Dec. 23, 1958 W. BLUMENTRITT 2,865,574

CORE HOLDER FOR WINDING MACHINES

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Fig. 1.

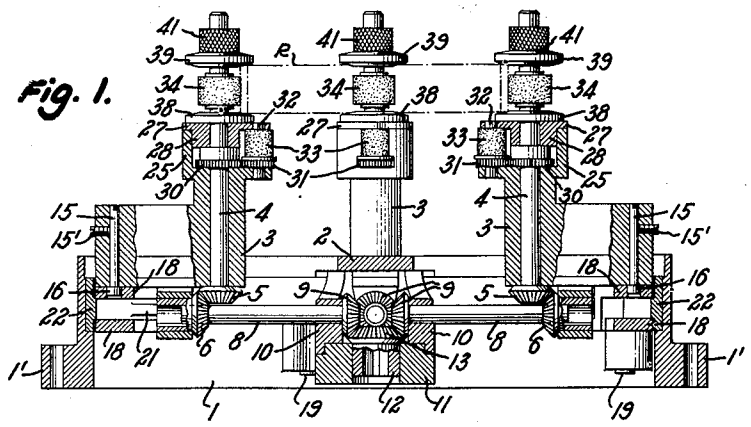
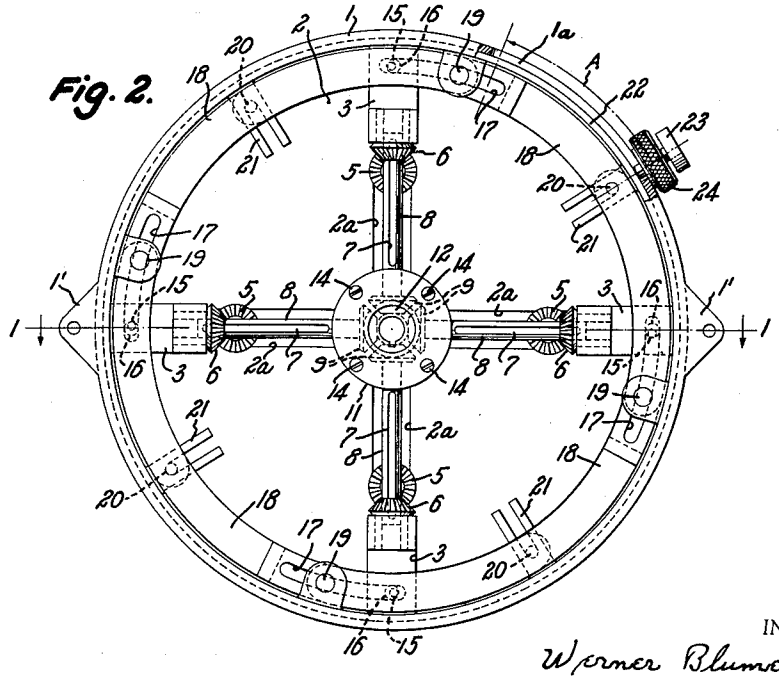


Fig. 2.



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Fig. 3.

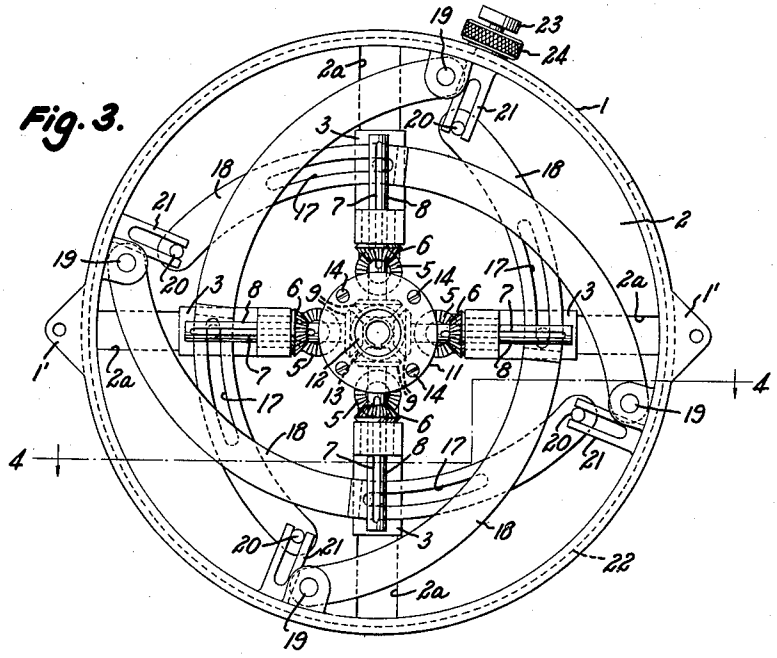
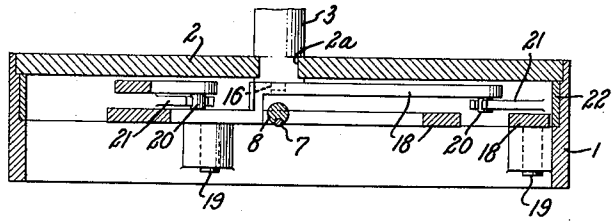


