April 5, 1938. G. A. HINRICHER 2,113,023

COIL WINDING MACHINE

Filed Feb. 1, 1936

Fig. 1

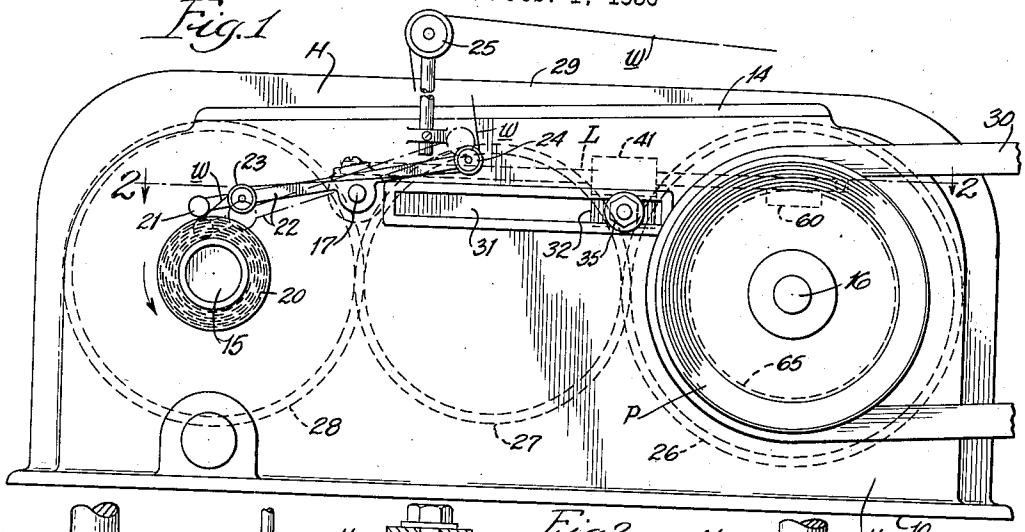


Fig. 2

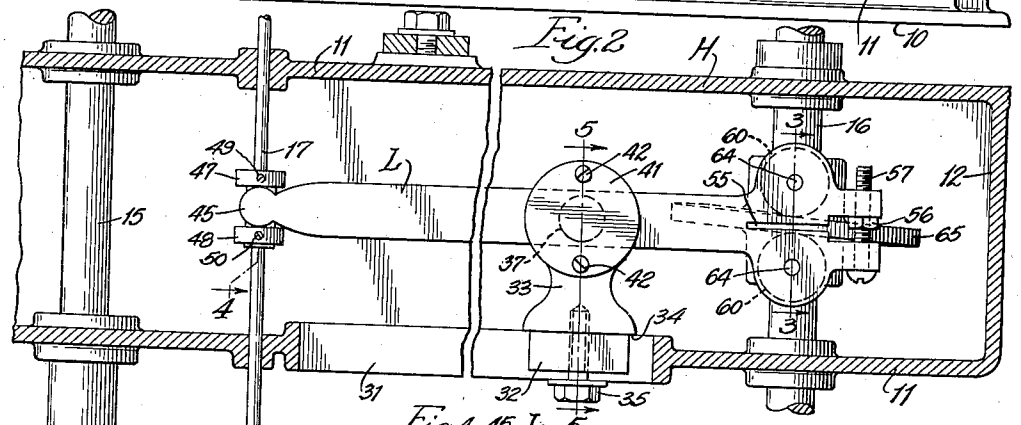


Fig. 4

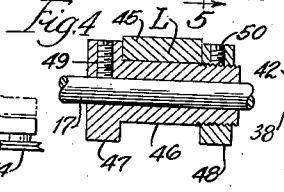
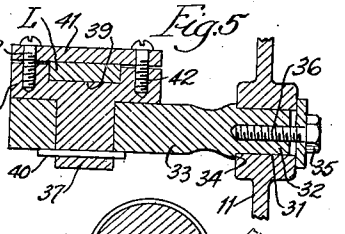


