May 26, 1959 J. COCKER III 2,887,842

YARN WINDING MACHINES

Filed Feb. 24, 1958 5 Sheets-Sheet 1

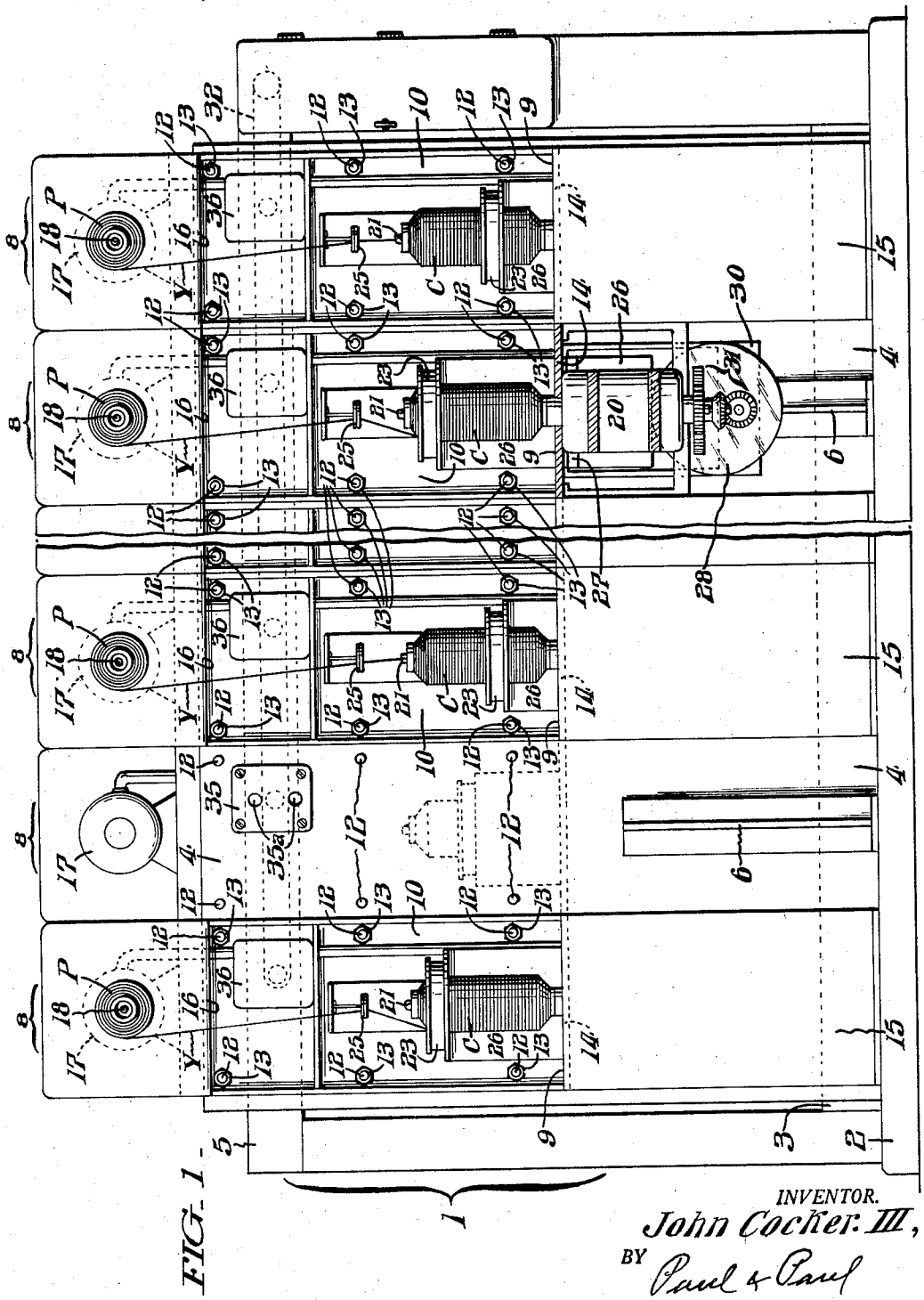


