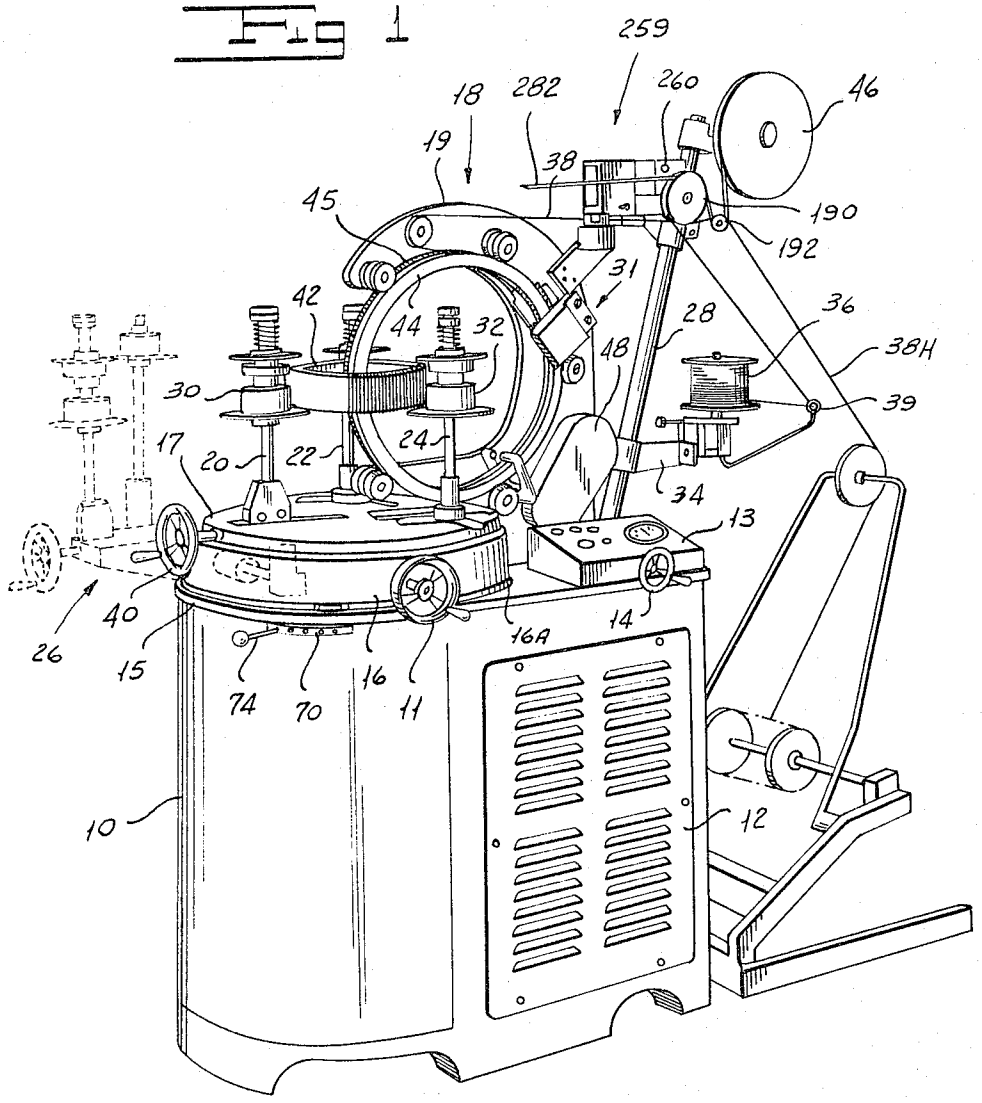
May 14, 1968 R. FAHRBACH 3,383,059

TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 1

Fig 1



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TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 2

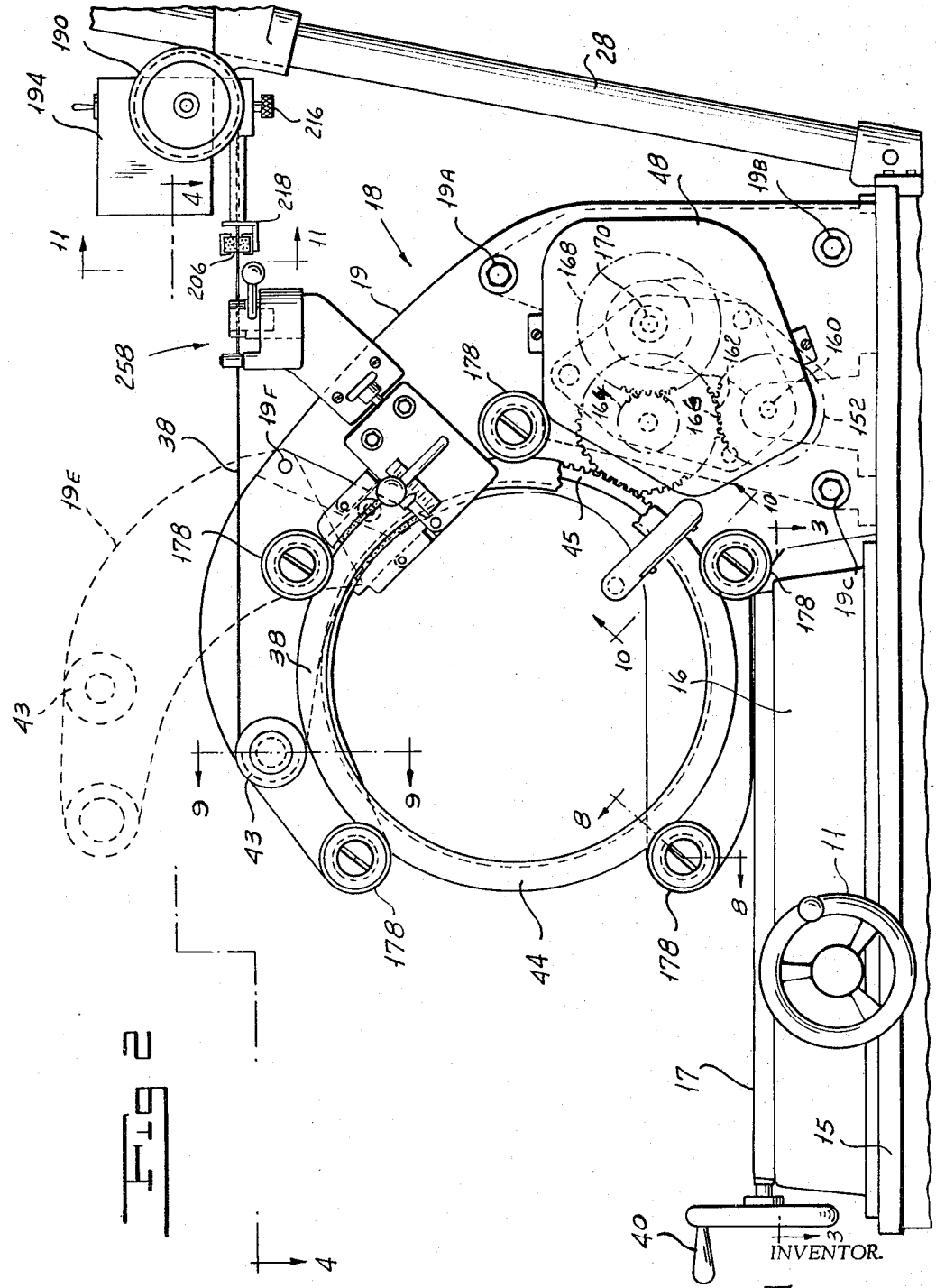


FIG 2

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TOROIDAL COIL WINDING MACHINE

