

April 25, 1961

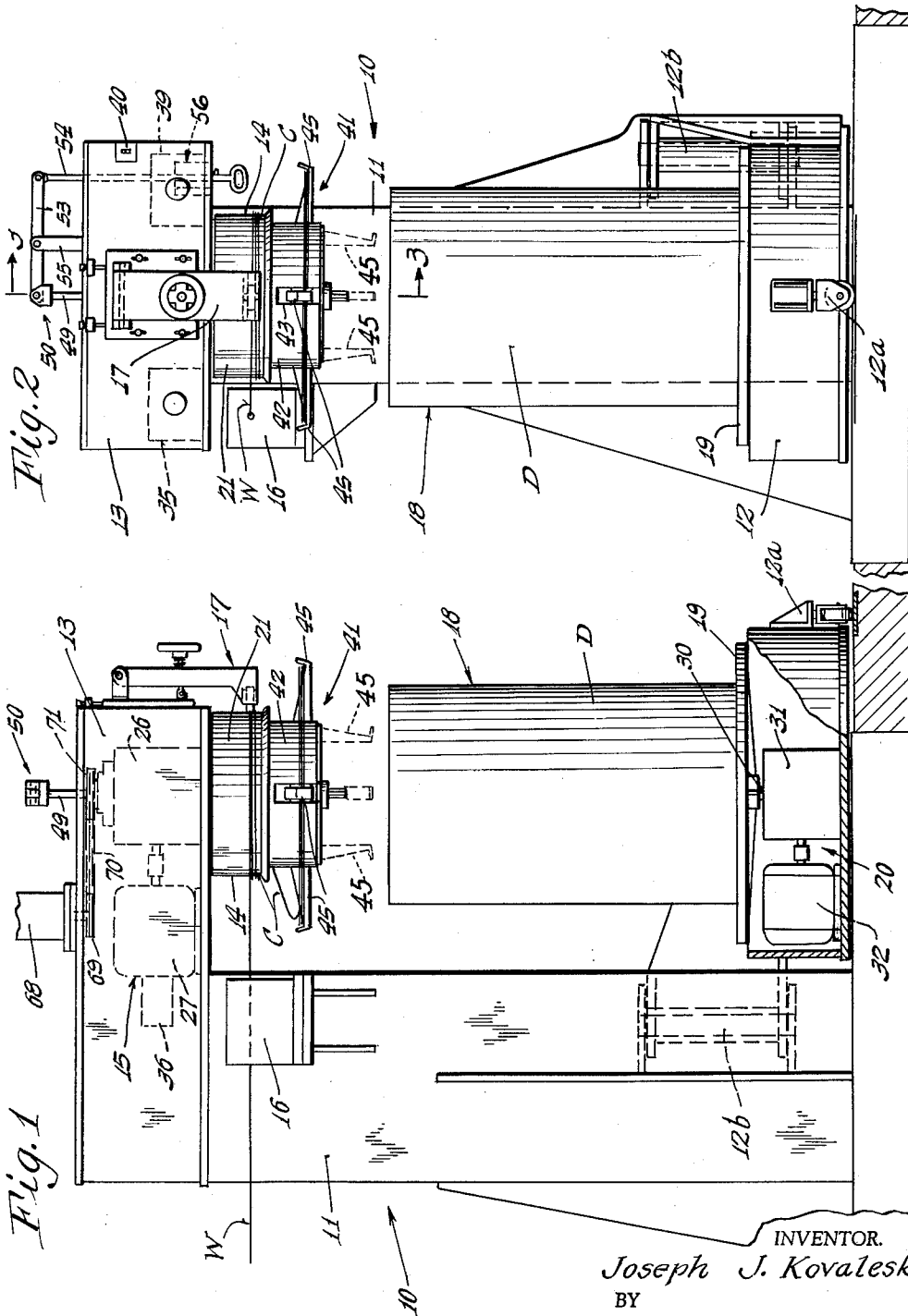
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2,981,494