FIG. 1

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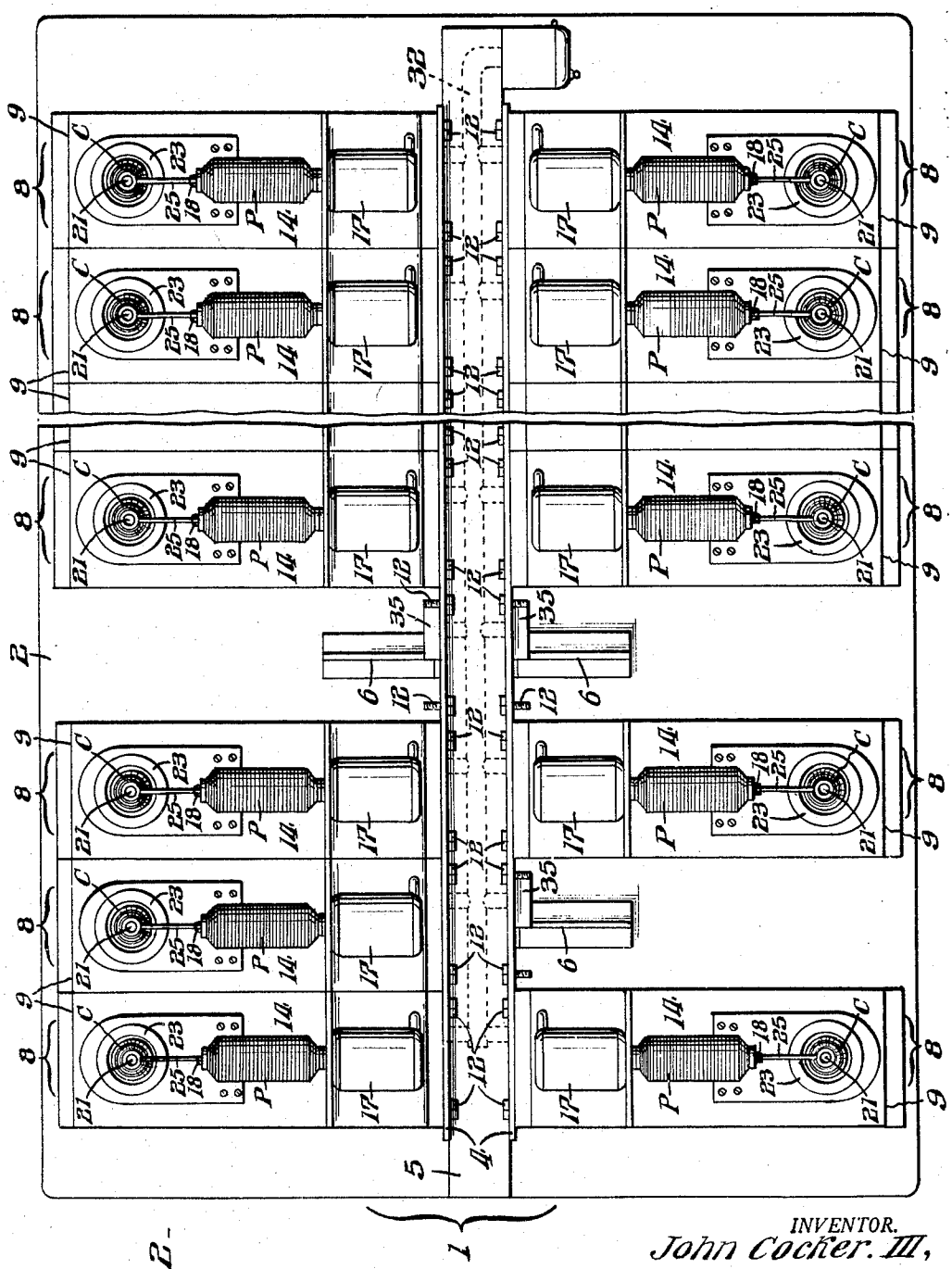


FIG. 2.

