction is accomplished by the slippage between the pulley 21 and belt 20. Because of this frictional drive of the shaft 43, there is a tendency to momentarily retard the speed of the disks 88 and the reels 44 and 45 when

one of the fingers 89 on either one of the disks 88 engages the wire as it is transferred from one reel to the other. Due to this momentary reduction in the speed of these reels, the wire is fed to the machine by the capstan 153 faster than it is taken up by the reels, with the result that the wire is loosely held between the disks 88. Consequently, unless the wire has been tightly wedged between the peripheries of the disks 88 and the particular engaging fingers 89 thereof, there will be a possibility of the wire sliding out from under the fingers. To obviate this difficulty and insure a wedging action in the gripping of the wire, the forwardly and upwardly protruding housing 180 comprising the wire guiding walls 181 and 182 is provided. (See Figs. 3, 10, and 11.) These wire guides 181 and 182 are positioned between the two disks 88 and serve to take up the slack in the wire, thereby putting the wire between the two walls under tension and thus serving to tightly wedge said wire between the peripheries of said disks and one of the fingers 89 on each of said disks.

As the disks 38 rotate, the wire is guided down the inclined upper surface of the guiding walls 181 and 182 to a second guiding surface 183 which constitutes an upwardly extending arm which is integral with the stationary cutting blade 184. This second wire guiding surface 183 functions to guide the wire to a position in the path of the cutting knives 35 to 38. Guiding of the wire to the cutting knives is necessary, since in the act of transferring said wire from one reel to the other, the wire will be caught by a finger in the disk associated with the first reel which is somewhat advanced in its relative peripheral position to the finger which picks up the wire attached to the disk associated with the second reel. Due to this action, the wire will not be stretched straight across the space intervening between the two disks 88, but will assume an angular position similar to that illustrated in Figs. 10 and 11. When the angle assumed by the wire between the disks is as great as that there shown, said wire will at no time be carried into the path of the rotating knives by the rotating disks, which will be evident from the circular path 185 shown in Fig. 11, which indicates the path of said wire around its rotating center when said wire is held in the angular position shown in Figs. 10 and 11. However, when the wire is held in such an angular position, it is forced into the path of the rotating knives by the wire guiding surface 183. Consequently as the reel moves around with the wire stretched between the two disks 88 it will be severed when it reaches the position of the rotating knives. After the wire has been severed it is completely disconnected from the reel which has just been wound

and the arm 112 is in a position to properly distribute the oncoming wire 85 in layers onto the second reel.

For the purpose of reducing the number of reels required per machine, the reels used are given an inclined winding surface 160 (see Fig. 1) and the outer face 161 of the reel is attached to the reel proper by any suitable means such as the screws 162 fitted in the slots 163. With this construction the face 161 of the reel can be readily removed, the coil of wire 164 slipped therefrom, and the reel is ready to be reused. In order to properly bind the reels of wire 164 wound on the reel, the reels are fitted with a series of slots 165 (see Figs. 3 and 8) and a series of flat spring clamps 166 secured to the side of the reel. Before winding any wire on the reels a binding wire 167 is slipped through these slots and fastened to the side of the reel by means of the springs 166. These binding wires serve to properly tie up the coil of wire 164 before it is slid from the winding surface 160 of the reel and in this manner retain the reels of wire more nearly in the shape in which they are wound on the take-up reel.

The operation of the machine may now be briefly described as follows:

The reels 44 and 45 are first placed in position on the rotating shaft 43 and locked into position so that they will rotate with said shaft by means of the mechanism hereinbefore described and illustrated in Fig. 7. The wire 85 which is to be wound on the reels is then first given several turns about the capstan 153, after which the wire is secured to the disk 88, associated with one of the reels, by means of one of the holding fingers 89. The machine is then started, which will rotate the two reels and also actuate the mechanism carrying the distributing fingers 113 and 114, thereby reciprocating it to and fro, feeding the wire onto the reel in smooth even layers as said reel is rotated. At the same time the eccentric 63 and the timing wheel 64 will be very slowly rotated.

