

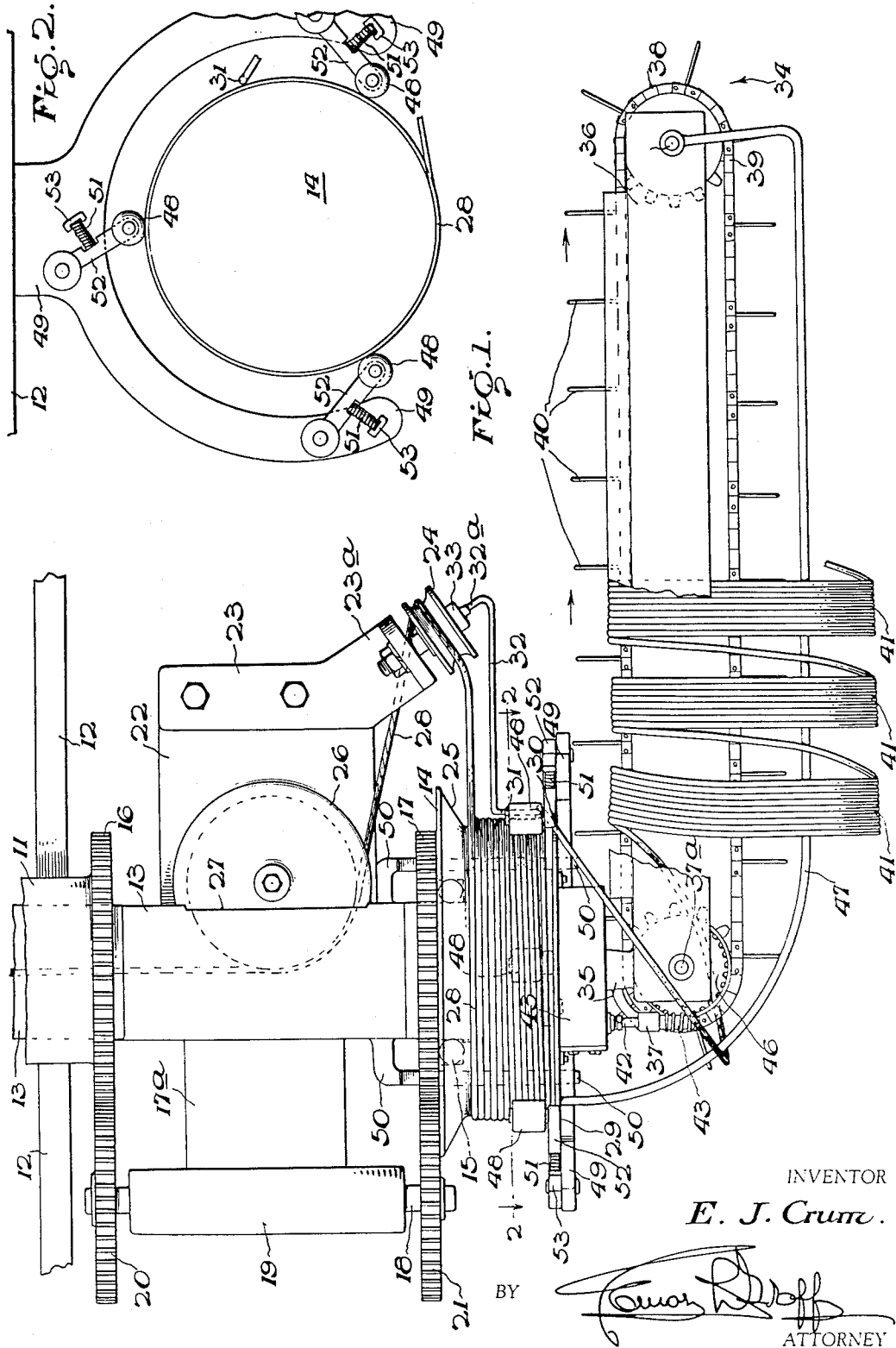
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CONTINUOUS COIL WINDING MACHINE

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CONTINUOUS COIL WINDING MACHINE

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2 Claims. (Cl. 242—79)

This invention relates to winding machines and an object thereof is the provision of a machine to wind wire or rope into continuous or connected coils or skeins containing given lengths of the wire or rope and which may subsequently be separated into individual coils or skeins or multiples thereof for individual use.

