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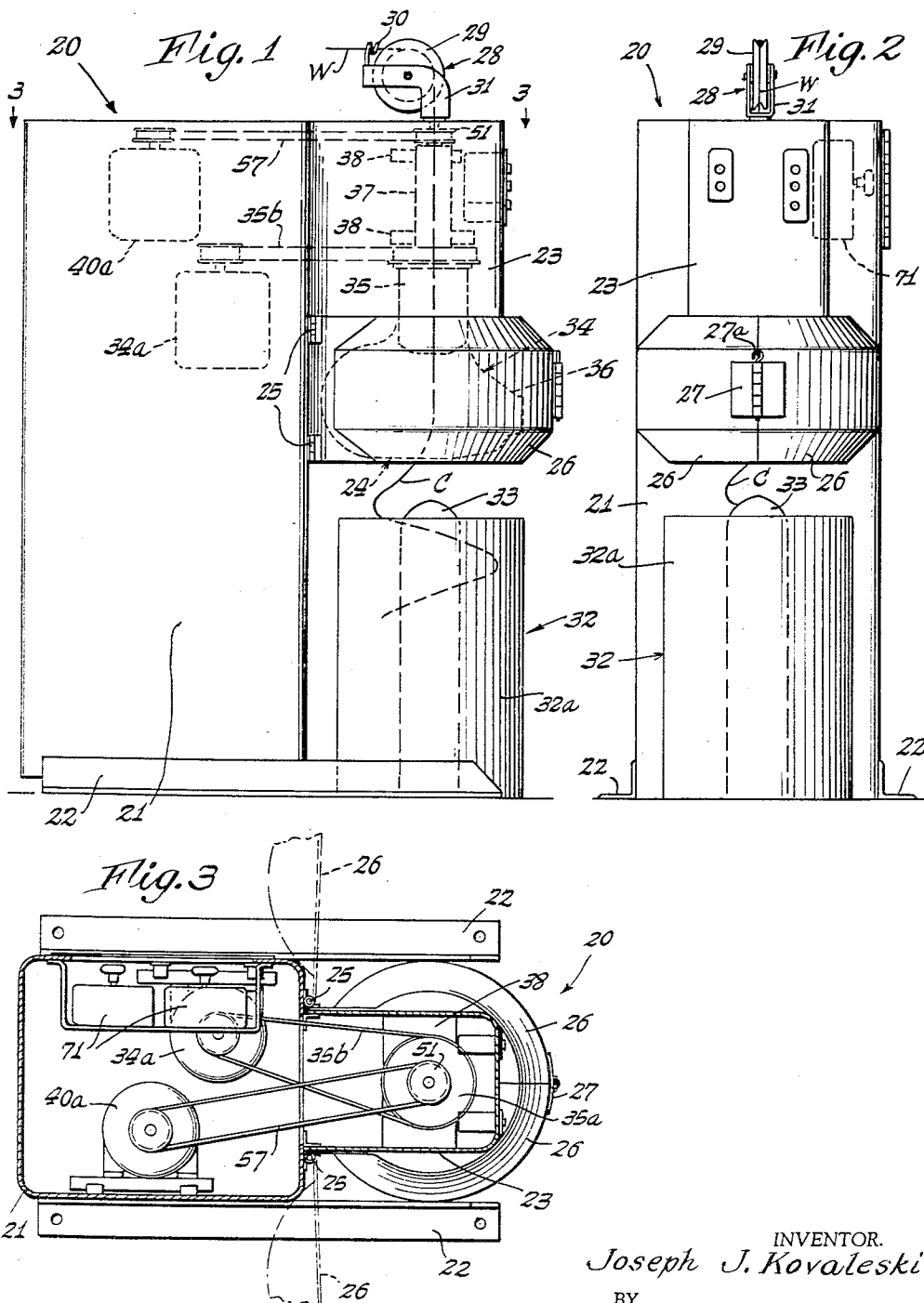
J. J. KOVALESKI