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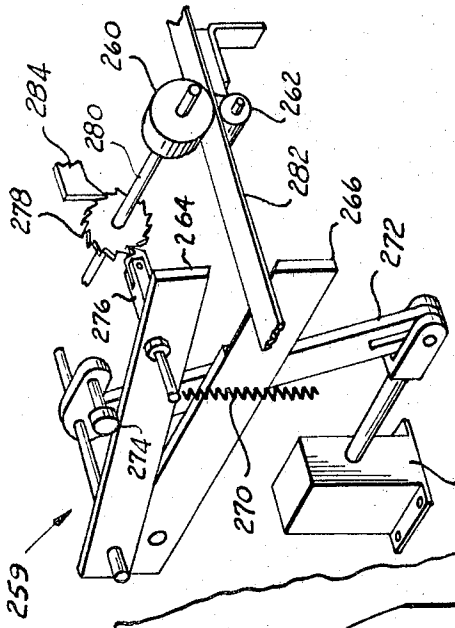


Fig 17

Fig 3

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TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 4

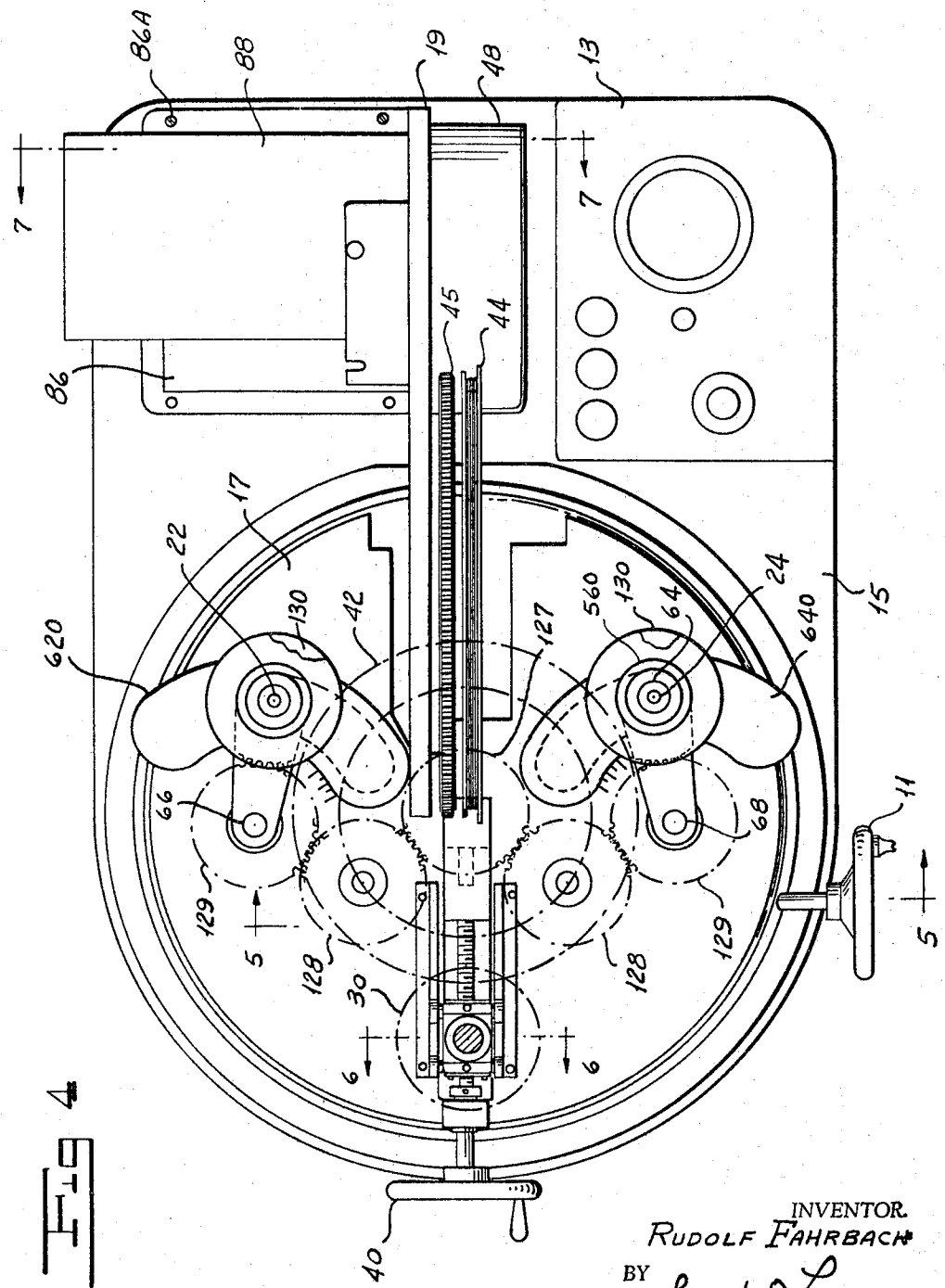


Fig. 4

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TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 5

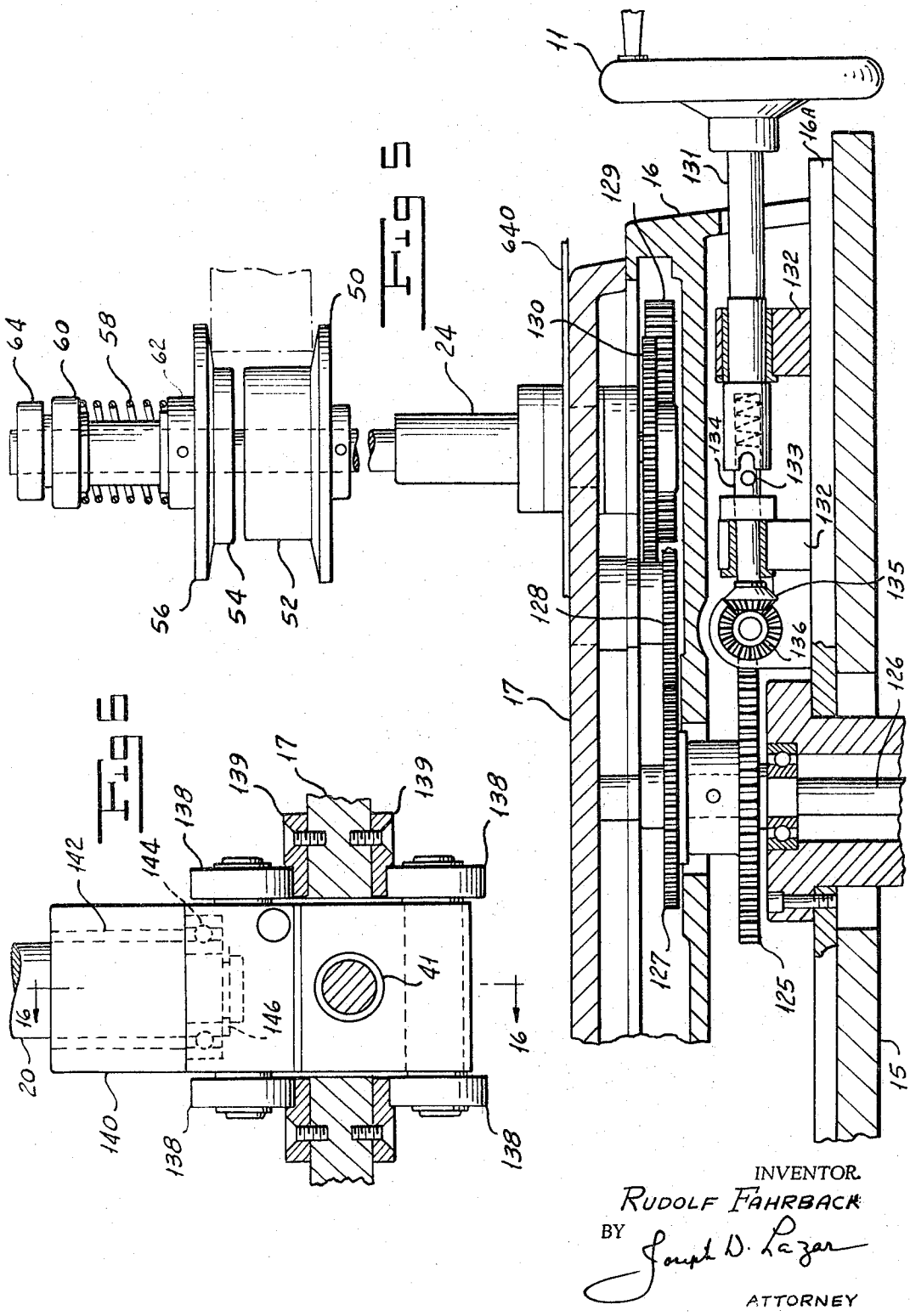


FIG. 5

FIG. 6

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TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 6