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YARN WINDING MACHINES

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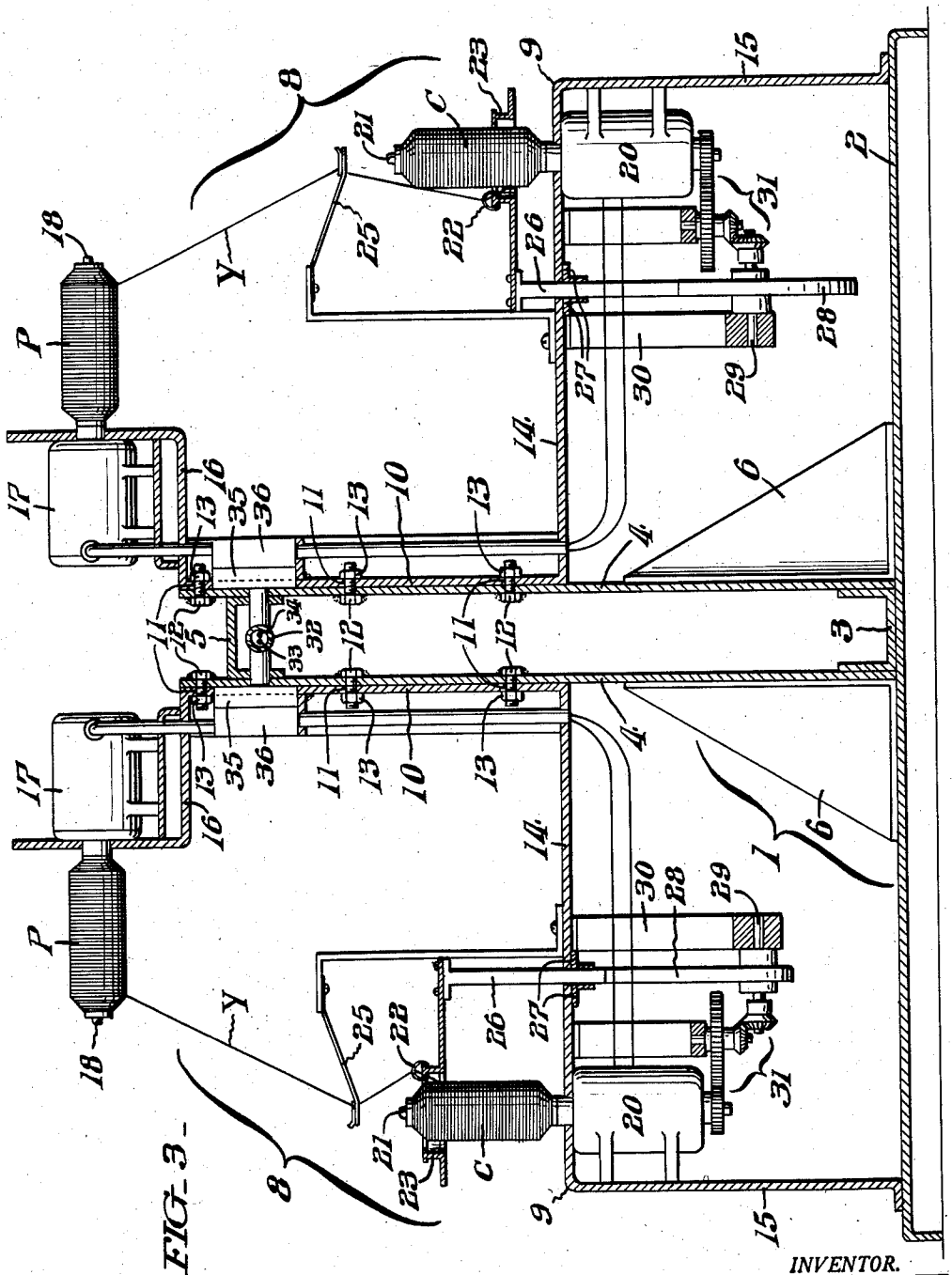


FIG. 3.