Fig. 5



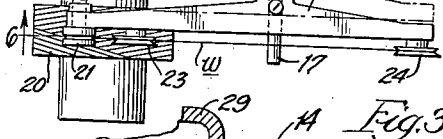


Fig. 3

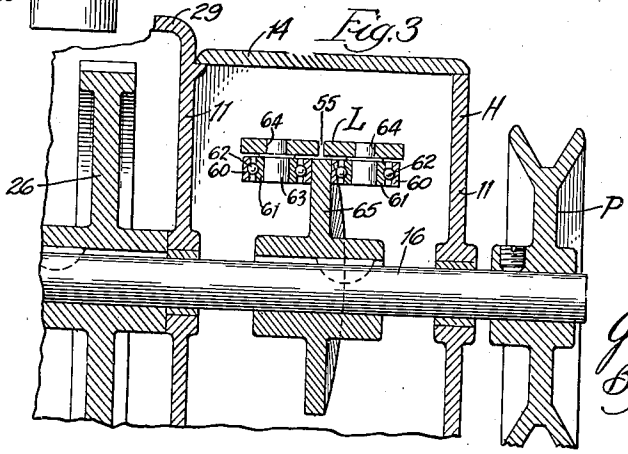
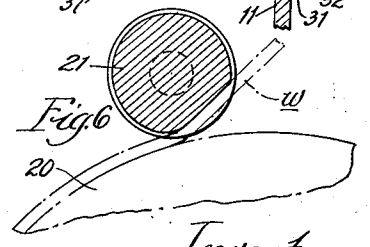


Fig. 6



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UNITED STATES PATENT OFFICE

2,113,023

COIL WINDING MACHINE

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Application February 1, 1936, Serial No. 61,868

1 Claim. (Cl. 242—25)

My invention relates to a simple and effective mechanism for winding coils of wire or other material upon arbors, spools or other cores. It is advantageous because of its compact arrangement of parts, the positioning of the principal operating elements within a protecting enclosure, the accessibility of all operating elements for adjustment or removal, and generally the simplicity of the mechanism as a whole by which it may be produced at small expense and be maintained in operative condition with a minimum of attention and effort.

An exemplification of this invention is set forth in the accompanying drawing wherein—

Figure 1 is a side elevation of the machine in its entirety;

Fig. 2 is a horizontal section through the machine on line 2—2 of Fig. 1;

Fig. 3 is a transverse section through the machine on line 3—3 of Fig. 2;

Fig. 4 is an enlarged detail in section on line 4 of Fig. 2;

Fig. 5 is an enlarged detail in section on line 5 of Fig. 2; and

Fig. 6 is an enlarged detail in section on line 6 of Fig. 2.

The entire mechanism is mounted within or upon a housing H having a base 10 from which rise side and end walls 11 and 12 respectively, there being an opening through the top adapted to be covered by a removable plate 14. The housing, as shown, is elongated in form. Formed in the side walls are opposed bearings for two shafts 15 and 16 located in opposite end regions of the housing. In addition, I provide other bearings for a guiding rod 17 which is both reciprocable and oscillatory, as will hereinafter be explained. One end of the shaft 15 which is extended exteriorly of the housing serves as an arbor to receive thereon windings 20 of a wire *w* or other material that is led from a supply reel (not shown). The wire is formed into coils as it leaves a guide 21 (see Fig. 6) here shown as a plate having a shallow groove whose depth is greatest just before the point where the wire leaves the guide. This guide is carried at one end of a bridge 22 close to an idler 23 around which the wire travels as it proceeds from a second idler 24 at the opposite end of the bridge. Support for the bridge intermediately of its ends is furnished by the rod 17. The wire is led to the bridge from an idler 25 that may be located above the housing conveniently with reference to the supply spool (not shown).

A pulley P is affixed to one end of the cam shaft 16 (see Fig. 3). As shown, this pulley lies adjacent one side wall of the housing. At the opposite end of the shaft is a gear 26 in mesh with an idler gear 27 which in turn meshes with a gear 28 on one end of the arbor shaft 15. These three gears which transmit power from the cam shaft to the arbor shaft lie along the exterior of one of the side walls of the housing and desirably are protected by a flange 29 which extends laterally therefrom (see Fig. 3). As by means of a belt 30 which runs from a source of power (not shown) to the pulley, motion is imparted to the cam shaft and other associated parts operatively connected therewith.

Between the cam and arbor shafts, and extending through one of the side walls of the housing, is an elongated slot 31. Within this slot is slidably received a tongue 32 which extends from one end of a supporting bracket 33 having a shoulder 34 in engagement with the inner face of the housing wall wherein this slot is formed. The head 35 of a bolt 36 engages the outer face of the wall, permitting the shank of the bolt to be screwed into a threaded socket within the tongue (see Figs. 2 and 5). In this manner I adjustably secure the bracket in any desired position lengthwise of the slot. The bracket extends inwardly of the housing in a horizontal plane, and at a point about midway between the opposite side walls is provided with an aperture through which is freely received a stud 37 which extends from a head 38 having across its top face a slot 39 (see Fig. 5). As by means of a pin 40 which extends transversely through the stud at a point just below the bracket, the head is secured rotatively in place on the bracket.

