April 7, 1925. 1,532,187

A. H. KOPPRASCH

COIL WINDING MACHINE

Filed June 23. 1924 2 Sheets-Sheet 1

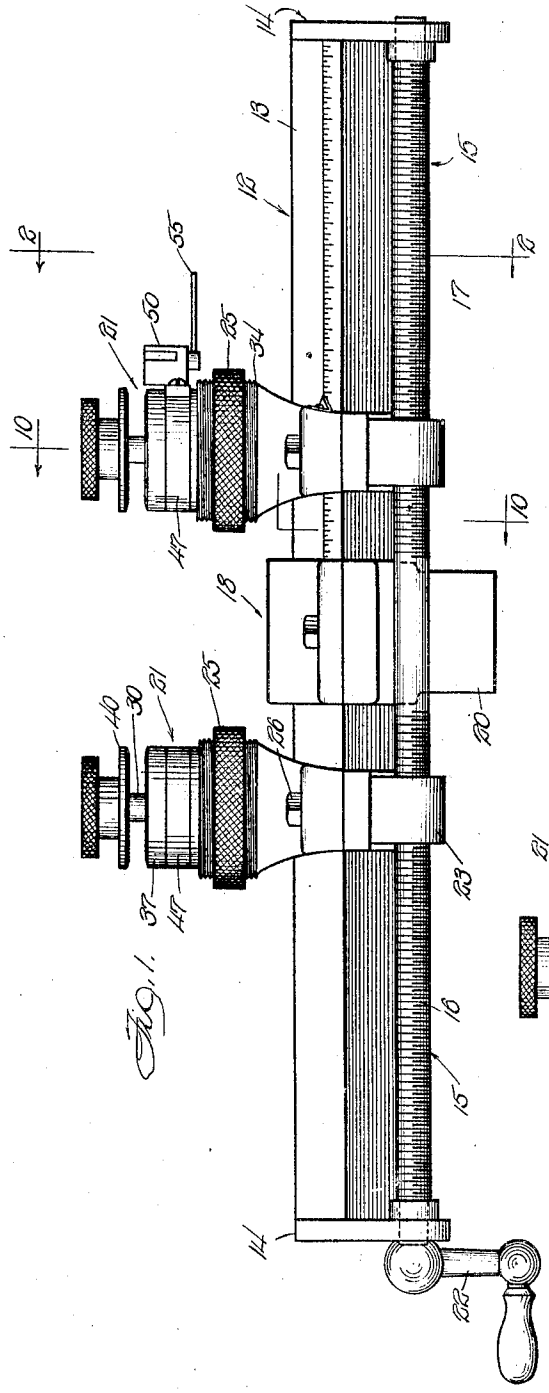


Fig. 1.

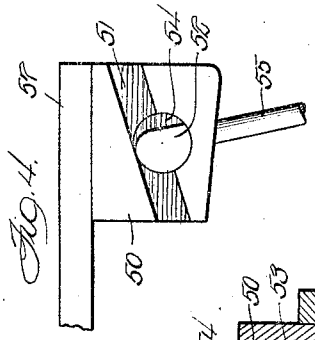


Fig. 4.

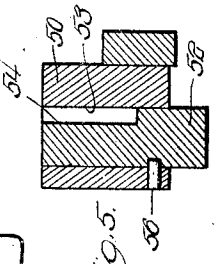


Fig. 5.

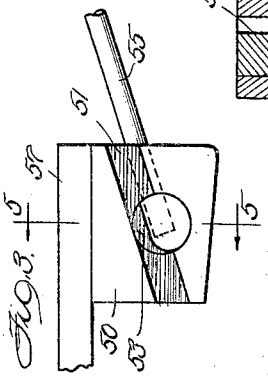


Fig. 3.

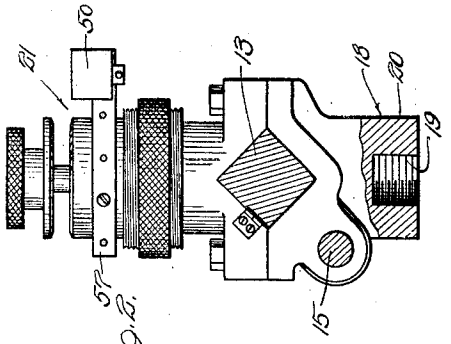


Fig. 2.