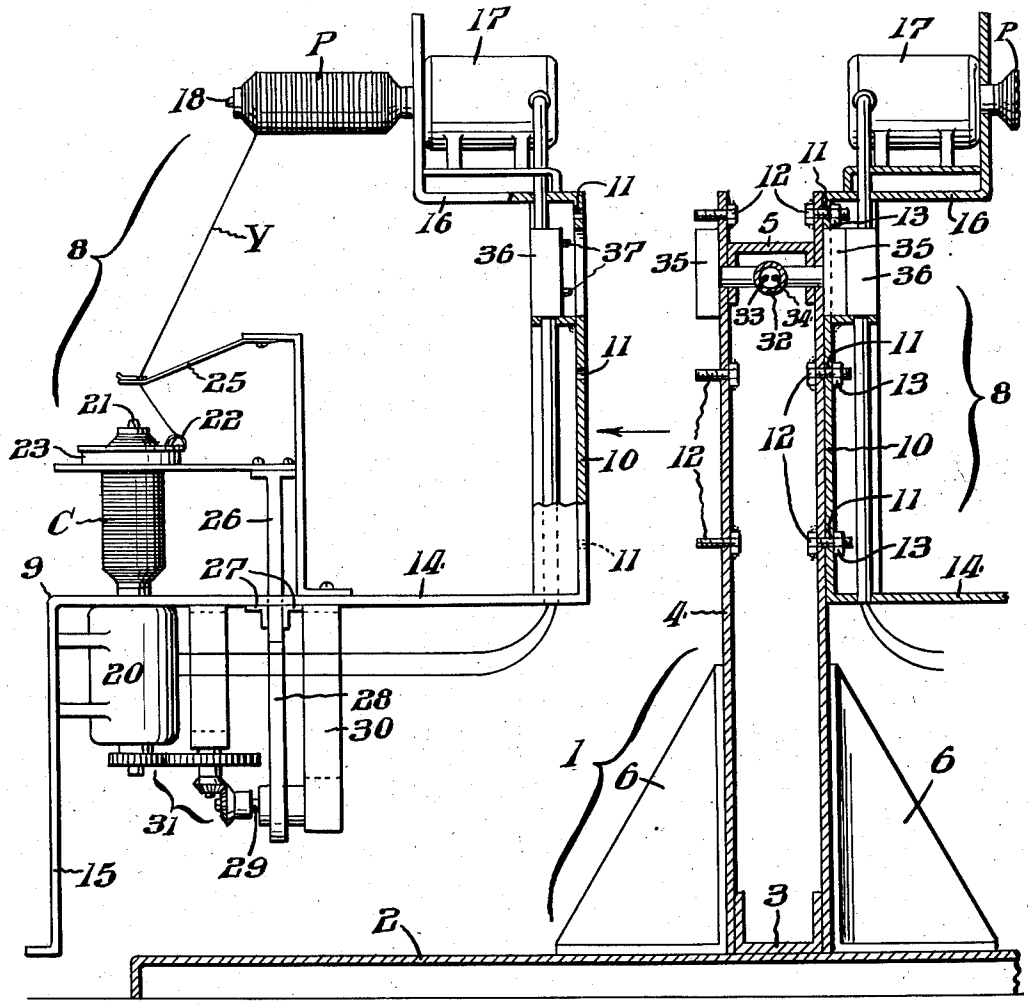
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YARN WINDING MACHINES

Filed Feb. 24, 1958 5 Sheets-Sheet 4

FIG. 4.



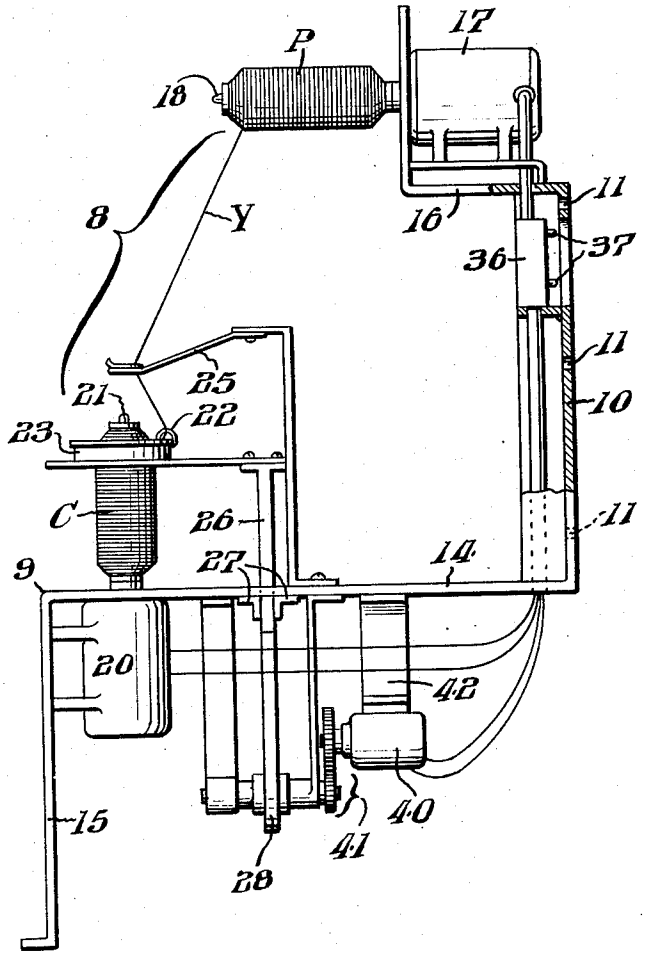
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YARN WINDING MACHINES