2,929,575

FLYER TYPE WIRE COILING MACHINE

Filed June 30, 1958

2 Sheets-Sheet 1



INVENTOR.
Joseph J. Kovalski
BY
Johnson and Kline
ATTORNEYS

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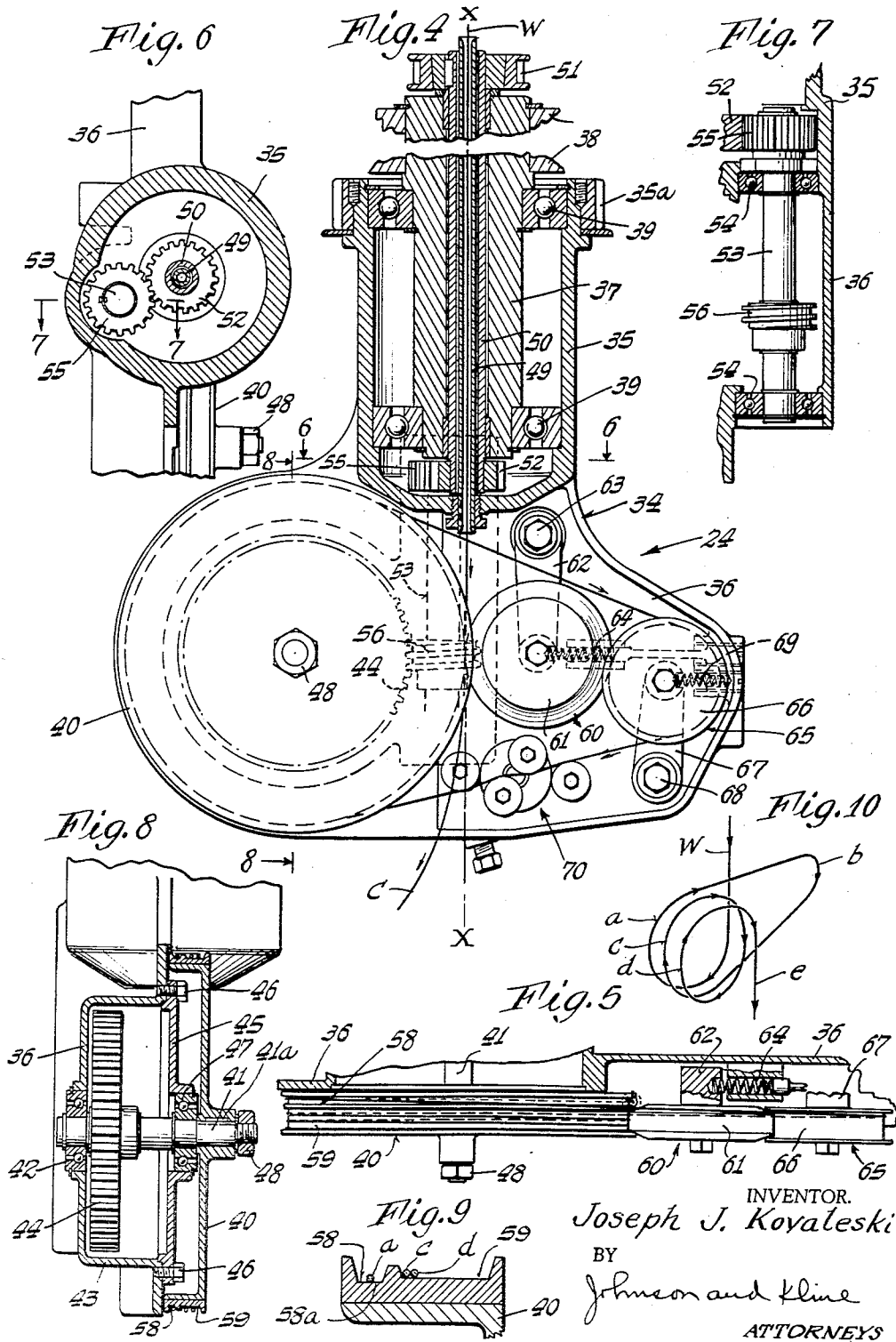
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FLYER TYPE WIRE COILING MACHINE

Joseph J. Kovaleski, Trumbull, Conn., assignor to The Couiter & McKenzie Machine Company, Bridgeport, Conn., a corporation of Connecticut

Application June 30, 1958, Serial No. 745,590

15 Claims. (Cl. 242—82)

This invention relates to wire coiling or packaging machines which form wire into continuous coils and deposits the same in containers or the like, 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 thereof of different sizes in a stationary wire receiving means.