VARIABLE SPEED WIRE COILING MACHINE

Filed April 22, 1958

3 Sheets-Sheet 1



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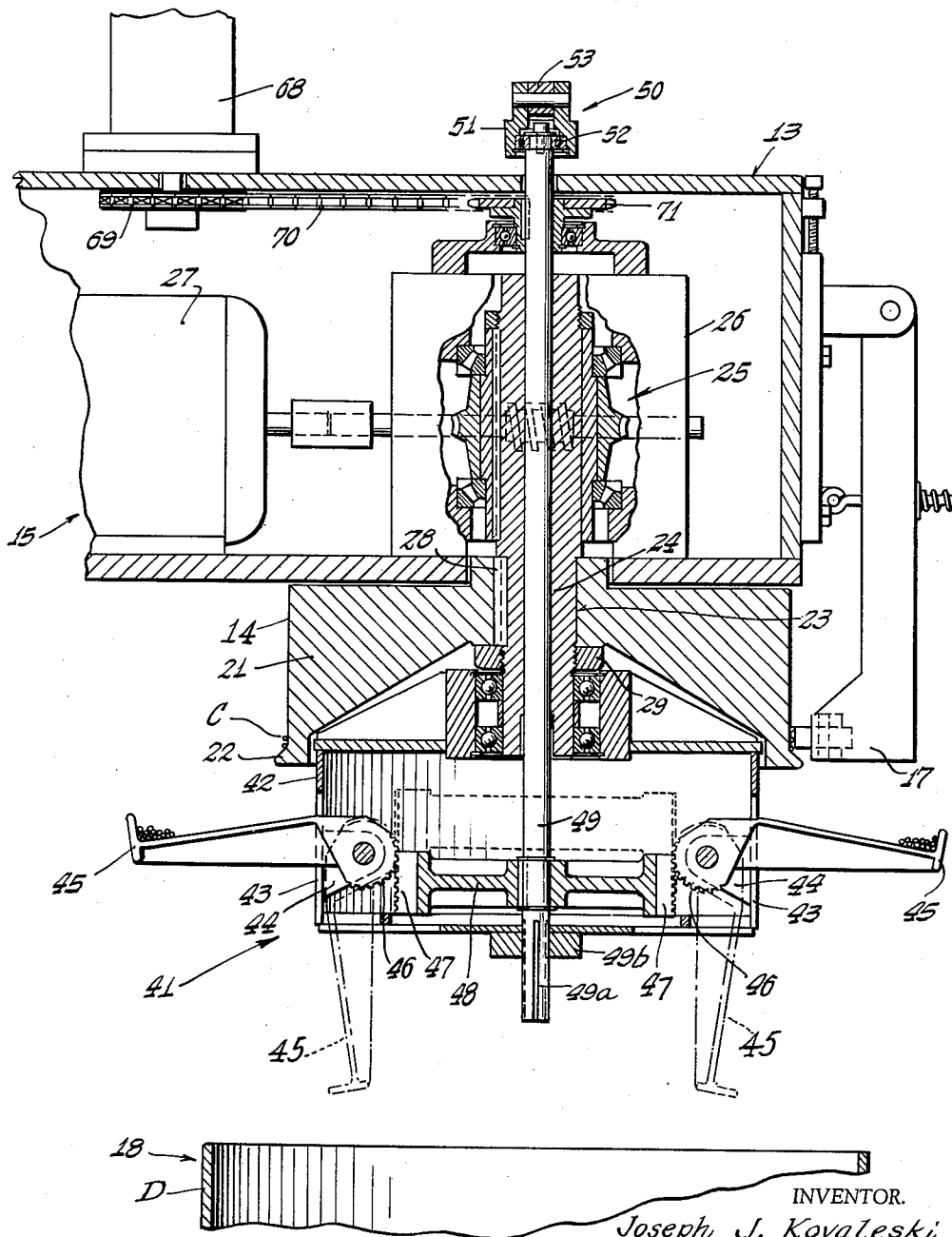
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3 Sheets-Sheet 2