The head furnishes a fulcrumed mounting for a lever L, here shown as of the first class. The lever is in the general form of a bar having a width about equal to that of the slot in the face of the head so as to fit slidingly therewithin. As by means of a cap plate 41 which may be tightened upon the head with the aid of screws 42, the lever is clamped upon the head in a desired position of longitudinal adjustment. It will accordingly be noted that the bracket which furnishes the fulcrumed support for the lever is itself adjustable longitudinally of the housing, and that the lever may be independently adjusted longitudinally of itself within the fulcrumed support just described.

As shown, the weight end of the lever is reduced in width to provide a neck upon which is formed a rounded head 45, whose center lies about in a plane which extends vertically through the

axis of the guiding rod 17. Fitted on this rod is a sleeve 46 having at one end a flange 47 and at its opposite end screw threads for receiving thereon a threaded nut 48 (see Fig. 4). The position of the sleeve upon the guiding rod may be fixed as by means of a set screw 49 and likewise the collar 48 may be provided with a set screw 50 by which to fix its adjusted position upon the sleeve. Between the flange 47 and the collar is a space within which the lever head is received. By proper manipulation of the collar upon the sleeve this space may accurately be adjusted to exactly accommodate the lever head without any play.

The opposite lever end to which the power is applied is extended laterally upon opposite sides in the form of a head which is bifurcated by a slot 55 which extends inwardly from the lever end. This slot is somewhat widened in its outer region to accommodate a lock nut 56 which is threaded upon a bolt 57 which is fitted through a pair of registering openings extending transversely through the lever close to its power end, one of these openings being screw-threaded so that as the bolt is tightened, the two portions of the lever on opposite sides of its bifurcation will be drawn together somewhat. The steel or other material of which the lever is made will normally possess a slight resiliency such that if the bolt be loosened, the two portions of the lever opposite its bifurcations will tend to spring back again to their initial position.

Mounted in the head portion of the lever, at places directly opposite to each other, is a pair of rollers 60 each having, by preference, an associated raceway 61 with balls or other anti-friction elements 62 (see Fig. 3). Each raceway is carried upon a stud 63 which is entered and secured within an opening 64 in the lever, so as to have a fixed mounting thereupon. The two rollers lie adjacent opposite faces of a wobble cam 65 which is carried fast on the shaft 16. By properly manipulating the bolt 57, and thereafter tightening the lock nut 56, the positions of the rollers may be accurately set with reference to the wobble cam so as to avoid any clearance or play therebetween. This is important because in the operation of the mechanism the lever will be oscillated at considerable speed and any loose movement or play between the cam and roller should therefore be avoided. As wear takes place, the rollers may be shifted toward each other by manipulation of the adjusting bolt 57 in the manner already explained.

In operation, the lever will be manipulated to reciprocate the guiding rod 17 concurrently with rotation of the arbor shaft upon which the wire is to be wound. Due to the pull on the wire by the arbor shaft, the guide 21 will be held constantly against the coil. The guiding rod will concurrently be reciprocated to lay the wire in proper coils upon the arbor or core.

Adjustment of the collar 48 may be made, as required, to take up any wear at the weight end of the lever whose movement may be amplified or reduced by shifting the position of the fulcrumed support lengthwise of the housing. In this operation it is necessary merely that the cover 14 be removed to permit loosening of the cap plate 41 after which the bolt 36 may also be loosened, permitting a shift in the position of the bracket. Should it be necessary at any time to make adjustment in the relative positions of the two rollers 60, then removal of the top plate 14, followed by taking off the cap plate 40, will permit free disengagement of the lever and its withdrawal from the housing. It will accordingly be observed that the several parts are so related to each other as to be easily accessible whenever it is necessary to make any adjustments or repairs.

The entire assembly of elements entering into the present mechanism is very compact and simple. In addition, the principal operating parts are protected within the housing to which access may easily be gained. It is accordingly with a view to protection of the several features of my invention as described above, that the following claim is hereto appended.

I claim:

In a coil winding machine comprising a casing supporting a winding spindle, a strand traversing guide rod slidably mounted in opposite side walls of said casing and having its traversing end portion extending outside the casing wall adjacent said winding spindle, a driven shaft also mounted in said walls of the casing to extend through the casing parallel to said guide rod, a cam means carried by said shaft between the side walls of said casing, a guideway formed in a side wall of said casing between said rod and shaft mountings, a bracket extending through said casing wall and slidably mounted in said guideway, said bracket having a pivotally mounted support at its inner end, a lever supported in the pivotal support of said bracket with its respective end portions overlying said rod and said cam means, and adjustable means providing an adjustable connection between said cam and said rod and the respective overlying portions of said lever.

G. ANTON HINRICHER.