Fig. 4.



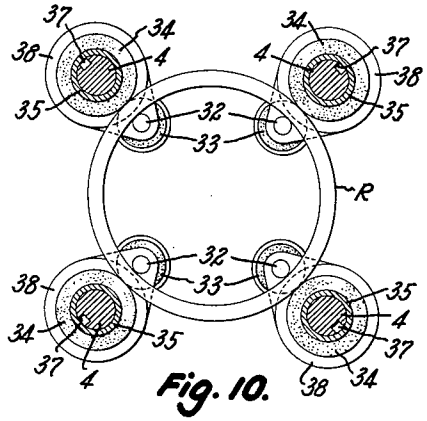


Fig. 10.

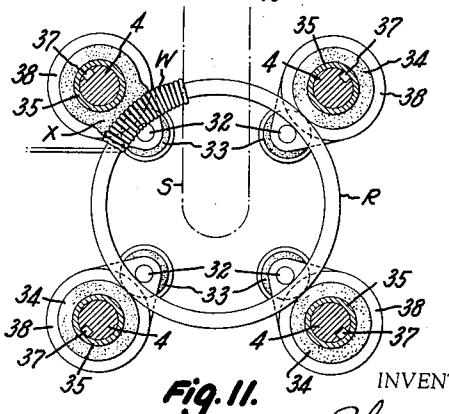


Fig. 11.

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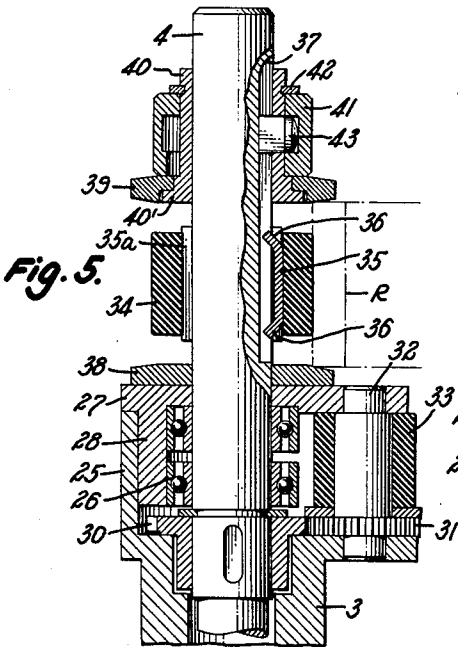


Fig. 5.

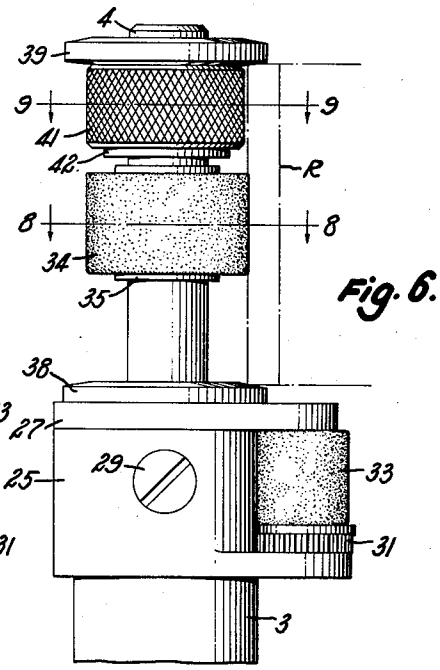


Fig. 6.

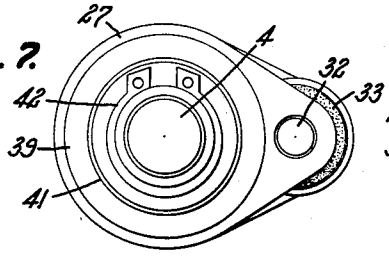


Fig. 7.