Fig. 3



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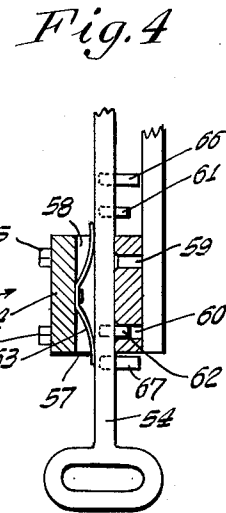
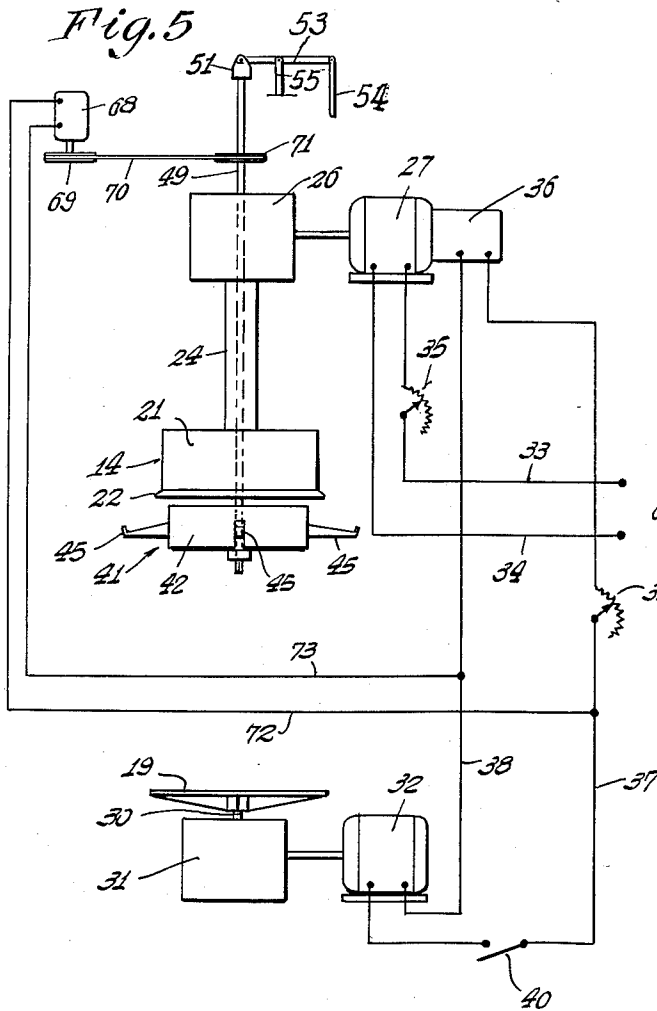
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3 Sheets-Sheet 3



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VARIABLE SPEED WIRE COILING MACHINE

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Filed Apr. 22, 1958, Ser. No. 730,163

15 Claims. (Cl. 242—83)

This invention relates to wire coiling or packaging machines which form wire into continuous coils and deposits the same in containers or bundles, from which the wire is again payed out at the point of use. More specifically, it pertains to a wire coiling machine which is readily adapted for use in coiling wire of different gauges and for forming coils of different sizes.

It is an important object of the invention to provide a wire coiling machine including a continuously rotating capstan and a separately driven rotating support for a wire receiving means, in which the relative rotation between the capstan and the support may readily be varied to cause wire of different sizes to be laid in coils in the wire receiving means.

It is also an object of the invention to provide a wire coiling machine, wherein a capstan and a support for a wire receiving means are individually rotated, by electrical means, at a fixed ratio relative one another, and in which the fixed ratio may be varied to cause the wire being fed from the capstan to be laid in coils of different sizes in the wire receiving means.

It is also an object of the invention to provide a wire coiling machine, wherein a capstan and a support for a wire receiving means are individually rotated by separate motors, having means therebetween for fixing the relative driving ratio so that the rotational ratio between the capstan and the support is fixed, and in which means are provided between the motors for varying the fixed driving ratio so that the rotational ratio is varied to cause wire, being fed from the capstan, to be laid in coils of different sizes in the wire receiving means.

It is another object of the invention to provide a wire coiling machine including a continuously rotating capstan and a support for a wire receiving means, wherein an accumulator assembly is mounted between the capstan and the support for accumulating the coils of wire being fed from the capstan to the wire receiving means, and in which the support and assembly are individually driven to rotate in a fixed ratio relative one another and at varying ratios relative to the capstan to cause wire being fed therefrom to be laid in coils of different sizes.

It is still another object of the invention to provide a wire coiling machine which is adapted to the continuous coiling of wire, even during the change-over of wire receiving means, and is readily adapted by merely varying the relative rotational ratio between the coil-forming capstan and the support for the wire receiving means, to lay the coils in bundles of a desired size.

It is further an object of the invention to provide a wire coiling machine wherein the individually driven support for a wire receiving means and accumulator assembly are rotated in fixed ratio relative to one another and in variable ratio relative to the coil-forming capstan so that wire coils are accumulated in bundles of desired size on the accumulator assembly for transfer and storage in the wire receiving means.

It is still further an object of the invention to provide a wire coiling machine which requires relatively little

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floor space, eliminates the time lost during the change-over of wire receiving means on the machine, is simple to operate and is of such rugged character as to function under all conditions of normal use.