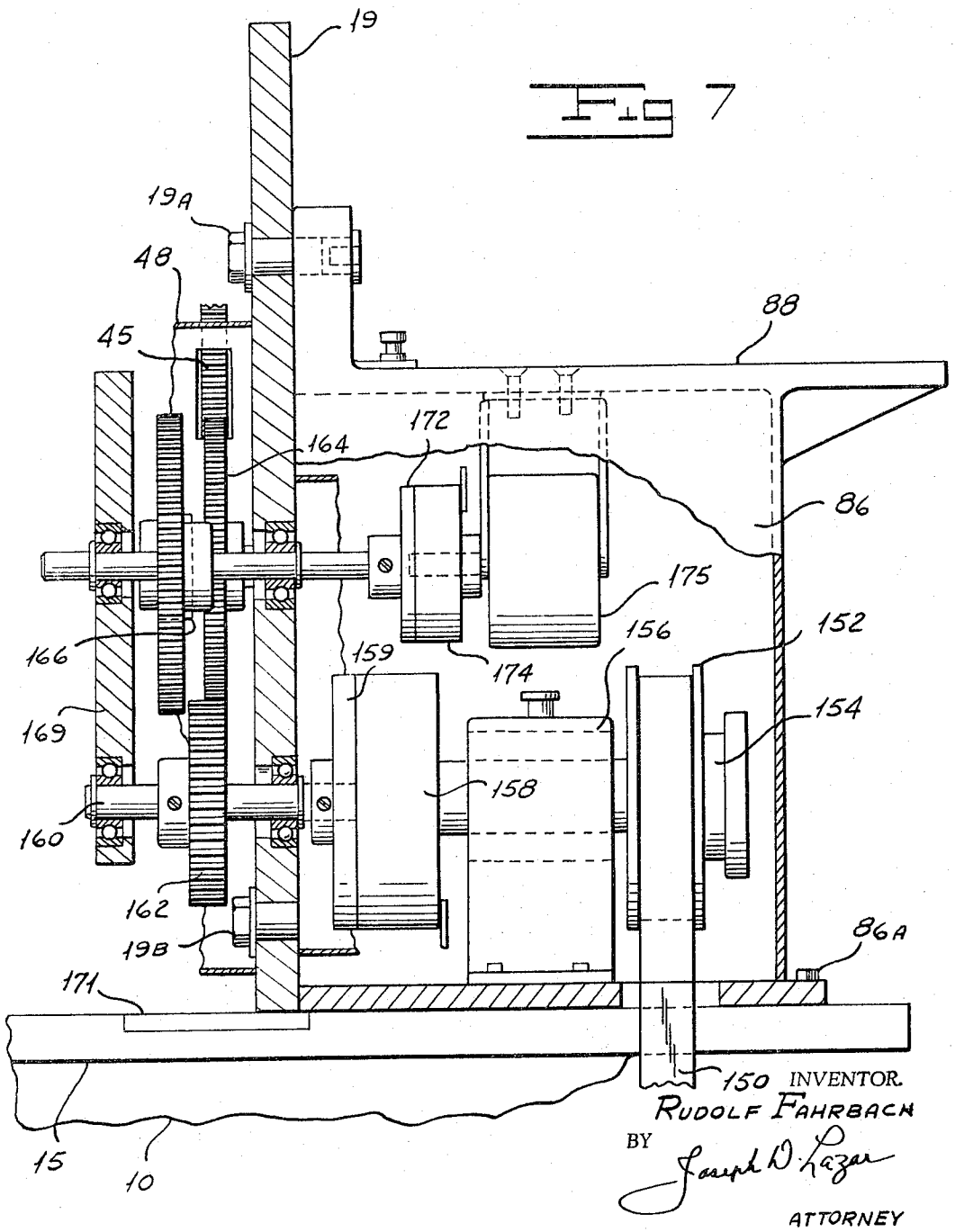


FIG 7

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TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 7

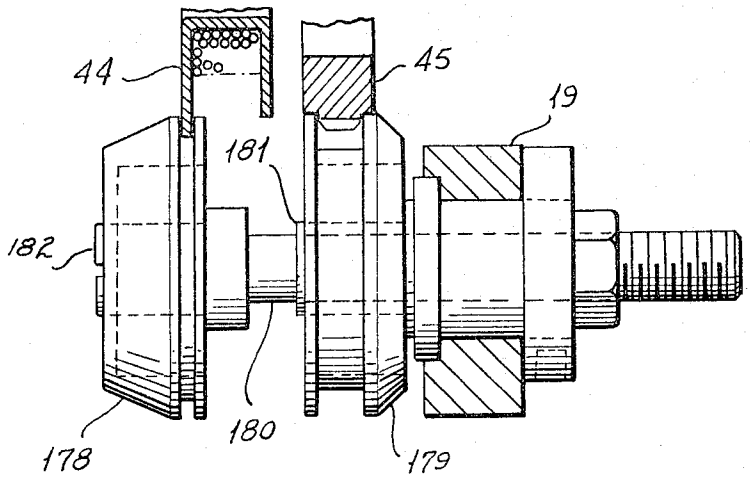


Fig 8

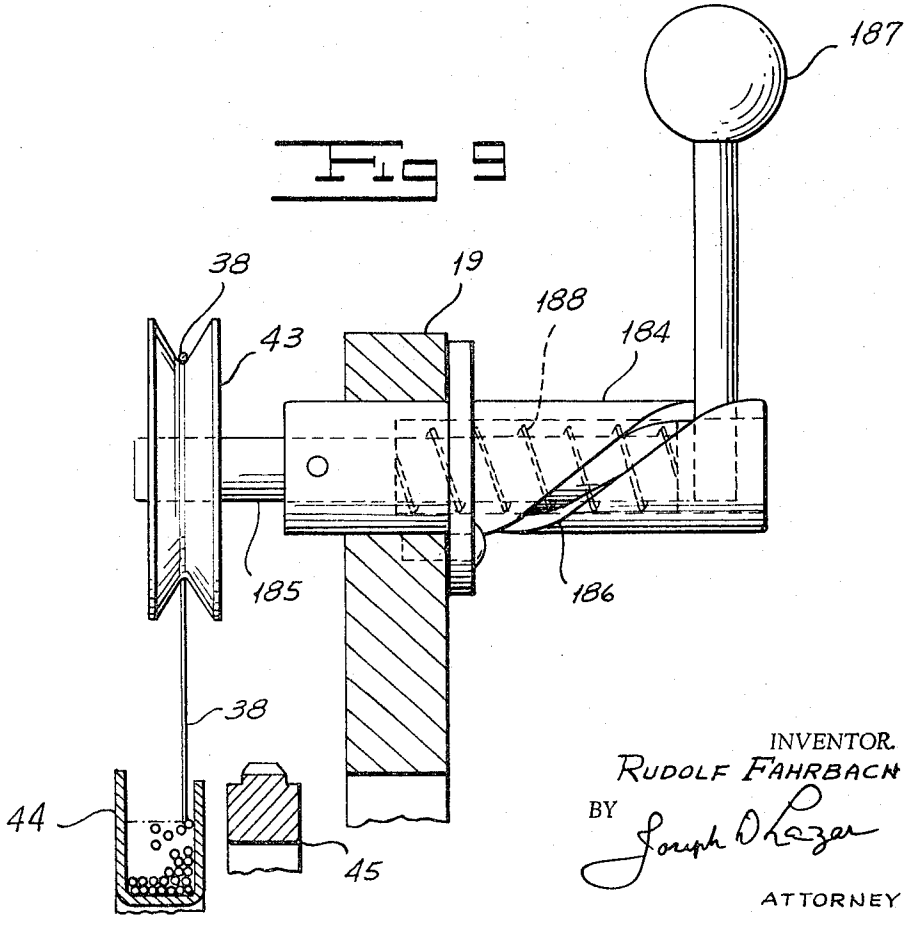


Fig 9

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TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 8

