Aug. 28, 1928. 1,682,213

P. E. CHAPMAN

WINDING AND DEREELING DEVICE

Filed Nov. 4, 1926

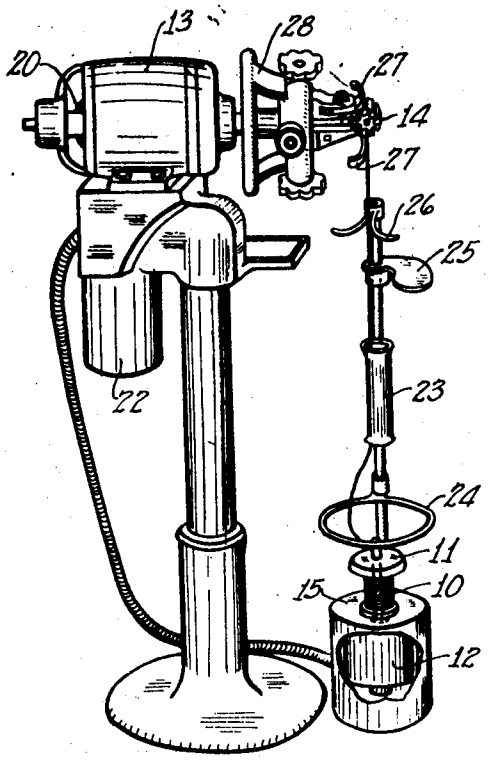


Fig. 1.

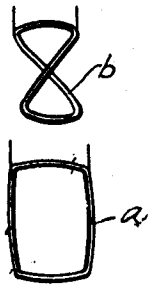


Fig. 3.

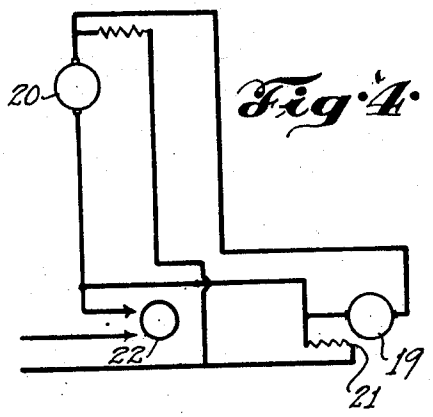


Fig. 4.

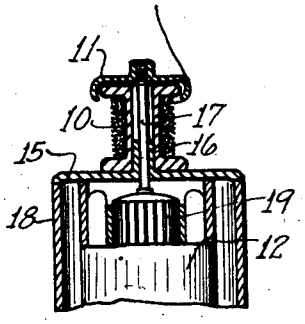


Fig. 2.

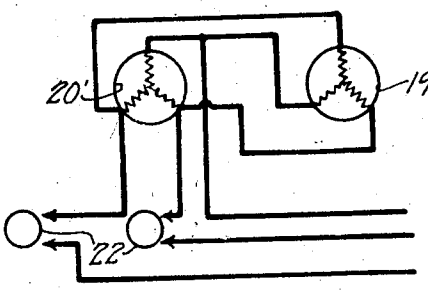


Fig. 5.

INVENTOR

Penrose E Chapman

Patented Aug. 28, 1928. 1,682,213

UNITED STATES PATENT OFFICE.

PENROSE E. CHAPMAN, OF ST. LOUIS, MISSOURI.

WINDING AND DEREELING DEVICE.

Application filed November 4, 1926. Serial No. 146,146.

The object of my invention is 1st, to enable the dereeling of wire, string, thread, or other elongated material any or all of which will be hereinafter referred to as "wire", smoothly, and without hitch, hindrance or drag from the material, spool, or reel from inertia at starting or momentum at stopping. And without injury thereto or to the finish thereon. In other words stop all spool troubles.

2nd. To dereel wire at any speed at zero or thereabouts tension.

3rd. To put a twist in the wire to compensate for the twisting action of a single fabric covering.

4th. Enable the winding of coils of small cross section in comparison with the included area such as phase or starter coils without having them twist themselves out of shape when disengaged from the winding jig.

5th. Enabling the winding of armatures with delicately insulated wires such as the present day enameled wires, which wire must be wound under practically no tension.

In the drawings Fig. 1 is a general elevation of my dereeler connected to an electric winding lathe that is carrying an armature winding machine head.

Fig. 2 is a sectional elevation of the body portion of my dereeler.

Fig. 3 shows a phase coil wound without and with my dereeler.

Fig. 4 is a diagram of D. C. electric connections between my dereeler and a winding lathe.