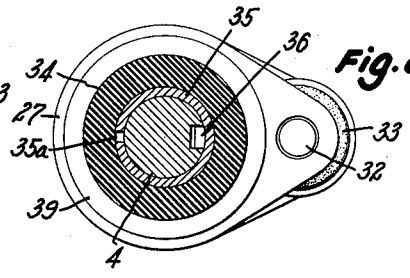


Fig. 8.

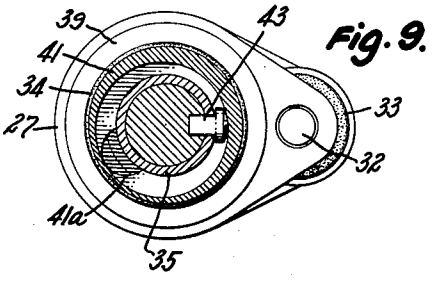


Fig. 9.

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CORE HOLDER FOR WINDING MACHINES

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Application January 11, 1955, Serial No. 481,200

Claims priority, application Switzerland January 12, 1954

10 Claims. (Cl. 242—4)

This invention relates to a holder for ring bodies or cores which are to be wound in winding machines, and more particularly to a holder for annular cores which affords a uniform angular feed of the ring bodies with respect to a wire as it is wound upon the ring body.

A known type of holder in use with ring winding machines has three columns offset by 120°, the columns being driven by a common gear wheel and each provided with a core supporting roller and a core driving roller. The columns are pivotable in relation to each other to receive annular cores of different size and are spring pressed to engage their driving rollers against the core. The pivoting of the columns results in a decentering of the supported core during a winding operation and this is a disadvantage when precision one-layer windings of resistance wires are to be applied to annular supporting bodies. The radius of the ring body is slightly increased by the winding and, when a wound portion of the ring body is engaged by a driving roller, there is a retarding of the feed action by that particular roller.

Objects of the present invention are to provide ring body holders of the automatic feed type which are free from the disadvantages of the prior holders. Objects are to provide ring body holders which include four uniformly spaced and positively driven shafts or columns which carry sets of feed rollers for imparting an angular feed to ring bodies of different diameter, the four shafts or columns being displaceable concentrically with relation to each other. A further object is to provide a ring body holder having the stated characteristics, and in which each column includes a device adjustable to provide a firm support for ring bodies of different thicknesses or axial length.

These and other objects and the advantages of the invention will be apparent from the following specification when taken with the accompanying drawings in which:

Fig. 1 is a central vertical section through a ring body support embodying the invention, as seen on section line 1—1 of Fig. 2;

Fig. 2 is a bottom plan view of the same;

Fig. 3 is a bottom plan view of the holder as adjusted to support ring bodies of small radius;

Fig. 4 is a fragmentary vertical section through the same on line 4—4 of Fig. 3;

Figs. 5 and 6 are a central section and an elevation, respectively, on a larger scale, of the upper portion of one of the columns and showing different adjustments of the upper ring body support;

Fig. 7 is a plan view of a column as shown in Fig. 5;

Figs. 8 and 9 are transverse sections on lines 8—8 and 9—9, respectively, of Fig. 6; and

Figs. 10 and 11 are diagrammatic plan views showing respectively a bare ring body and a partially wound one in position on the holder.

In Figs. 1–4, the reference numeral 1 identifies the annular housing of a ring body support which has apertured ears 1' through which bolts may be passed to secure the housing to a base on which a winding machine is mounted. A plate 2 is secured across the upper end of the housing bore, the plate 2 having four guide slots 2*a* uniformly spaced at 90° in which slide blocks 3 carrying vertically extending shafts 4 are mounted for radial movement in a manner similar to the jaws of a rotary chuck. The lower end of each shaft 4 carries a bevel gear 5 in mesh with a bevel gear 6 supported on the associated slide body 3 and provided with a key, not shown, seating in the groove 7 of a shaft 8. The adjacent inner ends of the four shafts 8 have bevel gears 9 fixed thereto and are journalled in bearing blocks 10 which are centered on the axis of plate 2 by a bearing block 11 in which the hub 12 of a bevel drive gear 13 is journalled. For accurate alinement, the bearing blocks 10 are preferably formed by drilling an integral piece of metal which is then sawed into the individual blocks which are secured to bearing block 11 by screws 14.