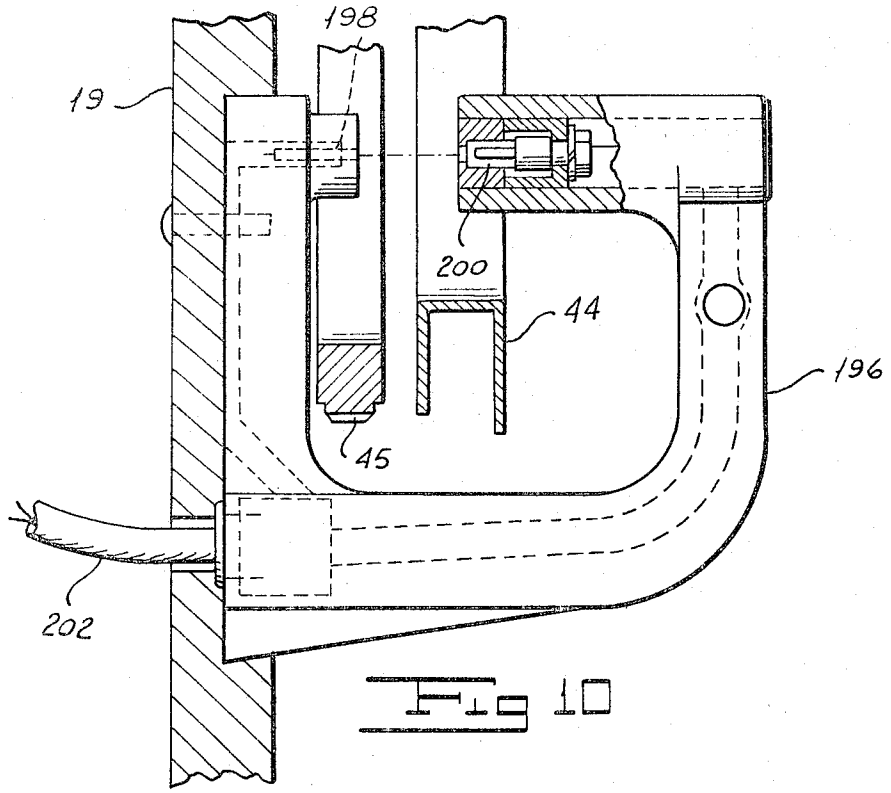


Fig 10

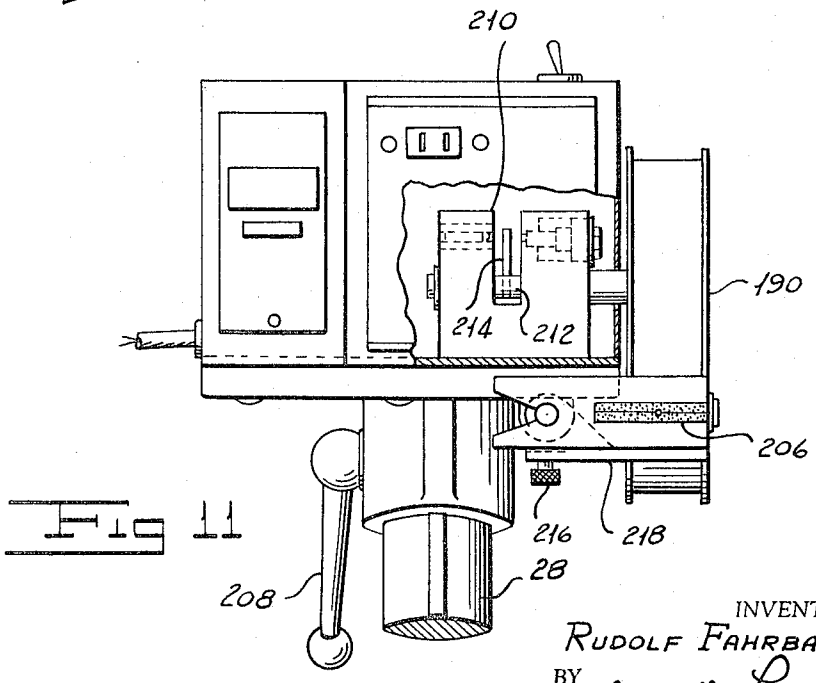


Fig 11

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TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 9

Fig 13

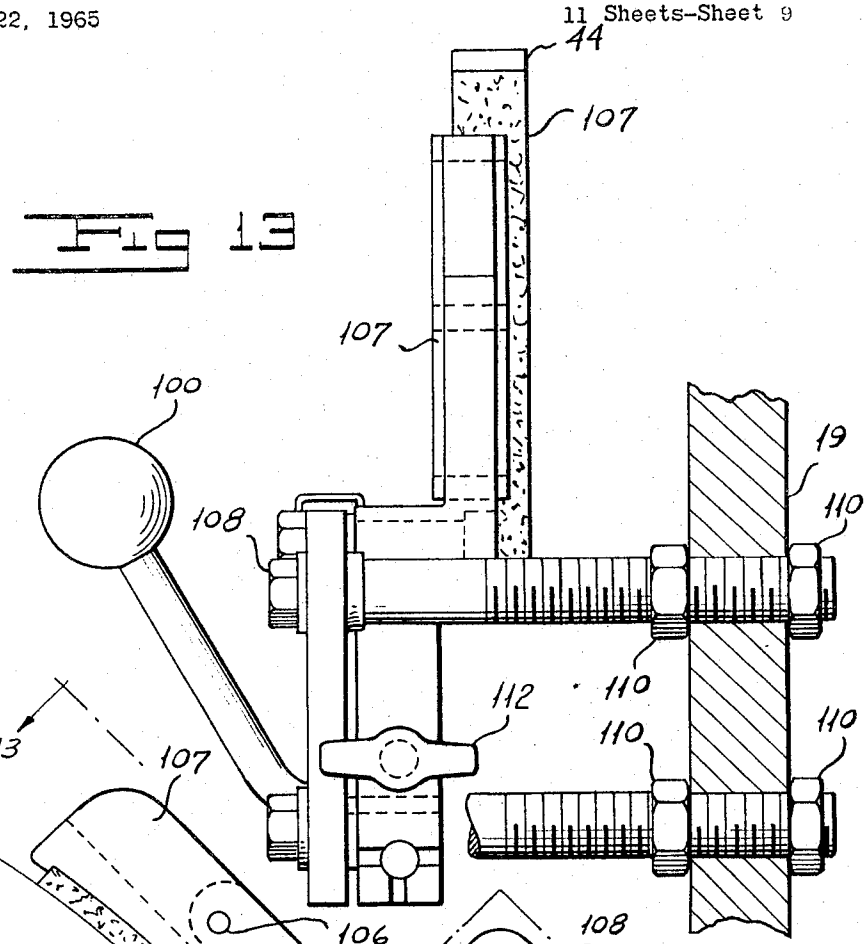


Fig 12

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TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 10

