

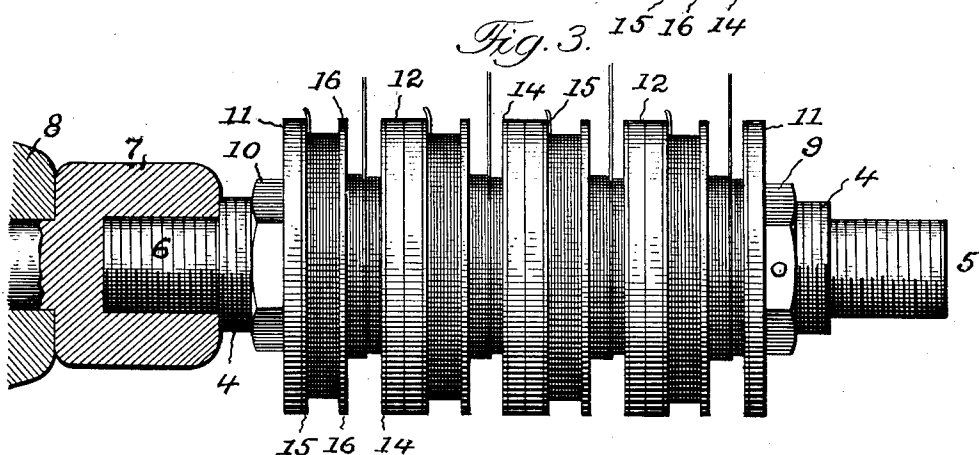
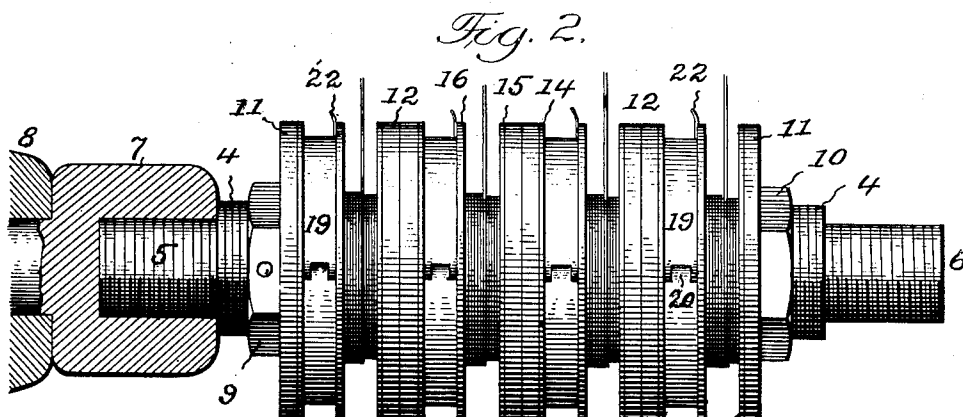
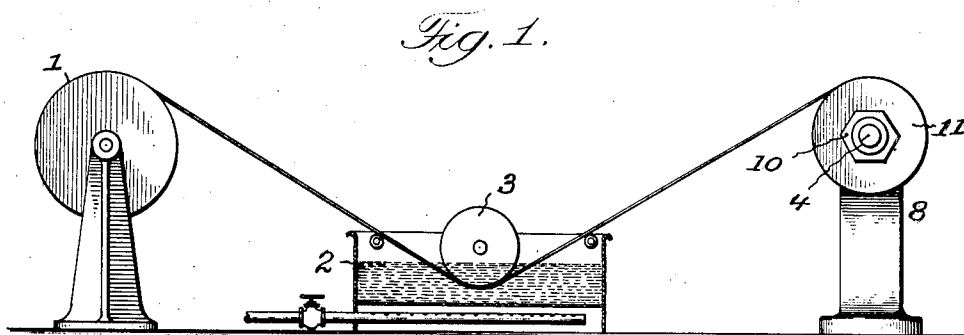
No. 862,935.

PATENTED AUG. 13, 1907.

C. A. PFANSTIEHL.
APPARATUS FOR WINDING INDUCTION COILS.

APPLICATION FILED DEC. 27, 1906.

2 SHEETS—SHEET 1.



Attest:
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Henry Moser.