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FIG. 5.



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United States Patent Office 2,887,842 Patented May 26, 1959

2,887,842

YARN WINDING MACHINES

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Application February 24, 1958, Serial No. 717,113

17 Claims. (Cl. 57—75)

This invention relates to machines having multiple pairs of spindles for respectively rotating supply packages of the yarn and cops onto which latter the individual yarns are rewound incident to being twisted by the action of travelers gyrated about the receiving cops or by flyers, as the yarns are rewound upon the cops. More particularly, the invention is concerned with winding machines wherein the spindles are driven by separate power devices such as electric motors rather than from a single powered shaft as ordinarily heretofore.

The chief aim of my invention is to simplify the construction of machines of the kind particularly referred to with a view toward attainment of greater uniformity in the treatment of the yarns and increased quantity output from such machines.

These objectives are realized in practice, as hereinafter more fully disclosed, through provision of winding units each complete in itself and capable of ready removal individually in the event of mal operation or damage thereto and of replacement with equal facility after being repaired, or replacement by new ones without interfering with the operation of the others and without necessitating stopping of the machines.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein:

Fig. 1 shows a broken out view in side elevation, of a multiple spindle yarn winding machine conveniently embodying my invention.

Fig. 2 shows the machine in top plan.

Fig. 3 shows the machine in cross section.

Fig. 4 is a fragmentary view in cross section showing how the component winding units of the machine are individually removable from the supporting frame of the machine; and

Fig. 5 is a view showing a modification of one of the twisting units.

With more specific reference first to Figs. 1–4 of these illustrations, my improved winding machine, in the form there shown, comprises a horizontally elongate frame comprehensively designated by the numeral 1, said frame having a base 2 which may be fashioned from suitably stout plate metal, and whereto is medially affixed lengthwise by welding a channel section bar 3. Similarly affixed along their bottom edges to the upstanding flanges of the bar 3 are upright metallic plates 4 which are coextensive with the base 1 and which are similarly joined along their tops by an interposed lengthwise-extending channel bar 5. At uniformly spaced longitudinal intervals the upright portion of the frame formed by the side plates 4 is braced by footings 6.

Secured side by side in lateral abutment to the opposite sides of the upright portion of the frame with capacity for individual removal and replacement, are individual winding units 8. As shown, each unit 8 comprises a bracket 9 which is fashioned to generally L-shaped configuration from stiff heavy plate metal. The upright arm 10 of the bracket 9 is provided along its opposite

side edges with groups of apertures 11 for registry with the outwardly projecting shanks of correspondingly-allocated bolts 12 fixed by welding into one of the side plates 4 of the frame 1, said bolts being provided with nuts 13 by which the unit is removably secured to the frame. At its distal end, the horizontal arm portion 14 of the bracket 9 has a pending leg portion 15 which, when the unit is in place, rests upon the base 2 of the frame 1. Mounted on an outward projection 16 at the top of the vertical arm 10 of the bracket 9 is an electric motor 17 with a prolongation of its shaft 18 serving as a spindle for an impaled package P of the yarn Y which is to be twisted. A vertical axis motor 20 supported adjacent the distal end of the horizontal arm 14 of the bracket 9 has its shaft upwardly prolonged as at 21 to serve as a spindle for a cop C upon which the yarn Y is wound after being twisted. The actual twisting is accomplished after customary practice in this instance by gyration of a traveler 22 about a ring 23 arranged coaxially about the spindle 21, the yarn being passed through the traveler after having traversed a guide 25 fixedly supported on the horizontal arm 14 of the bracket 9. In accordance with my invention, the ring 23 is affixed to the top of a slide bar 26 which is constrained to up and down movement through the horizontal arm 14 of the bracket by a guide formed by two angle pieces 27 affixed to the bottom of said arm. As shown, the slide bar 26 bears upon the periphery of an eccentric actuating cam 28 fast on a short horizontal shaft 29 rotatably supported in a projection 30 pendent from the horizontal arm 14 of the bracket 9. As further shown, the cam shaft 29 is driven from the motor 20 through the medium of a system 31 of speed reduction gears. It is to be understood that, if desired, a twisting means of the flyer type may be utilized instead of the ring type twisting means herein illustrated by way of example.