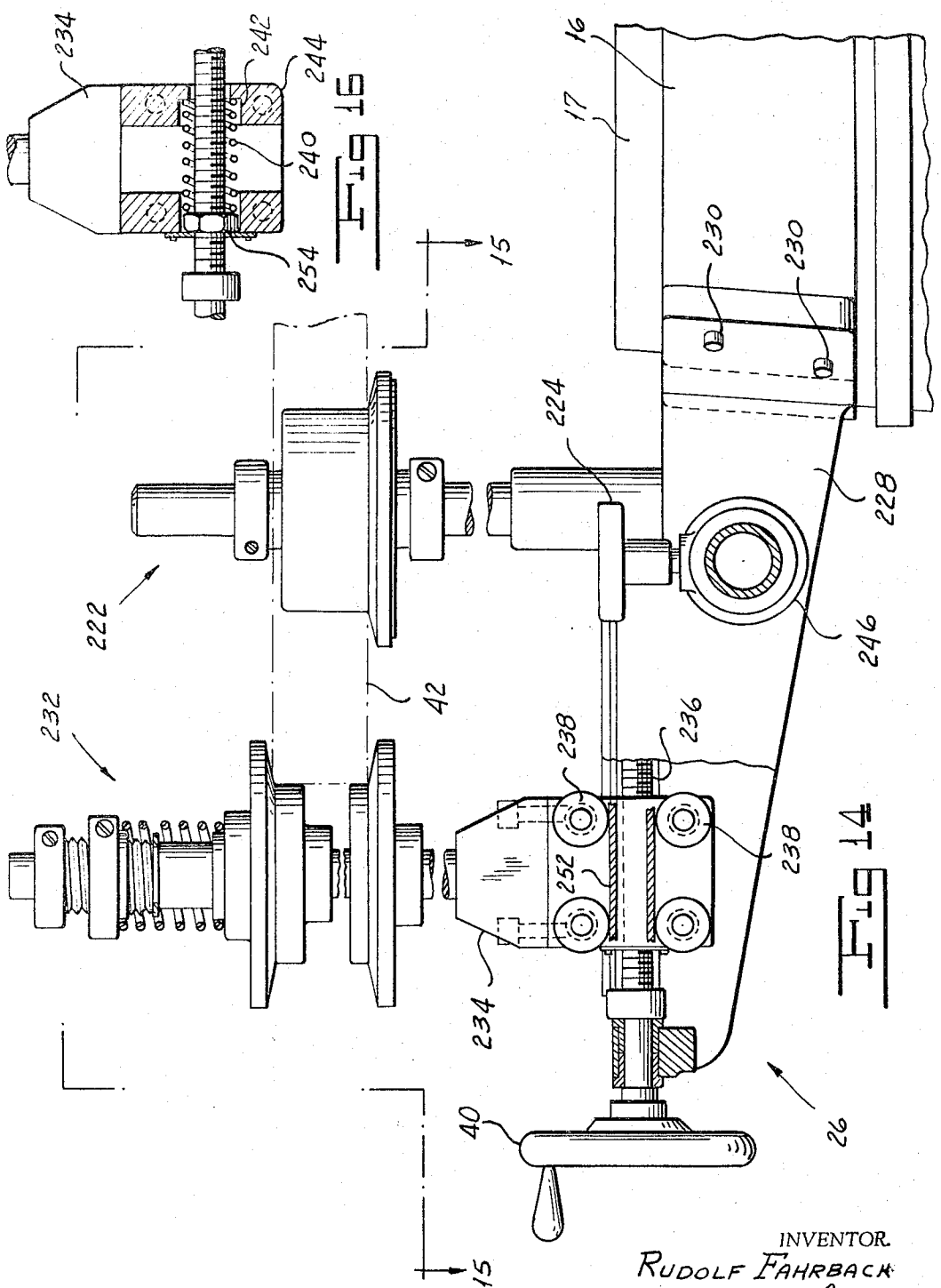


FIG 15

FIG 14

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TOROIDAL COIL WINDING MACHINE

Filed March 22, 1965 11 Sheets-Sheet 11

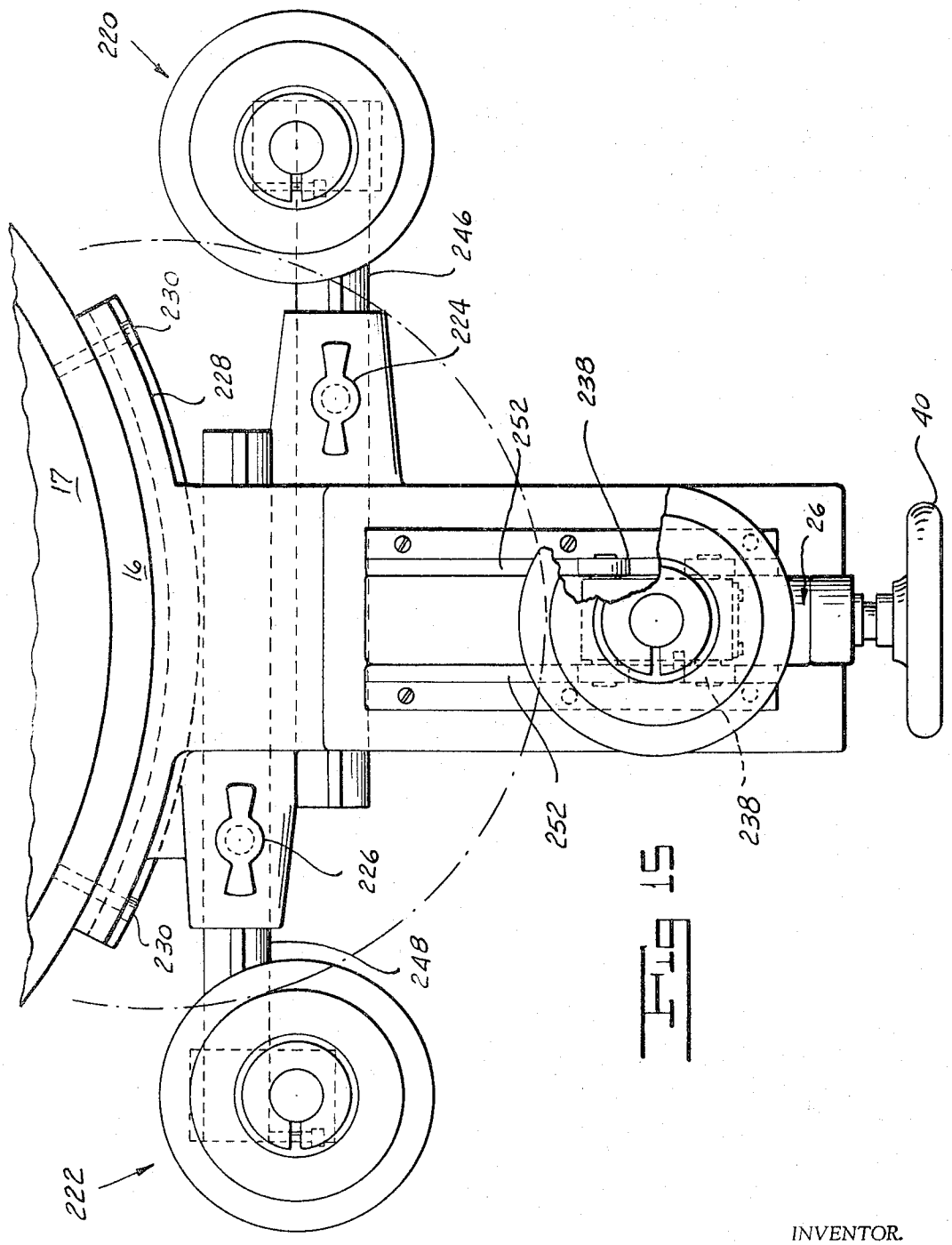


FIG 15

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United States Patent Office 3,383,059 Patented May 14, 1968

3,383,059

TOROIDAL COIL WINDING MACHINE

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Filed Mar. 22, 1965, Ser. No. 441,472
5 Claims. (Cl. 242—4)

This invention relates to winding and reeling apparatus and is directed more particularly to the ring winding of toroidal coils.