With these and other objects in mind reference is had to the attached sheets of drawings illustrating one form of the invention, wherein like characters represent like parts and in which:

Figure 1 is a side elevational view of the wire coiling machine of the invention;

Fig. 2 is a front elevational view of the wire coiling machine illustrated in Fig. 1;

Fig. 3 is an enlarged fragmentary cross-sectional view, partially broken away, taken in the direction of arrows 3—3 in Fig. 2;

Fig. 4 is a fragmentary enlarged detailed view, partially in section, of the accumulator assembly operating handle;

Fig. 5 illustrates schematically the driving mechanism of the wire coiling machine and its related electric circuit.

Referring to the drawings, in Figs. 1 and 2 a wire coiling machine is generally indicated by the numeral 10. The machine basically comprises an upstanding frame consisting of a post or column 11, a base member 12 pivotally secured thereto and an overhanging head portion 13, the head portion being adapted to carry an inverted coil-forming rotatable capstan 14 and the driving means 15 therefor. A caster 12a is mounted on base member 12 to enable the base member to be readily pivoted about pivot 12b, carried by column 11, for a purpose to be hereinafter described. Mounted on column 11 is a wire guiding means 16, which may be a drawing die or similar device, and is adapted to feed incoming wire W to the inverted capstan 14 where it is engaged by a pressure roller device 17 for applying a cast to the wire and maintaining the coils C, formed thereby, in feeding relation with the capstan.

A wire receiving means 18, here shown in the form of a drum D, is mounted below capstan 14, in axial alignment therewith, on a turntable 19 or similar rotatable supporting means, for rotation, as the wire coils from the capstan are fed thereto. It should be noted that the invention is not limited to a wire receiving means in the form of the drum D, but contemplates the use of any wire receiving means commonly known to the wire coiling and packaging art. The drum, which is normally formed with a cylindrical core around which the coils of wire are dropped, and its supporting means are, during the filling operation, driven by driving means 20, mounted in the base member 12 of the frame.

In the operation of the wire coiling machine 10, wire W is fed to the capstan 14, from guide means 16, in such a manner that pressure roller 17 applies a cast to the wire, forming coils C. Continued rotation of the capstan feeds the wire coils C downwardly into engagement with wire receiving means 18, which is being rotated with supporting means 19 by driving means 20. The capstan is being rotated by driving means 15. After the drum D has been filled, the rotation of supporting means 19 is stopped in any manner known to the art, as by shutting off driving means 20, and the base member 12 is pivoted around pivot 12b on post 11 to facilitate the removal of the drum therefrom. The drum, or other type of wire receiving means which may be utilized in connection with the wire coiling machine, is then removed from the rotatable supporting means 19 in any conventional manner and a new wire receiving means is mounted in its place on the rotatable supporting means for continued operation.

Referring now to Figs. 1 to 3 and 5, a more detailed description of the inverted coil-forming capstan 14 with its related drive means 15 and the rotatable supporting member 19 with its related drive means 20, is given. The

capstan includes a substantially cylindrical solid body 21 of sturdy material, which may be formed by casting or in any other manner known to the art, and is provided on its outer surface with a circumferential rib 22 defining the lower peripheral edge of the body. Inwardly of body 21 a bore 23 is provided, which is adapted to seat an elongated hollow shaft 24. The shaft 24, which is connected through a suitable gear train 25, in a variable speed reducer 26, to a motor or similar source of power 27, mounted in head 13, is secured against radial displacement with respect to body 21 by key 28 and against axial displacement therewith by means of the lock nut 29, which engages the shaft and abuts the body adjacent the bore. The capstan 14, as described, is rotated by means of motor 27, through variable speed reducer 26 and hollow shaft 24. Under some circumstances it may be found convenient to provide capstan body 21 in the form of a hollow cylinder wherein hollow shaft 24 is seated in a collar carried by radially extending webs. Other means, of course, may be resorted to in the construction of the capstan and its related drive shaft.

The rotatable supporting member 19 which carries the drum D, or other wire receiving means 18, is itself carried by a shaft 30 which engages a gear train (not shown), in a variable speed reducer 31, to be driven therethrough by a motor 32 or similar source of power. The support means 19 may conveniently take any form but must be adapted to removably carry a wire receiving means. In the illustrated embodiment of the invention it is shown as a turntable.