When the desired length of wire has been wound on the reel, which depends upon the rotation ratio between the capstan 153 and the shaft carrying the eccentric 63 and the timing wheel 64, the rocker arm 117 will be rotated through one of the slots of the timing wheel. This will shift the arm 112, as hereinbefore described, from the reel on which the wire was being wound to the other reel of the machine. In this shifting movement the wire will be caught by one of the fingers of the disk associated with the reel on which the wire is wound stretched across the space intervening between the two reels, and then caught by another finger on the disk associated with the empty reel on which the wire is about to be wound. As

the reels continue to rotate, the wire which is stretched between the space intervening between the two disks by the guiding walls 181 and 182 will be guided, by the guiding surface 183, into the path of the rotating knives which rotate about the shaft 32 at the bottom of the machine. The wire will therefore be cut by these knives and the oncoming wire will be disconnected from the wire which has been wound on the first reel.

The wire will now be wound on the second reel in smooth even layers by means of the reciprocations of the distributing arm 112. During the period that this wire is being wound on the second reel, the operator will depress the spring 97 in the cap 92 which will permit the cap to slip on the surface 99 of the collar 99' to which it is attached by means of the pins 96. The operator may now withdraw the cap 92, thereby disengaging the teeth 93 from the cooperating teeth 94 and 95 associated with the shaft and reel support respectively, whereby the reel which has been wound and its associated disk will cease to rotate with the shaft 43. The wound reel can then be slid from the shaft and replaced by an empty one. The cap is then returned and locked into place, after which the empty reel will revolve with the shaft 43.

When the second reel, to which the wire is now being fed, has been completely wound the arm 112 will be oscillated by the eccentric 63, the timing wheel 64 and the associated mechanism to a position to feed wire to the empty reel which has been put into position on the machine to replace the full reel first wound. In the shifting of the arm 112 the wire will be severed and caught by the fingers on the disk associated with each reel, as hereinbefore described.

The operation of winding wire on the empty reel will now be started, and the reel which has been completely wound will be removed from the shaft in a manner identical with that described for the first reel which was wound. This operation is continued, wire being continuously wound on one reel during the period that a completely wound reel is being removed from the machine. It will consequently be obvious that the reeling operation is continuous, the wire being fed to the machine at a constant rate, the full reels being removed from the machine and replaced by empty ones without in any manner retarding the reeling operation. This obviously greatly increases the speed and efficiency with which this work can be done.

Although the preferred embodiment of the invention herein described is designed for reeling 1000 feet of wire, it will be evident that suitable change gearing may be inserted between the capstan and the timing

device shaft, whereby the machine may readily be adapted for winding any desired length of wire. Obviously the invention is not limited to the preferred form thereof herein illustrated and described, but is capable of other applications and many variations without departing from its spirit and scope, as pointed out in the following claims.

What is claimed is:

1. In a continuously operating wire reeling machine, a continuously driven supporting member, a pair of receiving reels removably mounted for replacement upon said supporting member, a material distributing means, means for shifting said distributing means back and forth from a full to an empty reel in the operation of the machine, and a gripping means associated with each of said reels to secure the wire to the empty reel at each shift of said distributing means.

2. In a continuously operating reeling machine, receiving reels, a driven member upon which said receiving reels are adapted to be removably mounted in pairs for replacement, a material distributing means, means for automatically shifting said material distributing means back and forth from a full to an empty reel during operation of the machine, means associated with said reels for holding a section of the material therebetween during the shifting of said material shifting means, and means for severing the material between reels following the shifting of said distributing means from one reel to another.

3. In a continuously operating reeling machine, receiving reels, a driven member upon which said reels are adapted to be removably mounted in pairs for replacement, a material distributing means, means for automatically shifting said distributing means back and forth from a full to an empty reel during operation of the machine, means for severing the material between reels following the shifting of said distributing means, and means associated with the empty reel for catching and retaining the loose end of the material from the distributing means.

4. In a continuously operating reeling machine, receiving reels, a driven member upon which said reels are adapted to be removably mounted in pairs for replacement, a material distributing means, means for automatically shifting said distributing means back and forth from a full to an empty reel, and means for reciprocating said distributing means locally and in the same direction as the direction of the shift for feeding the material to the cooperating reel in smooth, even layers.