The winding of toroidal coils has long been known. For many years, all apparatus for doing this work employed a unitary, integrated assembly of power and winding elements which were individually and separately supported on and affixed to the frame of the winding machine. Each of these assemblies was so constituted that it was capable of winding only a limited range of coil sizes or a particular form of coil winding. When a different size or type of coil outside the range of the machine, was required it became necessary to remove the winding head which happened to be on the machine and substitute therefor a different winding head capable of carrying out the newly desired operation. Such a change over required that the winding head part of the assembly be removed from the remaining parts of the machine. This entailed unbolting the power drive therefrom, and a reassembly of the parts with an appropriate winding head, followed by a realignment and the establishment of a new connection between the prime mover and the new winding head.

The art of winding toroidal coils, particularly when wire of a wide range of sizes e.g., No. 40 AWG to No. 20 AWG is required, dictates accurate assembly of parts in order that the machine will function smoothly for long periods of time and under heavy duty. Consequently, great care had to be exercised in reassembling the parts during changeover, in order that all the critical requirements of such operation would be performed. This required considerable time for shut-down of the machine before the new winding head was ready for operation. In practice, it was not uncommon that such a changeover required a shut-down of an hour or more and had to be done by skilled operatives.

Many toroidal coils especially of the larger dimensions such as coils of 1⅞" inside diameter to 14" outside diameter need tape wound over the completed coil for a protective covering. The tape is made of fabric, paper or plastic material in ribbon form of widths in the order of ½" to 1". It is present practice to have tape applied to toroidal coils by machines designed for that function. To the manufacturer of such coils, this is an expensive capital investment since the taping operations are relatively infrequent but nevertheless essential. Heretofore the problems of combining into a single machine capable of being used as a universal machine for both wire winding and tape winding have remained unsolved. Among the problems involved are the geometric difference of wire and tape and the wide range of coil sizes and weights that are needed to be wound by these various materials.

It is the principal object of this invention to provide a toroidal coil winding machine having a common base and power source capable of winding a wide range of toroidal coil sizes and covering them with tape. It is a feature of my invention to arrange the basic table upon which the cores are mounted for winding with an extension means for carrying larger cores of greater weight. It is a further feature of the invention that the basic table has means for centering the core in general to a desired geometric center and further to adjust the table after the core has been centered to refined precision.

It is still a further feature of the invention to provide a counter of the material being used to wind upon the core whether it be wire or tape and to provide means for cutting the material at a predetermined length required for the winding operation.

Other and further objects and features will appear from the following description.

In the accompanying drawing to which reference is made in the following detailed description of one embodiment of the invention and in which like reference characters indicate like parts in the various views:

FIGURE 1 is an elevation view in perspective of the machine in operation and an indication in phantom of the machine adjusted for extended operation for larger coil cores;

FIGURE 2 is a side elevation of the upper portion of the machine as seen from the right side of FIGURE 1 with certain portions removed and other portions shown in dotted line to emphasize certain hidden portions thereof;

FIGURE 3 is a view of the machine taken along line 3—3 of FIGURE 2 illustrating the core centering means;

FIGURE 4 is a view of the machine taken along line 4—4 of FIGURE 2 with parts removed as needed to show the three pedestals for supporting core carrying rollers above the table illustrating the means for centering the core on the table;

FIGURE 5 is a view taken along line 5—5 of FIGURE 4 illustrating the manual means for rotating the core;

FIGURE 6 is a view on line 6—6 of FIGURE 4 illustrating details of the tension roller carriage;

FIGURE 7 is a view along line 7—7 of FIGURE 4 showing the detail on the power drive connection for rotating the ring gear and for driving the tachometer with the magnetic clutch connections therefor;

FIGURE 8 is a view taken along line 8—8 of FIGURE 2 illustrating the details of one of the five guide roll assemblies carrying the magazine and drive gear;

FIGURE 9 is a view taken along line 9—9 of FIGURE 2 illustrating the detail of the wire guide roll;

FIGURE 10 is a view taken along line 10—10 of FIGURE 2 illustrating the details for the loop counter;

FIGURE 11 is a view taken along line 11—11, FIG. 2, illustrating the detail of the footage counter;

FIGURE 12 is a view of the brake assembly for braking the magazine rotation illustrated as a fragmentary but enlarged portion of FIGURE 2 showing the brake;

FIGURE 13 is a view of the details of mounting the brake on the frame as seen along lines 13—13 of FIGURE 12;

FIGURE 14 is a side elevation view partly in section of the table extension as seen from the right side of FIGURE 1 there illustrated in phantom;

FIGURE 15 is a top view of the roller table extension as seen along line 15—15 of FIGURE 14;

FIGURE 16 is a view of the tension roller carriage taken along line 16—16 of FIGURE 6, and

FIGURE 17 illustrates a schematic of the tape cutter.

Referring now to FIGURE 1 there is illustrated a toroidal coil winding machine with one of a plurality of winding heads in place, winding a core. The cabinet **10** includes the motor and motor-drive used for the power source for the machine operation including electrical connections and gear trains therefrom. Screen **12** provides ventilation to the interior of the housing. Above the housing is a base stationary plate **15**. Across the top of the housing on the forward end of the unit above the base plate is a housing **16** containing the mechanism for automatically controlling the feed position of the core to be wound such as core **42**. A roller table **17** is disposed over the housing **16** and carries the two drive roll assemblies

on columns 22 and 24 respectively and support 20 for the tension roll assembly. The roller assemblies carry a core 42 in horizontal position on which turns are wound to the selected plurality linked from within the magazine and gear assembly 18. This assembly, also known in the art as a winding head, according to this invention is easily mounted on the machine and is quickly replaceable by a corresponding winding head of larger or smaller core size capability. A hand operated wheel 11 is provided for rotating a core 42 to a desired azimuth. Hand wheel 40 adjusts the tension of spring 240 (FIG. 16) on tension roll assembly 20. Hand wheel 14 on control box 13 provides manual selection of the speed of the feed control. Post 28 supports the various spools and guides required to supply or guide the wire or tape to the winding head. On the post 28 is mounted a bracket 34 carrying a supply of fine wire on spool 36 shown supplying fine wire 38 over guide 39 over wire guide roller 43 on to the magazine 44. A spool 46 for carrying tape is mounted on the upper end of post 28. Footage counter assembly 190 and tape cutting assembly 194 are mounted on post 28. Gear housing cover 48 contains the power gear train for driving the ring gear 45 of the winding head 18. The tension roll assembly and one idler roll assembly is shown in phantom generally indicated by reference numeral 26 for the means for providing the extension to the roller table for larger cores than that indicated by the core 42.

Referring now to the more detailed illustrations of the embodiment being described, the view as shown in FIGURE 5 shows the automatic feed housing 16. Column 24 for the drive roller assembly mounted thereon rotates the roller within which a core portion 42 is mounted. The roller assembly comprises the lower disc 50, lower roller 52, upper roller 54, upper disc 56 carrying a spring 58 between bearings 60 and 62 and lock nut 64, vertically displaceable on the column 24 for adjusting the tension on the assembly. Column 24 is rotated from the motor drive within housing 16 by means of the gear train comprising gear 520 (FIGURE 3) on the upper end of a shaft universally connected within housing drive not shown. The shaft connected to gear 520 is arranged to be displaceable in a limited degree to allow for displacement of the feed housing 16 with respect to the table platform 15. Bevel gear 540 driven by gear 520 rotates shaft 560 through U-bracket bearing 580 carrying worm 600 in meshed engagement with the teeth of gear 125. Gear 125 is rigidly connected to shaft 126 and rotates the gear train for driving the drive roller shaft 24 comprising gear 127, idlers 128, gears 129, and driver gears 130 (FIGS. 4 and 5). A similar gear train driven by gear 125 is similarly arranged to drive the column 22 for a similar drive roller assembly for another segment of the core 42.