Heretofore, in the operation of wire coiling machines the capstan and the supporting means were rotated at the same speed, or in a fixed ratio relative one another, the prior art machines being provided with means for driving the parts separately or for driving the supporting means from the rotating capstan. I have found that, to facilitate the coiling of wire of varying diameters and characteristics, it is desirable to be able to rotate the capstan and the supporting means at variable speeds relative to one another; in bundling heavy gauge wire, larger coils must be formed than in bundling light gauge wire and this is accomplished by reducing or increasing the rotational speed of the supporting means, relative to the capstan, as required. In the invention, relative changes in rotational speed are achieved by varying the driving ratio between the respective driving means for the capstan and the supporting means.

It is contemplated, in accordance with the invention, that motor 27, which drives capstan 14 be connected through appropriate input and output lines 33 and 34 respectively, to a source of power (not shown) and that control means 35, which may be in the form of a potentiometer, be provided in input line 33 to control the speed of motor 27. A generator tachometer 36 is connected to motor 27, to be driven thereby, the generator operating motor 32, of the supporting means, through input and output lines 37 and 38 respectively. The generator tachometer 36, in addition to operating motor 32, will function to maintain a fixed driving ratio between motor 27 and motor 32 by generating a predetermined amount of current to the latter. In one embodiment of the invention the fixed predetermined ratio between the motors will be one to one, however, any other desired ratio may be established. It should be noted, that control means 35, which controls the speed of motor 27, will likewise control the speed of motor 32, since the motors are retained in fixed driving ratio by the generator tachometer 36. A control means 39, in the form of a variable resistance, potentiometer or similar device, is provided in input line 37 for changing the amount of current flowing to motor 32 from generator 36. By means of this control, the driving ratio between motor 32 and motor 27 may be varied, thereby varying the rotational ratio between the capstan 14 and the supporting means 19 to

facilitate the coiling of wire having different diameters and characteristics.

A switch 40 may conveniently be provided in input line 37, adjacent motor 32, for opening the circuit between the motor and generator 36. By means of the switch, rotation of supporting means 19 is stopped to facilitate removal of wire receiving means 18 therefrom and the substitution of a new wire receiving means in its place.

In the operation of the wire coiling machine, above described, wire W is fed to capstan 14, which is being rotated by motor 27 through variable speed reducer 26, from guide means 16, at which point it is cast into coils C, by means of pressure roller 17. The driving speed of motor 27, which is being operated from a source of power, not shown, through leads 33 and 34 is controlled by control means 35. Supporting means 19, carrying wire receiving means 18, is rotated, simultaneously with capstan 14, by motor 32, which is powered by generator tachometer 36. As previously explained, the driving ratio between the motors is fixed and, therefore, the speed of motor 32 is also controlled by control means 35. After the wire has been passed around capstan 14 in a number of coils, it is directed over rib 22 into drum D, or similar wire receiving means 18. Should it be desirable to vary the fixed rotational ratio between the capstan and the rotatable support for the wire receiving means to accommodate wire of different gauges or characteristics, such variations may be achieved by manipulating control 39 to increase or to decrease the amount of current traveling to motor 32.

After the wire receiving means has been filled, the wire between the capstan and the wire receiving means is severed, by any means known to the art and switch 40 is opened, to break the circuit between motor 32 and generator 36, thereby stopping the motor and preventing further rotation of supporting means 19. The filled wire receiving means are then removed from the supporting means by a fork lift truck, or in any other manner known to the art, and a new wire receiving means is provided in its place. By merely closing switch 40, the coiling and packaging operation is repeated to fill the next container.