It is an important object of the invention to provide a wire coiling machine in which a continuously rotating coil forming capstan is carried in an orbit around an axis of rotation for laying wire, emanating therefrom, in coils in a wire receiving means.

It is also an object of the invention to provide a wire coiling machine in which a rotatable coils forming capstan is carried in an orbit around an axis of rotation at a variable speed, relative to the speed of rotation of the capstan, for laying down coils of wire of different gauges or for varying the size of the coils laid in a stationary wire receiving means.

Another object of the invention is to provide a wire coiling machine wherein a flyer assembly, rotatably mounted on a frame, includes a coil forming capstan rotatably mounted in the housing of the assembly for rotation therewith in an orbit around its axis of rotation for laying wire in coils in a stationary wire receiving means.

Still another object of the invention is to provide a wire coiling machine including a rotatable flyer having a housing rotatably mounted on a frame, a coil forming capstan rotatably mounted in the housing for rotation therewith in an orbit around the axis of rotation thereof and means for casting coils into wire being laid in a wire receiving means by the flyer assembly.

Yet another object of the invention is to provide a wire coiling machine having a flyer assembly including a coil forming capstan, wherein the assembly and the capstan are individually rotated, with the capstan being carried in an orbit around the axis of rotation of the assembly for laying wire, having a cast therein, in coils in a stationary wire receiving means.

A further object of the invention is the provision in a wire coiling machine, having a flyer assembly including a rotatable coil forming capstan mounted for movement in an orbit around the axis of rotation of the assembly, of means for individually rotating the capstan and the assembly, whereby, on varying the relative speed of rotation thereof, wire having a cast therein emanating from the capstan is laid in coils of varying size in a stationary wire receiving means.

A still further object of the invention is to provide a wire coiling machine for removing wire from a source of supply, eliminating twists formed therein, casting the wire and laying the same into neat balanced bundles of coils in a stationary wire receiving means.

With these and other objects in mind, reference is had to the attached sheets of drawings, illustrating one

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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 elevation view of the machine of Fig. 1;

Fig. 3 is a cross-sectional view taken in the direction of the arrows 3—3 in Fig. 1;

Fig. 4 is a detail view, partially in section, of the flyer assembly of the wire coiling machine;

Fig. 5 is a fragmentary view, partially in section of a portion of the flyer assembly of Fig. 4;

Fig. 6 is a fragmentary cross-sectional view taken in the direction of the arrows 6—6 in Fig. 4;

Fig. 7 is a fragmentary sectional view taken in the direction of the arrows 7—7 in Fig. 6;

Fig. 8 is a fragmentary cross-sectional view taken in the direction of the arrows 8—8 in Fig. 4;

Fig. 9 is an enlarged fragmentary cross-sectional view of the wire carrying track portion of the coil forming capstan; and

Fig. 10 is a schematic representation of the wire path through the flyer assembly.

Referring to the drawings for a detailed description of the invention, in Figs. 1 to 3, a wire coiling machine is generally indicated by the numeral 20. The machine basically comprises an upstanding frame consisting of a post or column 21, a base member 22 in the form of a pair of spaced parallel angle supports and an overhanging head portion 23, the head portion being adapted to carry a flyer assembly 24, shown in dotted lines in Fig. 1 and in detail on sheet 2. Pivotally secured to post 21, as at 25, and beneath and in line with head portion 23 are complementary protective casing members 26 which are adapted to enclose flyer assembly 24 during the operation thereof to protect the operator of the machine against injuries resulting from wire whip. Hinge lock means 27 are provided on casing members 26 for retaining the members in closed position during the operation of the machine and for releasing the members when it is desired to have access to the flyer assembly for repair or similar purposes. When hinge lock means 27 are released as by removing lock rod 27a, the complementary casing members 26 may be pivoted around hinges 25 to their open position as shown in dotted lines in Fig. 3. Pivotally mounted atop head portion 23 of the frame is a wire guiding means 28, which may include a pulley 29 and a substantially U-shaped wire support 30 carried by a support 31, for guiding wire W from a source of supply (not shown) to the flyer assembly, for a purpose to be hereinafter described. A wire receiving means 32 which may be in the form of a pallet or similar support, but is here shown as a drum 32a is positioned below and in coaxial alignment with protective casing 26 and flyer assembly 24 for receiving coils C of wire emanating therefrom. Though it is not necessary to the proper functioning of machine 20, a cone shaped guide 33, or similar member, may be provided in the wire receiving means for controlling the receipt of wire therein.