The two drive roller assemblies driven by columns 22 and 24 respectively are positionable on the roller table 17 over the arcuate plates 620 and 640 (FIGS. 4 and 5). They are positioned by rotation about the pivots 66 and 68 respectively, the gear 130 (below plate 17) connected to column 24 passing through the arcuate slots in plate 17, being in continuous mesh with gear 129 during the desired positioning of the roller assemblies.

The tension roll assembly (FIG. 1) supported on column 20 having main roller 30 is adjustable in a radial position with respect to the center of the roller table 17 by means of the hand wheel 40 connected to the threaded shaft 41 in threaded engagement with the roller carriage 140 (FIGS. 4, 6 and 16), which ride on tracks with wheels 138. Column 20 (FIG. 6) is received in the carriage 140 in bearing 142 and rides on ball bearing 144 and is held by retaining ring 146.

Refined positioning or centering of the core once it has been positioned within the three points of the roller supports carried by columns 20, 22 and 24 is effected by a pair of symmetrical linkages for rectangular coordinate adjustment, best seen in FIG. 3. One coordinate adjustment is effected by segment 70 rotated about pivot 72 by manual handle 74 also pivotly connected to sprocket 75 provided with teeth for carrying a chain 76 for driving a similar sprocket 77. On the sprockets 75 and 77 respectively an eccentric stud is slidably fitted in parallel slots 73 and 78 respectively, which slots are in the base plate member 16A of the housing assembly 16. The segment 70 (see also FIG. 1) is located below the base plate 15 and is conveniently exposed to the operator through the housing 10 for control by insertion of the lever 74 into any one of the recesses provided in the segment. Rotation of the segment causes the stud illustrated for movement in the slots 73 and 78 to slide in an eccentric fashion with respect to the sprockets 75 and 77 to cause the entire assembly above the base plate 15 to be displaced relative to the base plate by an amount proportionate to the displacement of the studs in the slots. In a similar fashion horizontal displacement perpendicular to the movement described is effected by a corresponding mechanism comprising a segment 79 a sprocket 80 and pair of slots 69 and the chain 81 for the pair of eccentrics. This eccentric mechanism, 82, operates in a manner similar to that for the other eccentric effecting relative displacement of the housing above the base plate 15.

Manual positioning of a core 42 for initiating operation of the machine or for positioning a core during a winding operation is effected by the hand wheel 11 (FIG. 5) rotating a shaft 131 carried on bearings 132 and split to provide a disconnection between the two bearings. On one end of the shaft segment, 134, is provided a pin 133 for engagement in the slotted end of shaft 131 having a socket therein to cause disengagement of the pin from the slot when expansion pressure is inserted axially on shaft 131. Bevel gear 135 on the opposite end of shaft 134 is in mesh with bevel gear 136 which in turn is in mesh with ring gear 125 on shaft 126. Thus when pin 133 engages the slot of shaft 131 rotation of the hand wheel 11 rotates gear 125 and thus the resulting gear chain is caused to rotate the roller assembly 24 and 22 as desired.

A winding head 18 FIG. 2 consists generally of a frame plate 19 articulated for opening about pivot 19F whereby the upper portion 19E may be raised to remove if desired the magazine and gear assembly riding on the rollers. The usual ring gear 45 and magazine 44 for carrying either wire strand or tape are carried on four roller assemblies one of which is illustrated in detail in FIG. 8. The roller assemblies comprise a roller 178 riding on shaft 180 journalled within shaft 181 which in turn carries roller 179 both bolted to the frame plate 19. Roller 178 is provided with a recess for carrying one flange of the magazine 44 and roller 179 is peripherally recessed to receive the ring gear 45. Nut 182 is provided to adjust the position of roller 178 on its shaft 180 whereby various widths of magazine types may be received thereon.

Wire guide roller 43 illustrated in detail in FIG. 9 is carried on shaft 185 journalled in stationary sleeve 184. Helical groove 186 guides the arm of lever 187 attached to the end of shaft 185 in the path indicated. A spring 188 maintains a compression force on lever 187. In operation the manual lever 187 is rotated through helical groove 186 causing the guide roller 43 to be displaced in an oscillating fashion over the magazine recess 44 whereby wire guided in the V-recess of the roller 43 is laid within the recess of the magazine according to the will of the operator.

For winding heads designed for tape rather than wire or strand, the oscillating guide roller is unnecessary since the tape is piled one layer over the other in a radial fashion in a magazine such as 44. Accordingly there is no need to guide the tape across the recess. For such winding heads I provide a pin or the like not shown located generally in the same location as the roller 43 whereby the tape is guided thereover into the magazine.

The means for rotating the shuttle gear **45** is best seen in views of the machine illustrated in FIGS. 2 and 7. Shuttle gear **45**, supported on roller **179** (FIG. 8) is of the usual well known type provided with peripheral teeth for engagement with gear **164** within the gear box housing **48**. A slot of sufficient size is provided in the face of the housing toward the gear to allow the two gears to engage. The gear box **48** is included in the winding head assembly **18** which is interchangeable with other similar winding heads differing in size with wire or tape handling capability. The entire winding head is connected to the base or machine proper by three bolts **19A**, **19B**, and **19C** (FIG. 2). When the winding head is removed from the machine proper by disconnection of the three mounting bolts, the power means connecting the main power source such as the motor as in housing **10**, is decoupled by the magnetic clutch to be described.

Power for driving the shuttle gear is obtained by means of a belt drive **150** (FIG. 7) driven by a reversible power source such as an electric motor and belt with reversible gear box of any well known type mounted in the lower portion of the machine. Belt **150** is carried over pulley **152** on shaft **154** through bearing block **156** and connected to an electromagnetic clutch unit **158**. The magnetic clutch is of any suitable type well known in the art and is magnetically connected to mating plate member **159** journalled on shaft **160**, which in turn is journalled on bearing plate **169** of the winding head **18** structure.

Gear **162** (FIG. 2) engages gear **164** in turn engaging shuttle gear **45**. Pinion gear **166** on the same shaft as gear **164** engages gear **168** carried on shaft **170**. Shaft **170** terminates in a magnetic clutch plate **172** of similar design as plate **159** for magnetic connection to a tachometer **174** which in turn is structurally supported by bearing block **175**. Tachometer **174** indicates the speed of shaft **170** which in turn indicates, or may be calibrated to indicate, the speed of shuttle gear **45**. The output of tachometer **174** is connected in the usual manner by electrical leads to a tachometer indicating device located on the machine for viewing by the operator but not shown in this embodiment. The direction of rotation of the gear train depends upon the direction of the movement of belt **150** which is reversible as above indicated. In operation the direction of rotation of shuttle gear **45** is selected for the phase of operation for which it is needed as will be explained. A switch, for example, on the control panel **13** will be made operative to change the direction of belt **150**.

It will be noted that the cover of the gear housing **48** is open faced in the portion covering the magnetic face plates **159** and **172** to sufficiently overhang same so that when stored the face plates are protected from accident.

I provide in the base plate **15** (FIG. 7) a wear plate **171** of steel or other extremely hard material as the support for the lower portion of frame plate **19**. Because of the strict and accurate requirement of precise location of winding head **18** over repeated usage, I have discovered that the wear plate **171** advantageously minimizes difficulties that would tend to arise if a plate of the usual materials such as aluminum were used.

As known in this art, during the winding operation in which the wire strand or tape is taken from the magazine and coiled on to the core **42**, the magazine **44** is freely rotated within the guide roller **178**. In order to accurately control the drag force needed for the wire or strand being used and for the speed of operation selected, my brake is provided for precise adjustment of drag and for rapid disengagement of the brake from the magazine if such a requirement arises. The brake assembly **31** is mounted on winding head **18** generally as indicated in FIGS. 1 and 2, and illustrated in greater detail in the enlarged view of FIGS. 12 and 13. The brake assembly is mounted on frame member **19** by nuts and bolts **108** and **110**. Brake shoes **107** are disposed on the inner and outer surface of magazine **44** and provided with the usual brake mounting material for frequent engagement with the magazine. Shoes **107** are pivotedly connected to links **104** about pivots **106**, links **104** pivoting about connections **105**. The end of links **104** are provided with cam surfaces **103** upon which ride pins **102** on the respective ends of shaft **101**. Shaft **101** is journalled for rotation by lever **100**. Operation of lever **100** causes the brake shoes to be released away from the surface of the magazine **44**. The tension of the brake shoe is controllably adjusted by rotation of attached knob **112** which adjusts the compression of spring **114**. Indicator **116** reflects the compression position of the spring **114** and is calibrated to indicate the relative force of the brake for the operator's convenience.