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ALEXANDER H. KOPPRASCH

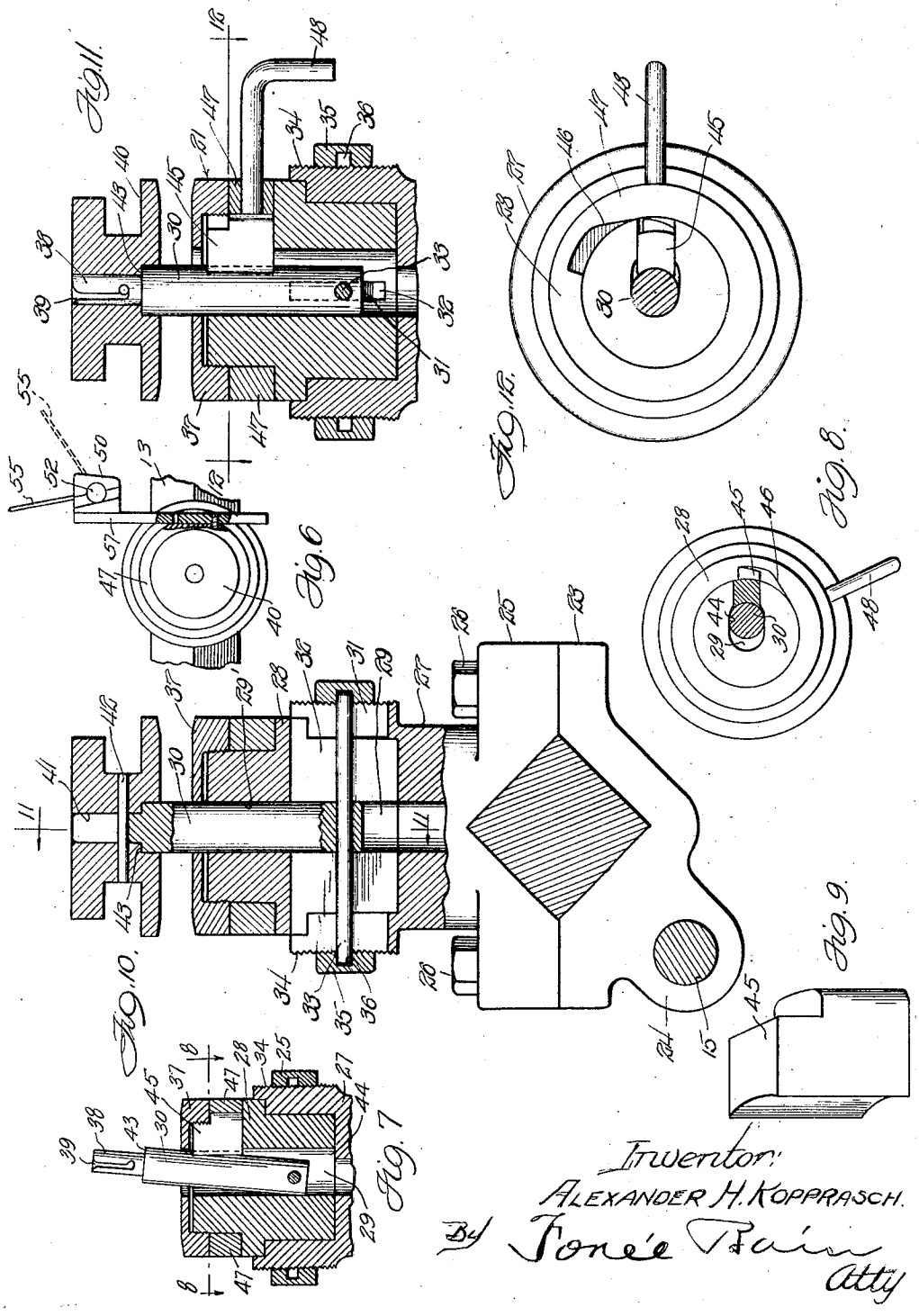
By Foree Bain Atty.

April 7, 1925. 1,532,187

A. H. KOPPRASCH

COIL WINDING MACHINE

Filed June 23. 1924 2 Sheets-Sheet 2



Inventor:
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By Fonée Brain
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Patented Apr. 7, 1925. 1,532,187

UNITED STATES PATENT OFFICE.

ALEXANDER H. KOPPRASCH, OF CHICAGO, ILLINOIS, ASSIGNOR TO ELECTRIC SERVICE SUPPLY CO., OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

COIL-WINDING MACHINE.

Application filed June 23, 1924. Serial No. 721,686.

To all whom it may concern:

Be it known that I, ALEXANDER H. KOPPRASCH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Coil-Winding Machines, of which the following is a specification.

The invention relates to machines for winding wire coils for dynamo electric machines.