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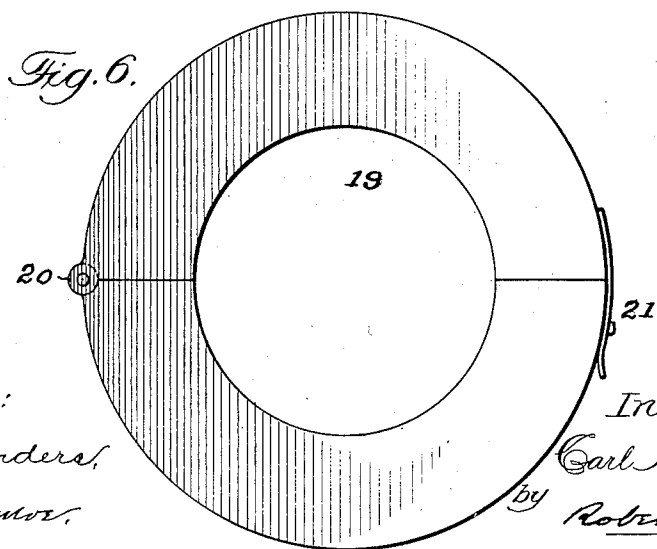
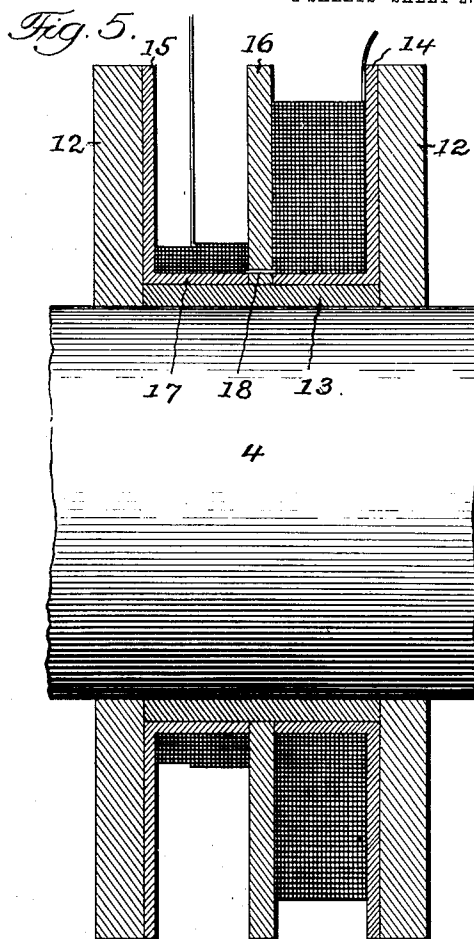
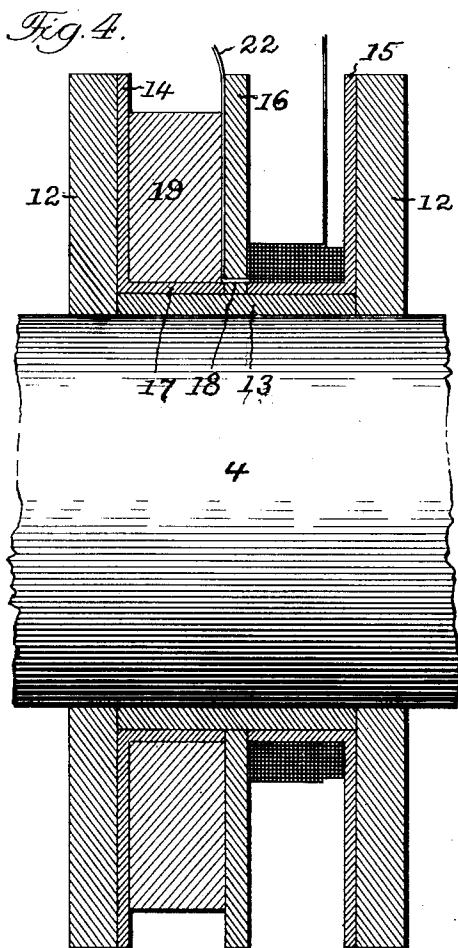
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CARL A. PFANSTIEHL, OF HIGHLAND PARK, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO PFANSTIEHL ELECTRICAL LABORATORY, OF NORTH CHICAGO, ILLINOIS, A CORPORATION.

APPARATUS FOR WINDING INDUCTION-COILS.

No. 862,935.

Specification of Letters Patent.

Patented Aug. 13, 1907.

Application filed December 27, 1906. Serial No. 349,726.

To all whom it may concern:

Be it known that I, CARL A. PFANSTIEHL, a citizen of the United States of America, and a resident of Highland Park, in the county of Lake and State of Illinois, have invented certain new and useful Improvements in Apparatus for Winding Induction-Coils, of which the following is a specification.

This invention relates to an apparatus for winding induction coil sections or units of the pancake form, and more especially the type of units which comprise a pair of reversely wound individual windings connected together at their innermost ends and with their outer ends adapted for ready connection with the like ends of adjacent coil sections. And the present improvement has for its object to provide a simple and effective structural arrangement and combination of parts whereby the different winding operations are performed in a ready, rapid and economical manner, all as will hereinafter more fully appear.