5. In a wire reeling machine, in combination, a capstan, a plurality of reels, a wire holding means associated with each of said reels, means to rotate said capstan, said wire

holding means, and said reels, a wire guiding means, said wire guiding means feeding said wire in even layers to one of said reels, means to shift said guiding means to another reel when a desired length of wire has been wound on one reel said wire being caught and held by said wire holding means associated with each reel in said shifting operation, and means to sever said wire after it is shifted from one reel to the other.

6. In a device of the character described, in combination, a rotatable capstan, a rotatable shaft, a plurality of receiving reels slidably and rotatably mounted on said shaft, a wire holding means for each of said reels rotatably mounted on said shaft, and means for locking said wire holding means and said reels to said shaft so they will rotate therewith.

7. In a device of the character described, in combination, a rotatable capstan, a rotatable shaft, a plurality of receiving reels slidably and rotatably mounted on said shaft, a wire holding means for each of said reels rotatably mounted on said shaft, means to lock said reels and said wire holding means to said shaft so they will rotate therewith, and means to unlock said reel and said wire holding means from said shaft during the continued rotation thereof.

8. In a wire reeling machine, in combination, a rotatable capstan, a rotatable shaft, a plurality of receiving reels mounted on said shaft, a wire guiding means common to all of said reels for feeding said wire from said capstan to said reels, means for locking and unlocking said reels to said shaft whereby said reels can be removed and placed on said shaft during the continued rotation thereof, means for winding a determined length of wire on one of said reels, means for shifting said wire guiding means to a second reel when a determined length of wire has been wound on one reel, a wire holding means associated with each reel for catching and holding the wire when the wire is thus shifted from one reel to the other, and means for severing the wire after it has been shifted from one reel to the other.

9. In a wire reeling machine, the combination with a plurality of rotating reels, of a wire guiding means for feeding the wire to said reels, a capstan for feeding the wire to said wire guiding means, a rotatable disk, and means interconnecting said capstan and said rotatable disk together with means associated with said disk for controlling said wire guiding means whereby said wire is shifted from one reel to another when a definite length of wire has been wound on the reel.

10. In a wire reeling machine, in combination, a rotatable capstan, a rotatable shaft, a pair of wire receiving reels slidably and rotatably mounted on said shaft, means to

lock said reels to said shaft, a wire guiding and distributing means for feeding the wire from said capstan to said reels in smooth even layers, means for shifting said guiding means from one reel to another when a desired length of wire has been wound on the reel, means associated with each reel for catching and holding the wire as it is shifted from one reel to the next, and a plurality of rotating knives for severing the wire which is stretched from one reel to the other in the shifting operation said wire end being held in position by the wire holding means.

11. In a wire reeling machine, in combination, a rotatable capstan, a rotatable shaft, a pair of wire receiving reels slidably and rotatably mounted on said shaft, means to lock said reels to said shaft, a wire guiding and distributing means for feeding the wire from said capstan to said reels in smooth even layers, means for shifting said guiding means from one reel to another when a desired length of wire has been wound on the reel, means associated with each reel for catching and holding the wire as it is shifted from one reel to the next, a plurality of rotating knives for severing the wire which is

stretched from one reel to the other in the shifting operation said wire end being held in position by said wire holding means, and means for guiding the wire into the path of said rotating knives.

12. In a wire reeling machine, in combination, a rotatable capstan, a rotatable shaft, a pair of wire receiving reels slidably and rotatably mounted on said shaft, means to lock said reels to said shaft, a wire guiding and distributing means for feeding the wire from said capstan to said reels in smooth even layers, means for shifting said guiding means from one reel to another when a desired length of wire has been wound on the reel, means associated with each reel for catching the wire as it is shifted from one reel to the next, other means for causing the wire to be firmly held by said catching means, and a plurality of rotating knives for severing the wire which is stretched from one reel to the other in the shifting operation said wire end being held in position by the wire catching means.

In witness whereof, I hereunto subscribe my name this 6th day of December, A. D. 1917.

WILLIAM F. HOSFORD.