Fig. 5 is the same for 3 phase current.

I accomplish my object as follows: Over the head of the spool 10, I slip a false head 11 that has nicely rounded and smooth edges which is not intended to touch the spool. This head is proportioned to prevent the wire touching the end of the spool and being smooth prevents catching the wire on rough spots on the spool, or itself.

The wire will however catch on the head when the spool approaches emptiness due to the angle of the wire with the edge of either the head of the spool or said false head. To meet this difficulty I arrange to rotate the false head 11 by any suitable means as an electric motor 12 or a mechanical connection to the winding lathe 13.

The rotation of the false head is in a direction such that were the wire caught on it, said wire would be unwound.

The spool 11 is supported fixedly by the base 15 which carries the sleeve 16 for centering the spool 10 and keeping it out of contact with the false head carrying shaft 17. The stand or housing 18 is provided to give space for driving devices.

This device works so perfectly that were the false head to continue to revolve after cessation of the demand for wire it would continue to pay out wire. It is therefore necessary that the false head revolve and stop about as does the winding lathe. It is for this reason that the de-reeler is connected to the winding lathe.

In Fig. 1 I have shown the dereeler driven by an electric motor 12 which is electrically connected to and with the electric winding lathe 13.

The shaft 17 of the armature 19, is extended to carry said false head 11.

I prefer to connect the armature 19 in parallel with the armature 20 of the winding lathe per diagram Fig. 4 so that when said armature 20 is energized the armature 19 will also be energized.

The word "armature" will be used to include either A. C. or D. C. types.

The fields 21 of the dereeler are preferably connected shunt to the line as thereby the dereeler armature will be caused to follow the motion of armature 20. The fields of the winding lathe motor 13 may be connected in any suitable manner.

Any suitable controller shown diagrammatically as 22 may be used.

In case of polyphase dereelers and winding lathes the true armatures commonly called the stators would be connected in parallel per Fig. 5, 20′ being the lathe motor and 19′ the dereeler motor.

To eliminate the inertia and momentum and to compensate for the twisting action of the spirally laid magnet wire covering I take the wire off the reel 10 over its end. This will of course impart a twist to the wire of one turn per turn on the spool. When this twist is in the proper direction it relieves the twisting action of the wire covering, and the wire will lay straight and not twist a coil of small cross section (Fig. 3) out of shape, *a*, being such a coil wound with my dereeler, *b* being the same coil wound by the ordinary methods of revolving the spool under the influence of the pull of the winding wire. The latter coil having twisted itself into a figure 8 after being disengaged from a winding jig, which may be substituted instead of the armature 14.

When the speed of dereeling becomes great the wire whipping around the end of the spool loops out under the influence of centrifugal force after the manner of a jumping rope producing considerable tension.

To overcome this centrifugal tension I feed the wire through a series of rings or a tube or both as tube 23 and ring 24.

The term "dampening ring" or "rings" will hereinafter be used to include any such parts as tube 23 and ring 24 or their equivalent whether used singly or collectively.

This device will unwind wire under a tension so low as to even become negative, and as to wind armatures with enameled or other delicately covered wires it is necessary amongst other things that the wire be fed to the armature under as nearly as possible no tension, it is therefore possible to wind armatures with enameled wire by the aid of this device.

In Fig. 1, 28 is one of my armature winding machine heads (which have been the subject of other patents and therefore need not be described here) attached to the winding lathe 13. An armature 14 may be inserted therein for winding as shown or any suitable winding form or jig not shown such as will make the coil *a*, may be substituted.

My device will feed the wire to the work under so low a tension that it will not lay down in the armature slot or coil jig. It is therefore necessary to supply a minute tension thereto. This is imparted by the minute tension necessary to allow the operator to feel the wire in going through his fingers, for fine sizes of enameled wires are so nearly invisible as to largely require the substitution of the sense of touch for that of sight. To steady the operator's hand I provide a hand rest 25.

I do not limit myself to the exact form of the invention shown as there are many variations that can be made without departing from the spirit of the said invention.

Having now described my invention I wish to claim:—

1. In a winding device, the combination of an electrically driven winding lathe, a false head over which wire from a spool may pass a motor for driving said head and the connections of the armature of said head driving motor, in parallel with the armature of said winding lathe motor.

2. In a dereeling device, the combination of a false spool head, damping rings through which wire from said spool may pass, wire directing guides for delivering the said wire in a desired place and a hand rest placed conveniently to said wire.

In testimony whereof I hereunto affix my signature this 30th day of October, 1926.

PENROSE E. CHAPMAN.