In the accompanying drawings:—Figure 1 is a diagram view illustrating the general arrangement of the present winding apparatus. Fig. 2 is a detail elevation with parts in section, illustrating the arrangement of the winding head in effecting the simultaneous formation of the initial windings of a series of coil sections or units. Fig. 3 is a similar view of the arrangement of the winding head in effecting the simultaneous formation of the other or final individual windings of the series of coil sections or units. Fig. 4 is an enlarged detail section, illustrating the arrangement of parts in the formation of the initial individual winding aforesaid. Fig. 5 is a similar view illustrating the arrangement of parts in the formation of the final individual windings aforesaid. Fig. 6 is a side elevation of one of the sectional filler disks of the present winding mechanism.

Similar numerals of reference indicate like parts in the several views.

Referring to the drawings, 1 represents a holding reel upon which is carried in any usual and suitable manner a series of supply coils of covered wire corresponding in number to the number of simultaneous windings laid during the operation of the winding mechanism.

2 is the melting tank containing the supply of molten paraffin or like material, through which the series of covered wires pass on their way to the winding head.

3 is a drum under which said wires pass to insure their immersion and proper saturation with the molten paraffin.

4 is the cylindrical axially arranged arbor of the winding mechanism formed at each end with counterpart screw-threaded extensions 5 and 6, for alternate attach-

ment to the chuck or head 7 of the live spindle of the carrying head 8 of the mechanism, and so that a ready and convenient reversal of the said arbor can be effected in the progress of forming the series of coil units or sections. Any usual and equivalent means of attaching the arbor to the live spindle may however be used without departing from the spirit of this part of the present invention.

9 is a fixed abutment collar near one end of the arbor 4, and 10 is a clamping nut screwing upon the other end of said arbor to securely clamp the hereinafter described spool holding means in place on said arbor.

11 are single end disks of aluminium or the like fitting upon the arbor 4, while 12 are pairs of intermediate disks, held in spaced relation by the series of spacing collars 13, surrounding the arbor 4, as shown, and so as to provide a series of peripheral channels in the winding head in which are received and held the series of spools upon which the windings of the coil units or sections are wound.

The winding apparatus illustrated in the drawings is more especially adapted for forming the type of induction coil units which constitute the subject matter of my companion application for Letters Patent Serial Number 349,725 filed December 27, 1906, and the form of spools employed therein is shown in the present drawings to illustrate the functions of the present apparatus; such spools comprise the following construction:—

14 and 15 are centrally orificed outer spool heads, and 16 the intermediate and similarly orificed spool heads, held in proper separated relation by inner annular necks 17 on the aforesaid outer spool heads, and which necks have bearing against the opposite faces of the intermediate spool heads 16, to hold the respective heads in proper separated relation and provide counterpart annular cavities for the coil windings hereinafter described.

18, is a small hole or passage through the intermediate spool head 16, in adjacent relation to the central orifice thereof, and adapted to receive an end portion of the wire used in forming the coil winding as hereinafter more fully set forth.

In the present arrangement each spool, constructed as above described, will have a width equal to that of a spacing collar 13, before referred to, and each spool will have its individual pair of supporting and holding disks 11 or 12, for convenience in conducting the final operations upon the coil units or sections.

19 are centrally orificed filler disks of a size corresponding to that of the cavities between the aforesaid heads 14, 15 and 16, and adapted for application there-

to, and removal therefrom, in the progress of the operation of the apparatus. For convenience in applying and removing the same as required, each filler disk is formed by two semicircular halves hinged together at one side by a hinge 20, and provided at the other side with a suitable catch 21 for holding the said halves together.

The operation of the apparatus is as follows:—The end portions 22 of the series of wires which are to form the coil windings are first threaded through the small passages 18, of the intermediate spool heads 16. The series of spool parts properly saturated with paraffin; end and intermediate disks 11 and 12, and spacing collars 13, are placed in position upon the arbor 4, with the filler disks 19 occupying alternate cavities of the spools, as shown in Figs. 2 and 4, after which the clamping nut 10 is screwed up to securely hold the aforesaid parts in place upon the arbor. Motion is now communicated to the winding head, arranged as above described, and with the continued revolution of the same, the series of initial coil windings are simultaneously wound into the series of alternate spool cavities not occupied by the filler disks 19 aforesaid. With the completion of such initial coil windings, motion of the winding head is stopped, and the winding wires severed to leave projecting ends at the peripheries of the coils for convenience in subsequent assembly into an induction coil. The winding head is then removed from engagement with the chuck 7, reversed end to end and again attached to said chuck. At the same time the filler disks 19 are removed and the series of end portions 22, above described, are electrically coupled with the series of wires from which the coil windings are formed. Motion is again imparted to the winding head, and the final coil windings are simultaneously wound into the series of spool cavities previously occupied by the filler disks 19, and as illustrated in Figs. 3 and 5, and in a reverse direction to that of the previously formed initial windings. With the completion of such final coil windings the motion of the winding head is stopped and the winding wires severed to leave projecting ends for convenience in assembling an induction or like coil as before stated. After each winding operation as above set forth, the winding head is placed to one side to set and cool; and to such end a series of winding heads are necessarily employed in order that the winding operations may be practically continuous. With the coiling and setting of the final windings, the clamping nut 10 is unscrewed, and the parts removed from the arbor 4. Heat is then applied locally to the disks 11 and 12, and spacing collars 13, so as to facilitate their removal leaving the coil units complete and ready for assemblage into an induction or like coil.