The outer end of each slide block 3 has a shaft 15 journalled thereon on an axis parallel to the axis of housing 1 and guide plate 2, the lower end of each shaft 15 having an eccentric head 16 which is slidably seated in the arcuate slot 17 of a lever 18 having one end hinged on the housing 1 by a pin 19 and carrying a pin 20 at its other end which seats within a yoke 21 fixed to a ring 22 that is supported for angular adjustment on the wall of the annular housing 1. A bolt 23 is secured to ring 22 and extends through a slot 1*a* in the wall of housing 1 to permit adjustment of the levers 18, and thereby of the slide blocks 3 from the exterior of the housing. A jamb nut 24 is provided on bolt 23 for securing the ring 22 in any desired position of adjustment. Small adjustments of the individual blocks 3 to set all at the same radial distance from the axis of the holder are had by turning the shafts 15 to vary the orientation of their eccentric heads 16 in slots 17 of the levers 18. When once correctly adjusted, the shafts 15 are secured against inadvertent movement by set screws 15'.

By movement of bolt 23 and ring 22 in the direction of arrow A, Fig. 2, the slide blocks 3 may be adjusted from their maximum spacing, as shown in Figs. 1 and 2, to minimum spacing as shown in Fig. 3.

The upper part of each slide block 3 is formed as a hollow flange or box 25 for a pin bearing 26 for shaft 4, the bearing being retained in place by a cover 27 having a depending flange 28 which telescopes within and is secured to the box 25 by screws 29. A gear 30 within the box 25 is keyed to shaft 4 and meshes with a gear 31 on a laterally arranged shaft 32 which is journalled in the box and its cover, and has a medium hard rubber surfacing 33 of about two to three millimeters thickness constituting a drive roller for ring bodies of relatively small diameter. Each shaft 4 carries a second drive roller for ring bodies R of larger diameter, each such roller comprising a facing 34 of medium hard rubber of about two to three millimeters thickness on a metal sleeve 35 having inturned portions 36 engaging in a longitudinal groove 37 of shaft 4 to key the roller to the shaft. Sleeves 35 are longitudinally split, as indicated at 35*a* in Fig. 8,

and resilient to maintain their position of adjustment along shafts 4 since it is preferable to have the drive roller surface 34 engage the central portion of the height of the ring bodies R which are to be wound, note Figs. 5 and 6 which illustrate ring bodies R of different height.

As previously stated, adjustment of shafts 15 permits the setting of all shafts 4 at the same distance from the axis of the holder, and the drive rollers 33 and 34 are ground if necessary to keep their diameters within small tolerances to insure an equal feed of the ring bodies by all drive rollers. Feed rollers 33 are of somewhat smaller diameter than feed rollers 34, and the gears 30, 31 which drive the shafts 32 of the feed rollers are preferably so designed that both sets of feed rollers have the same circumferential speed.

The ring body R is seated between washers 38 which rest upon the covers 27 of boxes 25 and are rotatable with respect to shafts 4, and upper washers 39 rotatable on flanged bushings 40 which are adjustable on the shafts 4 to adapt the holder to support ring bodies R of different thicknesses or axial lengths, see Figs. 1 and 5. While the ring body R is shown in Fig. 1 as seated on washers 38 within the feed rollers 34, it is apparent that larger diameter ring bodies may be supported on washers 38 to surround the feed rollers which will then contact the inner periphery of the ring body to feed the same angularly as it is wound.

The washers 39 are held against flanges 40' of the bushings 40 by knurled clamping sleeves 41 which, in turn, are retained in place by split spring washers 42 which seat in circumferential grooves at the other ends of the bushings 40. Each clamping sleeve 41 has an eccentric bore therein between upper and lower flanges by which it is journalled on its associated sleeve 40, and one of the flanges is provided with a recess 41*a* which permits the clamping sleeve to be assembled on a bushing 40 to enclose a stud 43 having a flat inner end for seating on the bottom of groove 37 of shaft 4 and a rounded outer end engaged by the inner wall of the eccentric bore of the clamping sleeve. As shown in Figs. 5 and 9, the clamping sleeve 41 is in position to force the stud 43 against shaft 4 to clamp bushing 40 to the shaft, thereby fixing the washer 39 at a desired distance from the lower washer 38. By turning the sleeve 41 on bushing 40, the clamping pressure may be relieved to permit adjustment of the bushing along shaft 4 and, by turning the sleeve 41 to aline the recess 41*a* with the stud 43, the bushing and sleeve assembly may be removed from shaft 4 and then re-assembled on the shaft in inverted position, as shown in Fig. 6, when ring bodies R of maximum thickness or axial length are to be wound.