In order to facilitate the removal of a filled wire receiving means 18, from its rotatable support, as above described, without shutting the entire machine down and stopping the wire coiling rotation of capstan 14, the invention contemplates providing a rotatable accumulator assembly 41 (best shown in Figs. 3 to 5) between the capstan and the wire receiving means. The accumulator assembly, which is carried in vertical coaxial alignment with capstan 14, includes a hollow substantially cylindrical carrier 42 having a plurality of finger slots 43 and being formed with integral inwardly extending brackets 44 adjacent the slots. Accumulator fingers 45 are pivotally supported by brackets 44 for extension outwardly of carrier 42 (as shown in solid lines in Fig. 3) and for retraction inwardly thereof (as shown in dotted lines in Fig. 3). The accumulator fingers 45 include gear segments 46 adapted to operably engage racks 47 carried by rack support 48 which is secured to a quill shaft 49 for longitudinal movement therewith. Quill shaft 49, which is rotatably mounted within hollow shaft 24, extends upwardly and outwardly thereof for connection to an accumulator finger operating assembly 50. The operating assembly 50, which is adapted to impart longitudinal axial movement to the quill shaft, includes a housing 51 having bearing means 52, of any type commonly known to the art, for enabling the quill shaft to rotate within the housing. An arm 53 is pivotally connected to housing 51 and to an operating handle 54 and is adapted to be pivoted around a fulcrum 55 (see Fig. 2). The operating handle 54 extends through head 13 of the frame of machine 10 and is engaged by means 56 which positively controls its operation (see Fig. 4). The positive control means 56 includes a box 57 which is formed with a channel 58 adapted to slidably receive the oper-

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ating handle. Slots 59 and 60 are formed in box 57 transversely of and opening into channel 58 and are adapted to alternately engage studs 61 and 62, formed on operating handle 54, respectively. Spring means 63 is provided in channel 58 for resiliently pressing operating handle 54 toward transverse openings 59 and 60. Box 57 may conveniently include a cover 64, removably retained in position with respect thereto by bolts 65 or similar means, adapted to be readily removed so that spring 63 may be replaced. Positive stop means 66 and 67 are formed on operating handle 54 to facilitate the alignment of studs 61 and 62 with their respective openings 59 and 60.

In utilizing the operating assembly 50 to extend and retract accumulator fingers 45, the operating handle 54 is moved upwardly such that stud 62 is engaged in opening 60 in control means 56. The upward movement of the operating handle pivots arm 53 around fulcrum 55 to force quill shaft 49 downwardly through hollow shaft 24 carrying support 48 and racks 47 with it. As racks 47 move downwardly they engage gear segments 46 on fingers 45 thereby pivoting the fingers to extended position. The engagement of stud 62 in opening 60 acts as a positive stop for fingers 45 and prevents the unintentional retraction thereof. In order to retract the fingers the operator need only move operating handle 54 to the left (as seen in Fig. 4), to compress spring 63 so that stud 62 is disengaged from opening 60, and then move the handle downwardly to engage stud 61 in opening 59. The downward movement of operating handle 54 pivots arm 53 around fulcrum 55 to move quill shaft 49 upwardly through hollow shaft 24. The upward movement of quill shaft 49 carries support 48 and racks 47 with it, the racks engaging gear segments 46 to pivot fingers 45 into retracted position.

It is desirable, when utilizing the accumulator assembly for accumulating coils of wire for transfer to wire receiving means 18, carried on the rotatable support 19, to rotate the accumulator assembly at the same speed as the supporting means is rotated. In the illustrated form of the invention the accumulator assembly is continuously rotated irrespective of the position of the accumulator fingers, however, it is understood, that under some circumstances it may be desirable to rotate the accumulator assembly only during the periods when the fingers are extended.

Many forms of drive means may be utilized to rotate the accumulator assembly. In the illustrated form of the invention the drive means is shown to include a motor 68 connected in driving relation to the quill shaft through a pulley 69, chain belt 70 and sprocket wheel 71. The rotation imparted to quill shaft 49, by the motor, is transmitted to accumulator carrier 42 through spline gear 49a, which engages the member 49b, connected to the carrier. It will be noted that the depth of spline gear 49a is sufficient to enable it to engage member 49b in both the finger extending and retracting positions of the quill shaft. Motor 68 is connected to generator tachometer 36, through input leads 37, 72 and output leads 38, 73, to be operated thereby and, similar to motor 32, is operating at a fixed driving ratio relative to motor 27 (see Fig. 5). The current flowing to motors 32 and 68 from generator 36, is substantially identical, thereby maintaining a substantially identical driving speed between the two and maintaining substantially identical rotational speeds between the supporting means 19 and the accumulator assembly 41. As was described with respect to motor 32, the control means 39, which is provided in input line 37, changes the amount of current flowing between the generator and motor 68 to vary the driving ratio between the latter and motor 27. In this manner the rotational ratio between the accumulator assembly and the capstan is varied while the rotational ratio between the accumulator assembly and the supporting means is maintained.