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

1. In an apparatus for winding induction coil units, the combination with a holding reel carrying the supply coils, and a heating tank containing molten paraffin or the like, of a winding head having a series of coil unit spools and adapted to simultaneously wind therein individually unit windings, and means for carrying and imparting rotation to said winding head, substantially as set forth.

2. In an apparatus for winding induction coil units, the combination with a holding reel carrying the supply coils,

and a heating tank containing molten paraffin or the like, of a winding head having a series of peripheral channels which receive and hold the series of coil unit spools and adapted to simultaneously wind therein individual unit windings, and means for carrying and imparting rotation to said winding head, the said winding head having carrying means at its respective ends adapting it to receive reverse rotation, substantially as set forth.

3. In an apparatus for winding induction coil units, the combination with a holding reel carrying the supply coils, and a heating tank containing molten paraffin or the like, of a winding head having a series of peripheral channels which receive and hold the series of coil unit spools and adapted to simultaneously wind therein individual unit windings, and means for carrying and imparting rotation to said winding head, the said winding head comprising a cylindrical arbor provided with carrying means at its respective ends, with a fixed collar near one end and with a clamping nut near the other end, and a series of disks arranged intermediate of said collar and nut, substantially as set forth.

4. In an apparatus for winding induction coil units, the combination with a holding reel carrying the supply coils, and a heating tank containing molten paraffin or the like, of a winding head having a series of peripheral channels which receive and hold the series of coil unit spools and adapted to simultaneously wind therein individual unit windings, and means for carrying and imparting rotation to said winding head, the said winding head comprising a cylindrical arbor provided with carrying means at its respective ends, with a fixed collar near one end and with a clamping nut near the other end, and a series of disks arranged in pairs intermediate of said collar and nut, substantially as set forth.

5. In an apparatus for winding induction coil units, the combination with a holding reel carrying the supply coils, and a heating tank containing molten paraffin or the like, of a winding head having a series of peripheral channels which receive and hold the series of coil unit spools and adapted to simultaneously wind therein individual unit windings, and means for carrying and imparting rotation to said winding head, the said winding head comprising a cylindrical arbor provided with carrying means at its respective ends, with a fixed collar near one end and with a clamping nut near the other end, a series of disks arranged intermediate of said collar and nut, and a series of spacing collars arranged between said disks, substantially as set forth.

6. In an apparatus for winding induction coil units, the combination with a holding reel carrying the supply coils, and a heating tank containing molten paraffin or the like, of a winding head having a series of peripheral channels which receive and hold the series of coil unit spools and adapted to simultaneously wind therein individual unit windings, and means for carrying and imparting rotation to said winding head, the said winding head comprising a cylindrical arbor provided with carrying means at its respective ends, with a fixed collar near one end and with a clamping nut near the other end, a series of disks arranged in pairs intermediate of said collar and nut, and a series of spacing collars arranged between said disks, substantially as set forth.

7. In an apparatus for winding induction coil units, the combination with a holding reel carrying the supply coils, and a heating tank containing molten paraffin or the like, of a winding head having a series of peripheral channels which receive and hold the series of coil unit spools and adapted to simultaneously wind therein individual unit windings, filler disks adapted to occupy alternate cavities of the spools to be wound, and means for carrying and imparting rotation to said winding head, substantially as set forth.

8. In an apparatus for winding induction coil units, the combination with a holding reel carrying the supply coils, and a heating tank containing molten paraffin or the like, of a winding head having a series of peripheral channels which receive and hold the series of coil unit spools and adapted to simultaneously wind therein individual unit windings, filler disks, made in halves and adapted to oc-

cupy alternate cavities of the spools to be wound, and means for carrying and imparting rotation to said winding head, substantially as set forth.

9. In an apparatus for winding induction coil units, the combination with a holding reel carrying the supply coils, and a heating tank containing molten paraffin or the like, of a winding head having a series of peripheral channels which receive and hold the series of coil unit spools and adapted to simultaneously wind therein individual unit windings, filler disks made in halves hinged together, and

adapted to occupy alternate cavities of the spools to be wound, and means for carrying and imparting rotation to said winding heads, substantially as set forth.

Signed at Chicago, Illinois, this 21st day of December 1906.

CARL A. PFANSTIEHL.

Witnesses:

ROBERT BURNS,
HENRY MOE.