Another object of the invention is the provision of a machine of the type mentioned which operates in a continuous manner.

A further object of the invention is the provision of such a machine comprising a stationary drum, means for continuously winding a coil of rope or wire about the drum and means for continuous peeling strands or convolutions thereof from the drum onto a take-off unit in individual connected coils or skeins.

Other objects and advantages of the invention will be apparent from the following description, considered together with the accompanying drawing.

In the drawing:

Figure 1 is a front elevational view, partly broken away, of the principal parts of an embodiment of the invention.

Figure 2 is a plan sectional view along the line 2—2 of Figure 1.

Referring with more particularity to the drawing in which like numerals designate like parts, the embodiment illustrated comprises a hollow stationary casing 11 supported by any suitable means, such as frame members 12. Within said casing there is rotatably mounted a hollow vertical shaft 13, the lower end of which is rotatably connected to a circular drum or block 14 by means of a collar bearing 15 and whereby the drum is carried by the said shaft. The shaft may be driven by any suitable exterior means (not shown), such means being well known in the art and need not be described herein.

A horizontal ring gear 16 is secured to the bottom of the casing 11 and a similar gear 17 is secured to the top of the drum 14, both gears being concentric with the shaft 13. Secured to and extending laterally from the shaft 13 is an arm 17a which carries a vertical rotatable shaft 18 in a tubular bearing 19. The ends of the shaft 18 are secured to gears 20 and 21 for rotation therewith, which gears are in mesh with the gears 16 and 17, respectively, as shown. By these means, the gear 17, and hence the block 14, is held in the same stationary position as the casing 11, irrespective of the rotation of the shaft 13, since the gears 16 and 17 cannot move relative to each other so long as they are connected together through the gears 20 and 21 and shaft 18.

Another arm 22 is also secured to and extends laterally from the shaft 13. The outer end of the arm 22 carries a bracket 23, the lower end 23a of which is disposed at an outward angle and which rotatably carries a guide sheave 24. The upper end of the drum 14 has an annular upwardly extending flare 25 and the lower end of the sheave is on a horizontal line just below the top of the drum. The arm 22 rotatably carries another guide sheave 26 which extends part way through a vertical slot 27 of the

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shaft 13. By these means, the rope or wire 28 to be coiled is led downward through the hollow shaft 13 over the sheave 26, out through the slot 27, over the sheave 24, to the drum 14, whereby rotation of the shaft 13 will cause the rope or wire to be wound about the periphery of the stationary drum 14. Each turn or convolution added to the drum causes the preceding turns to slide downward a corresponding distance. However, the bottom of the drum is provided with a flange 29 on top of which a foot member 30 of a peeling device revolves. The foot member comprises the bottom of a vertical leg 31, connected to an outwardly extending arm 32 carried by the bracket 23. Although any suitable means may be employed for supporting the arm 32, in the embodiment illustrated, its outer end 32a is bent in line with the axis of the sheave 24 and is secured to the shaft 33 upon which the sheave is rotatably carried. By these means, the coil around the drum is continuously peeled from the bottom as the bracket 23 revolves, the lower convolution of the coil being on the outside of the leg 31. Accordingly, the revolving of the bracket 23 accomplishes two purposes, namely, (1) winding of the rope or wire in the form of a coil about the top of the drum and (2) unwinding or peeling of the coil from the bottom.