Directing our attention to Figs. 4 through 10, a more detailed description of flyer assembly 24 is given. A housing member 34, which includes a substantially drum shaped neck portion 35 and an integral depending support portion 36, is rotatably mounted on head 23 of the machine frame for rotation around an axis of rotation X—X. The housing is mounted in head 23 through a sleeve 37. The sleeve, which is supported and fixed against rotation with respect to the head by blocks or plates 38 extending between the walls of the head, extends into neck portion 35 to rotatably carry the housing, through bearing means 39 of any type commonly known to the art. A toothed

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drive collar 35a is secured to the upper end of neck portion 35 for driving engagement with a chain belt 35b connecting the same to a motor 34a mounted in post 21 of the machine frame. It will be observed that the housing is rotated around the axis of rotation X—X by motor 34a through chain belt 35b and toothed drive collar 35a.

Rotatably mounted on support portion 36 of housing 34 is a coil forming capstan 40 which is adapted to be carried with the housing around the axis of rotation X—X. The capstan, as best seen in Fig. 8, is rotatably mounted on support portion 36 through a shaft 41, which is keyed to the capstan as at 41a and connected to the support through bearing means 42 of any commonly known type. It will be noted that support 36 is provided with a bulged portion 43 concentric with shaft 41 adjacent the end directed away from capstan 40 for accommodating a gear wheel 44 connected to the shaft for a purpose to be hereinafter explained. The shaft 41 is further rotatably supported with respect to support portion 36 through a bearing ring 45, connected to the support by bolts 46 or similar means, and a bearing means 47. A bolt 48 threadingly engages shaft 41 and retains capstan 40 against outward movement with respect thereto.

Connected to housing 34 and extending upwardly through neck portion 35 and sleeve 37, concentric with the axis of rotation X—X, is a quill shaft 49 for guiding wire W from the wire guiding means 28 (see Fig. 1) to the capstan. A capstan drive shaft or spindle 50, which is provided with a toothed drive pulley 51 at its outer end, ensleeves quill shaft 49 and extends downwardly through sleeve 37. The drive shaft is provided at its end directed away from drive pulley 51 with a gear member 52. A worm shaft 53 is rotatably carried by support portion 36 of the housing through bearing means 54 (see Fig. 7) and carries at its upper end a gear wheel 55 for meshing with drive shaft gear wheel 52. Intermediate the bearings 54 supporting shaft 53 is a worm gear 56 which is adapted to mesh with the teeth of gear 44 connected to capstan shaft 41. A motor 40a (see Fig. 1) mounted in post 21 of the machine frame is connected through a chain belt 57 or similar means to the toothed drive pulley 51. It will be observed that on rotating pulley 51 by motor 40a through belt 57, that drive shaft 50 and gear 52 are rotated. The rotation of gear 52, which meshes with gear 55 of worm shaft 53, turns worm 56 which is in meshing engagement with capstan gear 44 thereby rotating the capstan.

It should be noted at this point, that capstan 40, which is adapted to receive wire W guided thereto through quill shaft 49, is provided with a pair of parallel peripheral tracks 58 and 59, one of said tracks, track 58, being narrower than the other track. It will be observed from an examination of Fig. 9 that narrow track 58 is of slightly less diameter than track 59, as indicated at 58a, this structure serving a purpose to be hereinafter explained.