Protected within a conduit 32 extending lengthwise through the hollow of the upright portion of the frame 1 near the top are the conductors 33 and 34 of an electric power line; and affixed to the outer faces of the side plates 4 of the frame 1 at the locations of the units 8 are socket blocks 35 having terminals 35*a* in circuit with the conductors 33 and 34. At corresponding locations on the vertical arms 10 of the brackets 9 of the individual units 8 are blocks 36 with jack plugs 37 whereto the leads from the respective motors 17 and 20 are connected. Thus, as the units 8 are brought up into position and the brackets 9 are secured to opposite sides of the vertical portions 4 of the frame 1 by means of the nuts 13 applied to the shanks of the bolts 12, the jack plugs of the blocks 36 are entered into the socket blocks 35 and the motors 17 and 20 are thereby connected to the line conductors 33 and 34 for supply of electric current thereto.

From the foregoing it will be seen that the units 8 can be individually removed from the machine in the event of mal operation or damage thereto and replaced after repair, or replaced by new ones in a short space of time without interfering with the others and without stopping the machine. It will be further apparent that by changing the ratio of the gearing 31 associated with the motor 30, it is possible to vary the rate of reciprocation of the traveler ring 23 relative to the speed of the receiving spindle 21 of each unit and hence the compactness of the windings of the yarn on the cop C.

As a modification, the cam 28 for vertically reciprocating the traveler ring may be driven, as shown in Fig. 5 by a motor 40 separate from the motor 20 which drives the cop spindle 21, the additional motor having incorporated therewith a speed reducing gearing 41 and being supported by a suspension 42 from the horizontal arm 14 of the bracket 9. In order to dispense with the

necessity for repetitive description, all the component elements shown in Fig. 5 and having their counterparts in the first described embodiment, are identified with the same reference numerals previously used.

Here likewise, by changing the ratio of the gearing **41** associated with the motor **40** of the winding unit, the rate of reciprocation of the traveler ring **23** may be varied as may be desired or required as in the first described embodiment.

While in accordance with the provisions of the statutes, I have illustrated and described the best forms of embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus described without departing from the spirit and scope of the invention as set forth in the appended claims, and that in some cases certain features of my invention may be used to advantage without a corresponding use of other features.

Having thus described my invention, I claim:

1. In a winding machine, a horizontally elongate upright frame structure; and a plurality of winding units secured side by side to said frame with capacity for individual removal or replacement, each such unit comprising a bracket with a vertical portion adapted to be backed against a side of the frame, a power device supported at the top of the vertical portion of the bracket for driving a spindle on which a supply package of yarn is impaled, a receiving spindle rotatably supported on a forwardly projecting portion at the bottom of the bracket, means carried by the bracket for distributing the yarn as it is being wound on the receiving spindle, a separate power device on the bracket for driving the receiving spindle and actuating the yarn distributing means as the yarn is wound upon the receiving spindle.

2. The invention according to claim 1 wherein the power devices for driving the respective spindles of each unit are in the form of separate electric motors, and wherein the distributing means is actuated from the motor which drives the receiving spindle.

3. The invention according to claim 1 wherein the power devices for driving the respective spindles of each unit are in the form of separate electric motors, and wherein the distributing means is actuated from a separate motor mounted on the bracket of the unit.