One of the objects of the invention is to provide a machine which may conveniently and accurately be adjusted for winding coils of largely varying dimensions.

Another object is to provide a machine which is staunch and substantially unyielding in the constitution of its parts to withstand the strain impressed upon it by the stress of the succeeding convolutions of the wire wound thereon and which is so flexible in adjustment that the parts may be released without material effort, to remove the coil.

Other objects, benefits and advantages will become apparent to persons skilled in the art from a consideration of the following description when taken in conjunction with the drawings forming a part hereof, wherein:—

Fig. 1 is a side elevation of the machine.

Fig. 2 is a transverse section on line 2—2 of Fig. 1.

Fig. 3 is a plan view of a wire holding clamp to engage and hold the beginning end of a coil, showing the clamp open.

Fig. 4 is a similar view, showing the clamp closed.

Fig. 5 is a section taken on line 5—5 of Fig. 3.

Fig. 6 is a plan view of the aforesaid clamp and the head to which it is attached and on which it has a swivel movement.

Fig. 7 is a central vertical section of a spool-holding head showing the stem out of vertical alignment.

Fig. 8 is a sectional view, showing parts in plan and taken on line 8—8 of Fig. 7 with the cap removed.

Fig. 9 is an isometric perspective view of a clamping member to hold the spool-engaging stem in vertical alignment.

Fig. 10 is a section taken on line 10—10 of Fig. 1.

Fig. 11 is a section taken on line 11—11 of Fig. 10.

Fig. 12 is a plan view of the spool holding head showing the spool holding stem in section and in vertical alignment corresponding with Fig. 11.

The machine 12 is shown in side elevation in Fig. 1. It consists generally of a bar 13; in the particular illustration this bar is shown rectangular in cross section, as may be seen in Figs. 2 and 10. The bar may be round or polyangular to any desired extent. To each of its ends is connected a bracket 14 for supporting a parallel rotatable shaft 15. This shaft is threaded with a right hand and a left hand thread 16 and 17 from its center towards its respective ends.

A driving hub 18 is secured to the mid-portion of the bar 13 and provides a center bearing for the threaded shaft 15. The hub 18 is centrally bored and threaded at 19, so that it may be screwed on the head stock of a lathe, or like machine, or the concentric outside surface 20 may be grasped by and held in a suitable chuck.

Between the hub 20 and the respective ends of the machine is a coil supporting head 21. There is a pair and they are the same in kind. They are slidable on the bar 13 and are moved coextensively and always in opposite directions by the screw 15. The screw may be rotated by the handle 22.

The coil-supporting head 21 is shown in section in Figs. 10 and 11. A cap 23 has an extension 24 which has a threaded perforation thru which the threaded shaft 15 passes. This cap is secured to the base block 25 by screws 26. Between the block 25 and cap 23 the rod 13 passes and upon which the head 21, as a whole, is slidable. Extending upwardly at right angles from the bar 13 and as an integral part of the base block 25 is a hollow hub 27 to receive another hub 28. These hubs have aligning bores 29 and 29′ to receive a stem 30.

The hubs 27 and 28 each has transversely extending or diametric slots 31 and 32, respectively. A pin 33 passes thru these slots and thru the stem 30. The hub 27 is threaded at 34 and a threaded ring 35 is axially movable over the hub when rotated. The ring has an internal annular groove 36 into which both ends of the pin enters so that

when the ring is rotated the stem 30 is raised or lowered in its position.

The hub 28 carries on its upper end a removable fixed spool head 37 thru which the stem 30 passes. The stem 30 is reduced in diameter at its upper end 38 in which is formed a bayonet slot 39.

A removable spool head 40 has a central bore 41 of two diameters thru which the upper end of the stem 30 extends. Extending transversely of the bore thru the head 40 a pin 42 enters the slot 39 and is the other member of the bayonet joint. The head 40 rests on the shoulder 43 formed by the two diameters of the stem. By this means the head 40 may be firmly secured to the stem and quickly removed. The coil to be wound on the device is formed between and upon the two spaced stems 30—30 and between the coil forming spool heads 37 and 40. The distance these heads 37 and 40 are separated, one from the other determines the width of the coil to be wound. It is apparent that this distance of separation may be varied by rotating the ring 35 in one direction or the other. The distance the stems 30 are separated, one from the other, determines the length of the coil to be wound.

When a coil has been wound on and between the stems 30—30 it is difficult to remove it without rotating the screw 15 in a manner to cause the stems to approach each other when it may be removed after first taking off the removable spool head 40. This operation requires that stems 30 must be returned accurately to their former positions prior to winding another coil of the same length. This operation is fraught with possibility, even probability of error, due to failure to return the stems invariably to their initial positions.