Mounted on support portion 36 of the housing for pivotal movement toward and away from capstan 40 is a pressure roller 60 which includes a roller wheel 61 rotatably mounted on an arm 62 pivotally connected to the support as at 63. The pressure roller, which is adapted to engage capstan 40 in track 59 thereof, is pressed in the direction of the capstan by a helical spring 64 which has one end connected to the pressure roller at the intersection of arm 62 and roller 61 and its other end secured to support 36 in any convenient manner. A wire guiding member 65, which is pivotally mounted on support member 36 adjacent the side of pressure roller 60 directed away from capstan 40, includes a sheave or pulley type roller 66 rotatably mounted on an arm 67 that is pivotally connected to the support as at 68. Spring means 69, having one end connected to support 36 and the other end connected to the wire guiding member 65 at the intersection of arm 67 and sheave 66, acts on the

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wire guiding member to move it away from pressure roller 60. A wire casting device 70 of any type commonly known to the wire art is mounted on support portion 36 operably between wire guiding member 65 and capstan 40.

In the operation of the afore-described wire coiling machine, wire W is guided by wire guiding means 28 and quill shaft 49 to wire receiving track 58 of capstan 40 and therearound for one turn, indicated at a in Fig. 10. On completing one turn around track 58 the wire is passed around sheave 66 of wire guide member 65 as indicated at b and thereafter to wire casting device 70. The wire is operably engaged with the wire casting device and then wound in a plurality of turns c, d, etc., on track 59 of the capstan from whence it is passed out of the bottom of flyer assembly 24 in coils C as indicated at e for disposition in a wire receiving means 32. The pressure roller member 60 is adapted to engage the plurality of turns c, d in track 59 and forces the same into engagement therewith. The rotation of capstan 40, as described above, acts to draw wire W from the source of supply and through the path a, b, c, d, e, at which time it is cast, to eliminate undesirable twists, and forms coils of the wire. The housing which is being simultaneously rotated about its axis of rotation X—X, as afore-described, lays the coils C emanating from track 59 of the capstan, as indicated at e, in Fig. 10, in coils of a desired size in the wire receiving means.

It is necessary, when casting wire to retain the wire under a controlled constant tension during its passage through the casting device. While such tensioning may be accomplished by any means known to the art, it is here achieved by forming one of the tracks, on the periphery of capstan 40, of a diameter smaller than the other track (see 58a in Fig. 10). On forming one turn of wire around track 58, of lesser diameter, and thereafter around a guide 65 to the other track, the desired wire tension is provided when the capstan is rotated.

It is often necessary or desirable in the packaging and coiling of wire to form coils of different sizes; this may be necessary due to the difference in gauges of the wire or to the packaging requirements therefor. In order to accomplish this effect without the necessity of rotating the wire receiving means or changing blocks, as was taught by the prior art, this invention contemplates varying the relative speed of rotation between the capstan and the flyer assembly. While the relative rotational speed of the capstan and flyer assembly may be varied by conventional gearing or similar means, in the illustrated embodiment of the invention the desired result is achieved by regulating the driving speed of the motors 34a and 40a; the concept of separate driving means for the capstan and flyer assembly, as embodied in the invention, facilitates varying the relative rotational speeds. It is contemplated that the drive speed of the motors will be controlled by potentiometer controls 71, however, other means will be obvious to those skilled in the art.

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 including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a support member rotatably mounted on said frame, a coil forming capstan rotatably mounted on said support member for rotation therewith in an orbit around an axis of rotation of said support member, means for guiding wire to said capstan, means for casting said wire, means for rotating said capstan on its axis so that said wire is drawn through said guide means and casting means and means for rotating said support member so that wire

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emanating from said capstan is laid in coils in said wire receiving means.

2. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, means for guiding wire to said capstan, means for casting said wire, means for rotating said capstan on its axis so that said wire is drawn through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

3. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, means concentric with said axis of rotation of said housing for guiding wire to said capstan, means mounted in said housing for casting said wire, means for rotating said capstan on its axis to draw said wire through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

4. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, means concentric with said axis of rotation of said housing for guiding wire to said capstan, means for casting said wire, means rotatably concentric with said axis of rotation of said housing and operably connected to said capstan for rotating the same so that said wire is drawn through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

5. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, a quill shaft connected to said housing and concentric with the axis of rotation thereof for guiding wire to said capstan, a casting device mounted in said housing for casting said wire, means rotatably carried by said housing for rotating said capstan on its axis so that said wire is drawn through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

6. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, means connected to said housing and concentric with the axis of rotation thereof for guiding wire to said capstan, means mounted in said housing for casting said wire, a spindle rotatably carried by said housing concentric with said axis of rotation and operably engaging said capstan for driving the same, means for rotating said spindle so that said capstan is rotated and

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wire is drawn through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

7. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan having a pair of parallel peripheral wire receiving tracks rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, means for guiding wire to one of said tracks, means for casting said wire emanating from said one track and directing the same to said other track, means for rotating said capstan so that said wire is drawn through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

8. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan having a pair of parallel peripheral wire receiving tracks rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, means for guiding wire to one of said tracks for making one turn therearound, means mounted in said housing for casting said wire emanating from said one track and directing the same to said other track for making a plurality of turns therearound, pressure means movably mounted in said housing for engaging said plurality of turns of wire on said other track, means for rotating said capstan so that said wire is drawn through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

9. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan having a pair of parallel peripheral wire receiving tracks rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, one of said tracks being of lesser diameter than said other track, means for guiding wire to said one track of lesser diameter for making one turn therearound, means for casting said wire emanating from said one track and directing the same to said other track for making a plurality of turns therearound, pressure means movably mounted in said housing for pressing said plurality of turns into engagement with said other track, means for rotating said capstan so that said wire is drawn under tension through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

10. A wire coiling machine as in claim 9, and means rotatably mounted in said housing for guiding said wire emanating from said one track of lesser diameter into operable engagement with said casting means.

11. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan having a pair of parallel peripheral wire receiving tracks rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, means concentric with said axis of rotation of said housing for guiding wire to one of said tracks for making one turn therearound, means for casting said wire emanating from said one track and

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directing the same to said other track for making a plurality of turns therearound, means for pressing said plurality of turns into engagement with said other track, means rotatably carried by said housing concentric with said axis of rotation thereof for rotating said capstan so that said wire is drawn under tension through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

12. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, means for guiding wire to said capstan, means for casting said wire, means for rotating said capstan so that said wire is drawn through said guide means and casting means, means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means and means for varying the relative rotational speed of said capstan and housing so that wire coils of different sizes are laid in said wire receiving means.

13. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan having a pair of parallel peripheral wire receiving tracks rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, means concentric with said axis of rotation of said housing for guiding wire to one of said tracks for making one turn therearound, means for casting said wire emanating from said one track and directing the same to said other track for making a plurality of turns therearound, means for pressing said plurality of turns into engagement with said other track, means rotatably carried by said housing concentric with said axis of rotation thereof for rotating said capstan so that said wire is drawn under tension through said guide

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means and casting means, means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means and means for varying the relative rotational speed of said capstan and said housing so that wire coils of different sizes are laid in said wire receiving means.

14. A wire coiling machine including a frame and a flyer assembly mounted on said frame for receiving wire from a source of supply and laying the same in coils in a wire receiving means; said flyer assembly comprising a housing rotatably mounted on said frame, a coil forming capstan having a pair of parallel peripheral wire receiving tracks rotatably mounted in said housing for rotation therewith in an orbit around an axis of rotation of said housing, one of said tracks being of lesser diameter than said other track, a quill shaft connected to said housing and concentric with said axis of rotation for guiding wire to said one track of lesser diameter for making one turn therearound, means for casting said wire emanating from said one track and directing the same to said other track for making a plurality of turns therearound, a sheave between said one track and said casting device for guiding said wire, a pressure roller pivotally connected to said housing for pressing said plurality of turns into engagement with said other track, a spindle rotatably carried by said housing concentric with said axis of rotation thereof, means operably connecting said spindle and said capstan so that said capstan is rotated and said wire is drawn under tension through said guide means and casting means and means for rotating said housing so that wire emanating from said capstan is laid in coils in said wire receiving means.

15. A wire coiling machine as in claim 14, and means for varying the relative rotational speed of said capstan and housing, so that wire coils of different sizes are laid in said wire receiving means.

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Notice of Adverse Decision in Interference

In Interference No. 92,587 involving Patent No. 2,929,575, J. J. Kovaleski, Flyer type wire coiling machine, final decision adverse to the patentee was rendered Oct. 8, 1963, as to claim 1.

[*Official Gazette November 12, 1963.*]