The described holder is secured to the base carrying the winding machine with which it is to be used by screws or bolts, not shown, passed through the mounting ears 1'. The holder is so positioned that the hub 12 of drive gear 13 is centered on and engaged with a shaft, not shown, which rotates in synchronism with the winding machine.

In use of the holder, the slide blocks 3 are adjusted by manipulation of bolt 23 in accordance with the diameter of the ring body or core to be wound and, in the case of relatively large diameter ring bodies R, the feed rollers 34 are adjusted on shafts 4 to contact the middle portion of the height of the ring body. The core or ring body R is placed on the lower washers 38, as shown in Fig. 10, and the slide blocks 3 are moved slightly inward to engage the drive rollers with the ring body. As the winding progresses, the shuttle S moves through the ring body to wrap on the wire W and the ring body is rotated by the feed rollers 34 as the wire is applied. When the wound portion of the ring body engages a feed roller 34, the wire W deforms the roller, as shown at X in Fig. 11, since the shafts 4 are all substantially rigidly supported and the greater force exerted on this feed roller by the wire W is counteracted by the opposite feed roller as well as the frictional forces established by the adjacent feed rollers. The decentering which results from the presence of the wire W is therefore negligibly small. Further, the winding plane of the shuttle S is at an angle of only 45° to the decentering force and any decentering therefore has little effect upon the uniformity of the winding.

I claim:

1. A holder for simultaneously supporting and effecting rotation of ring bodies to be wound, said holder comprising a base having a vertical axis, four vertical slide blocks on said base and spaced uniformly about said vertical axis, each said slide block having a vertical bore therein, a first vertical shaft individual to and rotatably mounted in each said block bore, a first feed roller secured to each said first shaft, a second vertical shaft individual to and supported by each said slide block, said second shafts being also uniformly spaced about said vertical axis and being located intermediate the latter and said first shafts, resilient material on each of said second shafts to constitute a second feed roller and which is spaced vertically from said first feed roller on the same slide block, drive gearing interconnecting each of said first shafts with the said second shaft correlated therewith, means for driving each of said first shafts and hence also said second shafts and said first and second feed rollers, and means for effecting simultaneous equal and radial adjustments of said slide blocks in the same sense with respect to said vertical axis thereby to position all of said first rollers and all of said second rollers at the same radial distances respectively from said vertical axis in any given position of radial adjustment.

2. A holder as recited in claim 1, wherein said second feed rollers constituted by the resilient material on said second shafts are of less diameter than said first feed rollers on said first shafts, and the ratio of said drive gearing is such that all feed rollers are driven at the same peripheral speed.

3. A holder as recited in claim 1, wherein said means for effecting simultaneous radial adjustment of said slide blocks comprises a horizontal guide plate carried by said base and provided with slots spaced 90° apart and extending radially outward from said vertical axis, means supporting said slide blocks in said slots respectively for longitudinal movement along said slots, a lever individual to each said slide block disposed within and pivoted on said base, means coupling each said slide block when the said lever correlated therewith, and means movable with respect to said base to effect simultaneous movement of said levers and slide blocks.

4. A holder as recited in claim 3 wherein said base is annular and is provided with a slot through the wall thereof, and said movable means comprises a ring slidable angularly on said annular base, and a bolt secured to said base and extending through said slot of the annular base.

5. A holder as recited in claim 4, wherein said bolt is threaded, in combination with a jamb nut on said bolt for clamping said ring in any desired position of adjustment, whereby said slide blocks and the shafts carried thereby may be retained in desired positions of adjustment.

6. A holder as recited in claim 3, wherein said means coupling said slide blocks to said levers includes means for individually adjusting each slide block radially with respect to its associated lever.

7. A holder as recited in claim 1, in combination with washers rotatable on each of said first shafts and located above and below said first feed rollers for the support of a ring body to be wound.

8. A holder as recited in claim 7, in combination with means supporting those washers which are above the said first feed rollers for vertical adjustment along said first shafts.

9. A holder as recited in claim 3 and wherein the

means for simultaneously rotating said first shafts comprises a drive shaft individual to each of said slide blocks, a first gear at the lower end of each said first shaft, and a second gear meshed with said first gear, said second gear being mounted on said drive shaft for rotation thereby and sliding movement therealong as said slide block is shifted radially, and said drive shaft being received telescopically within said slide block as the latter is shifted radially inward.

10. A holder as recited in claim 9 wherein the inner end of each said drive shaft includes a gear thereon to drive the same and said drive gears are meshed with a common gear supported by and coaxial with the vertical axis of said base.

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