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Switch 40, which was previously described, is adapted to cut off the flow of current to motor 32, to stop the rotation of supporting means 19 without cutting off the flow of current to accumulator assembly motor 68. In this manner, the rotation of supporting means 19 is stopped to facilitate the removal of a filled wire receiving means therefrom and the substitution of a new wire receiving means in its place, while simultaneously the coils of wire which continue to emanate from the continuously rotating capstan are temporarily accumulated on the extended fingers of the rotating accumulator assembly.

Thus, among others, the several objects of the invention as aforementioned are achieved. Obviously, numerous changes in the structure may be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, means for rotating said capstan to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, separate means for rotating said support means, means for directing said wire coils from said capstan to said wire receiving means, means cooperating between said means for rotating said capstan and said separate means for rotating said support means for establishing a fixed rotational ratio between said capstan and supporting means and electrical means for varying the rotational ratio between said capstan and rotatable support means, whereby wire coils of varying sizes are received by said wire receiving means.

2. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, electrical means for rotating said capstan to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, separate electrical means for rotating said support means, means for directing said wire coils from said capstan to said wire receiving means, means cooperating between said electrical means for rotating said capstan and said separate electrical means for rotating said support means for establishing a fixed rotational ratio between said capstan and said rotatable support means, and electrical means for varying the rotational ratio between said capstan and said rotatable support means, whereby wire coils of varying sizes are received by said wire receiving means.

3. A wire coiling machine comprising a frame, an inverted rotational coil forming capstan mounted on said frame, means for feeding wire to said capstan, a motor operably connected to said capstan for rotating the same to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, a second motor operably connected to said support means for rotating the same, means for directing said wire coils from said capstan to said wire receiving means, means acting between said motors for fixing the driving ratio therebetween to establish a fixed rotational ratio between said capstan and support means and means for varying the rotational ratio between said capstan and rotatable support means, whereby wire coils of varying size are received by said wire receiving means.

4. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, a motor operably connected to said capstan for rotating the same to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, a second motor operably connected to said support means for rotating the same, means for directing said wire coils from

said capstan to said wire receiving means, a generator operably connected to said first named motor and operating said second motor for fixing the driving ratio therebetween to establish a fixed rotational ratio between said capstan and support means and electrical means acting between said motors for varying the driving ratio therebetween to vary the rotational ratio between said capstan and support means, whereby wire coils of varying sizes are received by said wire receiving means.

5. A wire coiling machine as in claim 4, wherein said electrical means acting between said motors for varying the driving ratio therebetween comprises a potentiometer.

6. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, means for rotating said capstan to form said wire into continuous coils, a turntable in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, separate means for rotating said turntable, means for directing said wire coils from said capstan to said wire receiving means, electrical means cooperating between said means for rotating said capstan and said separate means for rotating said turntable to establish a fixed rotational ratio between said capstan and turntable and electrical means for varying said fixed rotational ratio, whereby wire coils of varying sizes are received by said wire receiving means.

7. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, means for continuously rotating said capstan to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, separate means for rotating said support means, means for directing said wire coils from said capstan to said wire receiving means, means disposed between said capstan and support means for releasably accumulating said wire coils between said capstan and wire receiving means, said accumulator means being normally inoperative to receive wire coils and being adapted to be operated to receive wire coils from said continuously rotating capstan when said support means is not being rotated, electrical means cooperating between said means for rotating said capstan and said separate means for rotating said support means for establishing a fixed rotational ratio between said capstan and supporting means and electrical means for varying the rotational ratio between said capstan and rotatable support means, whereby wire coils of varying sizes are received by said wire receiving means.

8. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, electrical means for continuously rotating said capstan to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, separate electrical means for rotating said support means, means for directing said wire coils from said capstan to said wire receiving means, an accumulator assembly including normally retracted movable fingers therein rotatably mounted between said capstan and said rotatable support means, means for extending said normally retracted fingers so that said wire coils are accumulated thereon from said continuously rotating capstan when said support means is not being rotated, separate means for rotating said assembly, means for establishing a fixed rotational ratio between said capstan and the supporting means and assembly and electrical means for varying the rotational ratio between said capstan and the rotatable support means and assembly, whereby wire coils of varying sizes are received by said wire receiving means.

9. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, electrical

means for continuously rotating said capstan to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, separate electrical means for rotating said support means, means for directing said wire coils from said capstan to said wire receiving means, an accumulator assembly including normally retracted fingers rotatably mounted between said capstan and rotatable support means, means for extending said normally retracted fingers so that said wire coils are accumulated thereon from said continuously rotating capstan when said support means is not being rotated, further electrical means for rotating said assembly, means cooperating between said electrical means for rotating said capstan and said separate electrical means for rotating said support means and said further electrical means for rotating said assembly for establishing a fixed rotational ratio between said capstan and the supporting means and assembly and electrical means for varying the rotational ratio between said capstan and the rotatable support means and assembly, whereby wire coils of varying sizes are received by said wire receiving means.

10. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, a motor operably connected to said capstan for continuously rotating the same to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, a second motor operably connected to said support means for rotating the same, means for directing said wire coils from said capstan to said wire receiving means, an accumulator assembly including normally retracted fingers rotatably mounted between said capstan and rotatable support means, means for extending said fingers from normally retracted position when said support means is not being rotated so that said wire coils are accumulated thereon from said continuously rotating capstan, a third motor operably connected to said assembly for rotating the same, means acting between said motors for fixing the driving ratio therebetween to establish a fixed rotational ratio between said capstan and the support means and assembly and means for varying the rotational ratio between said capstan and the rotatable support means and assembly, whereby wire coils of varying sizes are received by said wire receiving means.

11. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, a motor operably connected to said capstan for continuously rotating the same to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, a second motor operably connected to said support means for rotating the same, means for directing said wire coils from said capstan to said wire receiving means, an accumulator assembly including normally retracted fingers rotatably mounted between said capstan and rotatable support means, means for extending said fingers from normally retracted position when said support means is not being rotated so that said wire coils are accumulated thereon from said continuously rotating capstan, means for positively retaining said fingers in extended position, a third motor operably connected to said assembly for rotating the same, a generator operably connected to said first named motor and operating said other motors for fixing the driving ratio therebetween to establish a fixed rotational ratio between said capstan and the support means and assembly, electrical means acting between said generator and said second and third motors for varying the driving ratio between said first motor and said other motors to vary the rotational ratio between said capstan and the support means and as-

sembly so that wire coils of varying sizes are received by said wire receiving means and means for stopping the rotation of said support means relative to said capstan and said accumulator assembly, whereby said wire receiving means are removed therefrom.

12. A wire coiling machine as in claim 11, wherein said electrical means acting between said generator and said second and third motors for varying the driving ratio therebetween comprises a potentiometer.

13. A wire coiling machine comprising a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, means for continuously rotating said capstan to form said wire into continuous coils, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, separate means for rotating said support means, means for directing said wire coils from said capstan to said wire receiving means and an accumulator assembly including movable normally retracted fingers therein rotatably mounted between said capstan and said rotatable support means, means for extending said fingers from normally retracted position when said support means is not being rotated so that said wire coils are accumulated thereon from said continuously rotating capstan and said wire receiving means, further separate means for rotating said assembly, means co-operating between said means for rotating said capstan and said separate means for rotating said support means and said further separate means for rotating said assembly for establishing a fixed rotational ratio between said capstan and the supporting means and assembly and means for varying the rotational ratio between said capstan and the rotatable support means and assembly, whereby wire coils of different sizes are received by said wire receiving means.

14. In a wire coiling machine including a frame, an inverted rotatable coil forming capstan mounted on said frame, means for feeding wire to said capstan, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon and means for directing said wire from said capstan to said wire receiving means; the improvement in driving

means comprising a motor operably connected to said capstan for rotating the same to form said wire into continuous coils, a second motor operably connected to said supporting means for rotating the same, a generator operably connected to said first named motor for operating said second named motor to fix the driving ratio between said motors and rotational ratio between said capstan and supporting means and means between said generator and said second named motor for varying the drive ratio between said motors and the rotational ratio between said capstan and supporting means.

15. In a wire coiling machine including a frame, an inverted rotational coil forming capstan mounted on said frame, means for feeding wire to said capstan, rotatable support means in vertical coaxial alignment with said capstan for supporting a wire receiving means thereon, means for directing said wire from said capstan to said wire receiving means and an accumulator assembly including movable normally retracted fingers therein rotatably mounted between said capstan and rotatable supporting means, and means for extending said fingers from normally retracted position when said support means is not being rotated so that said wire is accumulated thereon from said capstan; the improvement in driving means comprising means for continuously rotating said capstan to form said wire into continuous coils, independent means for rotating said supporting means and said assembly in fixed relation with respect to one another and said capstan and means for varying the rotation of said supporting means and assembly relative to said capstan, whereby wire coils of different sizes are laid in said wire receiving means.

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