4. The invention according to claim 1 wherein the power devices for driving the respective spindles of each unit are in the form of separate electric motors, and wherein the distributing means is actuated from the motor which drives the receiving spindle and further including line conductors extending lengthwise of the frame; and means whereby the respective motors are automatically connected to the line conductors as each unit is secured to the frame.

5. The invention according to claim 1 wherein the power devices for driving the respective spindles of each unit are in the form of separate electric motors, and wherein the distributing means is actuated through changeable speed reducing gearing from the motor which drives the receiving spindle.

6. The invention according to claim 1 wherein the power devices for driving the respective spindles of each unit are in the form of separate electric motors, and wherein the distributing means is actuated from a separate motor mounted on the bracket of the unit through changeable speed reducing gearing.

7. In a winding machine, a horizontally elongate upright frame structure; and a plurality of independent winding units secured side by side to said frame with capacity for individual removal or replacement, each such unit comprising a bracket having a vertical portion adapted to be backed against a side of the frame, a power device supported at the top of the vertical portion of the bracket for driving a spindle on which a supply package of the yarn to be twisted is impaled, a receiving spindle rotatably supported on a forwardly projecting

portion at the bottom of the bracket for receiving the yarn from a supply package, twisting means by which the yarn, as it comes from the supply package, is twisted incident to being wound on the receiving spindle, a support for the twisting means constrained to reciprocatory movement in a guide on the bracket, and a separate power device means mounted on the forwardly projecting portion of the bracket for driving the receiving spindle and for reciprocating the twisting means to cause distribution of the twisted yarn on the receiving spindle.

8. The invention according to claim 7, wherein the power devices for driving the respective spindles of each unit are in the form of electric motors and wherein the support for the twisting means is actuated from the motor which drives the receiving spindle.

9. The invention according to claim 7, wherein the power devices for driving the respective spindles are in the form of separate electric motors wherein the support for the twisting means is actuated from the motor which drives the receiving spindle; and further including line conductors extending lengthwise of the frame; and means whereby the respective motors are automatically connected to the line conductors as each unit is secured to the frame.

10. The invention according to claim 7, wherein the power devices for driving the respective spindles are in the form of separate electric motors; wherein the support for the twisting means is actuated from the motor which drives the receiving spindles; and further including line conductors extending lengthwise of the frame; jack plugs disposed at intervals along the frame and connected to the line conductors; and sockets on the bracket of the respective units having terminals for the leads from the respective motors, adapted to engage the jack plugs on the frame as the individual units are secured to said frame.

11. The invention according to claim 7, wherein the twisting means of each unit is of the traveler type with the support for the traveler ring reciprocated from the power device that drives the receiving spindle.

12. The invention according to claim 7, wherein the two spindles of each unit are driven by independent power devices mounted on the bracket of the unit; and wherein the support for the twisting means is driven by a separate power device also mounted on the bracket of each unit.

13. The invention according to claim 7, wherein the two spindles of each unit are driven by independent electric motors mounted on the bracket of the unit; and wherein the support for the twisting means is driven by a separate electric motor also mounted on the bracket.

14. The invention according to claim 7 wherein the two spindles of each unit are driven by independent electric motors mounted on the bracket of the unit; wherein the support for the twisting means is driven by a separate electric motor also mounted on the bracket and further including line conductors extending lengthwise of the frame, and means whereby the respective motors are automatically connected to the line conductors as each unit is secured to the frame.

15. The invention according to claim 7, wherein the power devices for driving the respective spindles of each unit are in the form of electric motors; and wherein the support for the twisting means is actuated through changeable speed reducing gearing from the motor which drives the receiving spindle.

16. The invention according to claim 7, wherein the two spindles of each unit are driven by independent power devices mounted on the bracket of the unit; and wherein the support for the twisting means is driven through changeable speed reducing means by a separate power device also mounted on the bracket of each unit.

17. In a winding machine, a horizontally-elongate upright frame structure, and a plurality of self-contained winding units secured side by side to said frame with capacity for individual removal from the frame, each

such unit comprising a bracket, means on the bracket for rotatively supporting a spindle for a yarn supply package, means on the bracket for rotatably supporting a yarn receiving spindle, means on the bracket for distributing the yarn as it is being wound on the receiving spindle, and power means on the bracket for driving the two spindles.

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