To release the tension of the wires upon the pins 30 without bodily moving either of the heads 21, I provide means permitting one of the stems 30 to move into an inclined position, as shown in Fig. 7.

To this end I provide a lateral groove 44 into which the upper end of the stem 30 is drawn when released. A dog 45 slides radially in the groove and bears against the stem 30.

The stem 30 is returned to vertical position by a cam 46 made on the inner surface of the rotatable ring 47. The handle 48 is the means by which the ring 47 is rotated.

The cam 46 returns the pin to vertical position when the ring 47 is rotated to bring the cam 46 into position shown in Fig. 11, and when it is in inclined position shown in Fig. 7 the tension of the wires in the coil is relaxed and the coil may easily be removed from the stems.

A clamp to which the wire part constituting the beginning end of the coil to be wound is to be secured consists of a block 50 having a slot 51 to receive the wire and a plug 52 which is rotatable in the bore 53 which bisects the slot. The plug 52 is cut away at one side, at 54, to provide a wire clamping member in cooperation with the wall of the slot 51 when the plug is turned for the purpose by the handle 55. A pin 56 extends into a slot in the plug to prevent the plug from leaving the block.

A flat rod 57 is secured to the block 50. The rod 57 is secured to the clamp ring 47 so that strain by pull of the wire in the holder 50 tends to tighten the clamp 45 engaging the stem 30.

To provide shorter beginning terminals for the coils the rod 57 may be lengthened and it may be provided with a plurality of spaced screw-receiving holes for the purpose.

Having described my invention what I claim as new and desire to secure by Letters Patent, is:—

1. A coil winding machine comprising a bar, two coil supporting heads slidable thereon, means to adjust the heads toward and from each other to vary the length of the coil, a pair of normally parallel stems one on each head and about which the coils are to be wound, and means to incline one stem to permit it to be moved out of parallelism with the other stem to facilitate removal of the coils.

2. A coil winding machine comprising a bar, two coil supporting heads slidable thereon, means to adjust the heads toward and from each other to vary the length of the coil to be wound thereon, a pair of normally parallel stems, one on each head, about which the coils are to be wound; means to hold one stem parallel with the other and movable to release one said stem to permit it to be inclined toward the other stem to facilitate removal of the coils therefrom; a pair of spool heads surrounding each stem, between which to wind and form the coils, said heads relatively adjustable axially about the respective stem to accommodate coils of different widths.

3. In a coil winding machine having two coil forming heads, one head comprising a hollow hub exteriorly threaded and having a diametric slot; a threaded ring axially movable on the threaded hub and having an interior annular groove; an interior hub, inside of the threaded hub having a corresponding slot, and having a spool head on its outer end; a stem pivoted in the inner hub; a spool head detachably secured to the outer end of said stem and a pin extending transversely through said stem and thru the slots of both hubs into the groove of said threaded ring whereby to separate the spool heads by rotation of said ring.

4. In a coil winding machine having two coil forming heads, one head comprising a

hollow hub having a transverse slot; another hub therein having a registering slot and centrally bored, for a stem, and provided with a laterally extending groove; a stem pivoted at its inner end in both hubs, in said axial bore movable into said lateral groove; a spool head detachably secured to the outer end of said stem; means for axially moving said stem and head carried thereby, and means to retain said stem within said bore and prevent its lateral movement.

5. In a coil winding machine having two coil forming heads, one head comprising a relatively fixed spool-head structure; an axially positioned stem pivoted therein and movable laterally thereof on said pivot; a removable spool-head on the free end of said stem; means to move the stem and attached spool head axially of said structure, and positive means to move said stem and head into axial positions and to hold them in said positions.

6. In a coil winding machine having two coil forming heads, one head comprising a relatively fixed spool-head structure; an axially positioned stem therein; a spool-head detachably secured to the outer end of said stem and axially movable with the stem; means to clamp the stem in adjusted position; a rotary cam arranged to operate said clamping means; and a wire holding means to hold the beginning end of a wire of the coil, said means attached to the rotary cam whereby to tighten the clamping means by stress imparted to the wire in winding the coil.

7. In a coil winding machine having two coil forming heads, one head comprising a relatively fixed spool-head structure; a movable spool-head; a stem secured to the latter head and movable in the former head; a rotatable means for clamping the stem in the fixed structure, and a wire holding means to hold the beginning end of the wire of the coil to be wound, attached to the stem clamping means.

In testimony whereof I hereunto set my hand.

ALEXANDER H. KOPPRASCH.