As the coil is peeled from the bottom, it drops by gravity and falls on a horizontal endless conveyor 34 which is supported in cantilever fashion on a bracket or post 35 secured to and extending downwardly from the bottom of the drum 14. The conveyor comprises an elongated channel 36 one end of which is secured to the bracket 35 and the other end extending outwardly in a horizontal direction. The ends of the channel 36 straddle and support sprocket wheels 37 and 38 on shafts 37a and 38a and an endless sprocket chain 39 is supported on the sprocket wheels. The chain 39 carries a series of spaced upstanding pins or bars 40. As the peeling proceeds, the convolutions fall between a consecutive pair of the upstanding bars on the chain 39. When the required number of convolutions have fallen to form a coil or skein 41 containing the desired length of wire or rope, the upper reach of the chain is moved forward an interval equal to the distance between a consecutive pair of bars 40, so that the next group of convolutions is collected, in succession, in the next space between a pair of bars 40.

The interval movement of the chain 39 may be effected in any desired manner, such as by hand or by a solenoid intermittently energized by a switch actuated by timing gears (not shown) or, as illustrated, the chain may be moved continuously at a slow speed synchronized with the speed of rotation of the shaft 13 to permit the collection of a given desired number of convolutions as the chain moves through one interval. This may be done by an extension 42 of the shaft 13 passing through the block 14 and connected to the worm 43 of a worm gear through bevel gears 44 and 45, the worm wheel 46 being connected to the sprocket shaft 37a.

A guard rail 47 has one end secured to the bottom of the drum 14 and extends downwardly and outwardly below the bottom trace of the bars 40 to prevent fouling of the moving parts by the falling convolutions.

To provide for intermittent movement of the chain 39, instead of continuous movement, a Geneva cam (not shown) may be included in the chain of gearing between the shaft 13 and sprocket wheel shaft 37a.

When the coils reach the outer end of the belt conveyor they are individually tied by hand or machine and discharged, thereby completing the operation.

In order to maintain sufficient friction of the wire or rope against the face of the drum 14, and to avoid strands from dropping too rapidly or prematurely without bene-

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fit of the action of the peeler, a group of vertical rollers 48, say three, is disposed about the drum. These rollers are carried on spring loaded arms 52 which are pivoted to a stationary shelf 49. The shelf 49 is carried on brackets 50. The springs 51 are mounted between the arms 52 and abutments 53 on the shelf 49 so as to urge the rollers 48 in gentle contact with the wire or rope on the face of the drum. Consequently, as the leg 31 moves about the drum, it passes between the drum and the rollers. The latter moves outwardly against the action of the springs 51 each time the leg 31 passes and is returned immediately by the springs.

I claim:

1. A machine of the character described comprising a vertical stationary drum, a hollow vertical shaft rotatable relative to the drum, an outwardly extending bracket secured to the shaft, said shaft having an aperture therein adjacent said bracket, sheaves carried by said bracket for guiding wire or rope from the interior of said shaft to said drum, an arm secured to said bracket, said arm having a foot member adapted to engage the surface of said drum, a horizontal endless conveyor below said drum, said conveyor being supported entirely by said drum by being secured at one end to the bottom of said drum and extending outward therefrom in cantilever fashion, spaced separators carried by said conveyor and means for driving said conveyor at a fixed ratio relative to the rotation of said shaft.

2. A machine of the character described comprising a vertical stationary drum, a hollow vertical shaft rotatable relative to the drum, an outwardly extending bracket

secured to the shaft, said shaft having an aperture therein adjacent said bracket, sheaves carried by said bracket for guiding wire or rope from the interior of said shaft to said drum, an arm secured to said bracket, said arm having a foot member adapted to engage the surface of said drum, a horizontal endless conveyor below said drum, said conveyor being supported entirely by said drum by being secured at one end to the bottom of said drum and extending outwardly therefrom in cantilever fashion, spaced separators carried by said conveyor, and means for driving said conveyor at a fixed ratio relative to the rotations of said shaft, said last mentioned means comprising a speed reducer unit having its intake connected to the shaft and its take-off connected to the conveyor.

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