I provide means for counting the number of turns that are applied to the core by means of the photocell counter indicated in detail in FIGURE 10 as seen along section lines **10—10** of FIG. 2. The unit comprises a photocell means for detecting the passage of material being wound across the gap of the frame member **196** which is mounted to the frame plate **19** in a suitable manner. The frame **196** has a photo-electric cell **198** excited by an exciter lamp **200** mounted in the respective ends of the gap. Electrical connections **202** connect the unit to the usual amplifiers and indicators. The photocell is energized by light **200** and passage of material across the path carried by each loop wound on the core breaks the exciting circuit which results in a count recorded in the usual read-out counter which may be located on the machine such as in control panel **13** (FIG. 1).

The length of material being supplied for loading by winding on the magazine is measured by means of the counting mechanism ilustrated in FIG. 11. The unit is mounted on column **28** and may be adjusted for any position depending upon the kind or size of winding head being used by clamp lever **208**. Material passing over roller spool **190** causes its shaft **212** attached thereto to rotate and in turn rotate pin **214** carried on the shaft. A pad **206** mounted on bracket **218** in the path of the material is positionable by thumb screw **216**. Pin **214** breaks the photocell light path within the structure **210** to count the rotations of the shaft. The counting mechanism is calibrated to reflect distance by the computation of the circumference of the spool **190** as the constant of proportionality multiplied by the number of rotations reflected by the count of the photocells. The output of the counter may be used to be read directly on a meter on panel **13** or may be used to energize a reset counter the output of which is used for stopping the machine or for cutting a predetermined length of material as, for example, will be described in another feature of this embodiment.

Referring now to FIG. 17 there is shown in schematic form a means for cutting material to be wound on a core and is particularly useful for tape. This automatic cutter is mounted on the machine as indicated generally by reference numeral **259** in FIG. 1. Tape **282**, for example, is carried from a supply spool **46** over a length counter spool such as spool **190** illustrated in FIG. 11, over a guide plate not shown between a pair of tension rollers **260** and **262** and across the knife blades **266** and **264**. The knife blades are pivoted for closure by the force of roller **274** carried on pivoting arm **272** when energized by solenoid **268**. Compression spring **270** is disposed to effect force on the blades against closure. In other words the acting force of solenoid **268** closes the knife blades **264** and **266** against the force of spring **270**. A dog ratchet holder **276** connected perpendicularly to upper knife blade **264** is in engagement with ratchet wheel **278** which in turn is carried by shaft **280** connected to upper tension roller **260**. Leaf spring **284** is disposed to prevent reverse (counterclockwise) motion of ratchet **278**. In operation the automatic counter is energized manually or automatically to cause solenoid **268** to snap the knife

blades closed thereby cutting the tape material. Upon opening the knife blades, dog **276** rotates ratchet wheel **278** clockwise, rotating tension roller **260** clockwise to advance the tape **282** a sufficient distance to ride over knife blade **266**. Thus the operator need not be concerned about finding the end of the tape since it will always be available at the point of cutting.

For large cores beyond the capacity of the above described machine I provide an extension means as illustrated in FIGS. 14 through 16 representing the extension portion **26** shown in part in FIG. 1. The extension bracket **228** is mounted to the housing **16** by bolts **230** after hand wheel **40** has been removed from the main housing, as well as the upper portion of the main tension roller assembly illustrated in FIG. 6. The column **20** is removed, for example, by removal of the retaining ring **146**. The same handle is used on the extension table in the position shown in FIGS. 14 and 15 serving the same function as that described above with respect to the positioning of the tension roller carriage. It is to be noted that in greater detail there is illustrated the tension roller carriage **234** having four wheels **238**, for riding on lower and upper tracks **252**. The threaded shaft **236** rotated by wheel **40** is journalled within the lower portion **244** of the carriage passing through a recess portion carrying nut **254** and spring **240**. Within this recess **242** a relative displacement of the carriage is allowed by the longitudinal displacement of the nut **254** restrained from rotation by the walls of recess **242**. Thus forces exerted radially on the tension roller assembly **232** is absorbed by the spring **240** after a relatively smaller displacement. A pair of symmetrically disposed roller supports **220** and **222** are connected to the bracket **228** by horizontal shafts **246** and **248** axially attached by wing nuts **224** and **226**. Thus with the extension table added to the main housing of the machine there are five roller support points provided for a large core, the rotation of the core being effected as before by the driver roller assemblies rotated by columns **22** and **24**.

In operation, the winding machine serves to wind tape or wire in the well known manner on a toroidal core. Briefly, a strand of wire or tape is taken from a supply spool such as **36** or **46** and carried over the guide roller **43** or equivalent pin, back onto the magazine and the end fixed thereto. A link rigidly connects the magazine **44** to shuttle gear **45**. The gear **45** is caused to rotate clockwise as viewed in FIG. 1 to load the magazine with the desired length of material. The core, already in place in the well known manner of breaking the shuttle gear and magazine, has connected to it one end of the material. The link between the magazine and gear is removed and the usual guide eyelet and roller riding on the magazine but driven by the shuttle gear carries the material from the magazine onto the core as the shuttle gear is rotated in a counterclockwise direction. The machine now operates in the well known manner of rotating the core **42** as the strand or tape is wound thereon. When a selected number of turns has been applied to the core the machine is stopped manually or automatically according to the means provided therefor.

When it is desired to remove the winding head **18** to replace it with a winding head of similar design but of different material handling capability, whether wire or tape, the magnetic clutch connections **172**, **174** and **159**, **158** are de-energized, and, simply on removal of bolts **19A**, **19B** and **19C**, the head can be removed from the machine.

I claim:

1. A toroidal coil winding machine comprising in combination a permanent platform and an exchangeable transitory winding head, said platform having a plurality of core supporting pedestals, means for orienting said pedestals with respect to each other to support thereby any one of a plurality of different size cores, manually operable slidable platform means for orienting said pedestals conjointly with respect to said platform whereby a core supported by said pedestal is manually positionable relative to said head, said winding head having a split ring magazine, means for rotating said magazine, mounting means for allowing easy replacement of said head, including means for disconnecting said magazine rotating means, means on said platform for measuring the length of material to be wound upon a core, means for cutting the material at the measured length, and means for advancing the remaining end of said cut material.

2. A machine for winding material such as wire or tape upon closed cores or segments thereof, said machine having

(a) a stationary housing (**10**) containing motor and gear means for reversibly rotating a first shaft (**126**) extending therefrom and reversibly rotating a second shaft (**154**) spaced over said housing (**10**);

(b) a stationary plate (**15**) fixed horizontally on said housing;

(c) a slidable plate (**16A**) horizontally mounted over said stationary plate including manually operable means (**74**) for moving relative to said stationary plate, said slidable plate in a horizontal plane;

(d) a plurality of core-support pedestals (**20**, **22**, **24**) mounted radially on said slidable plate and arranged to support a core in winding relation;

(e) gear means (**127**, **130**) coupling said first shaft to one of said pedestals for reversibly rotating a core supported by said pedestals; and

(f) means for positioning said pedestals on said slidable plate to support a selected one of a plurality a different-sized cores, in combination with:

(g) a transitory toroidal coil winding head having a generally C-shaped frame plate carrying a plurality of magazine-supporting rollers, a magazine supported on said rollers and having a groove for carrying winding material therein, and means associated with said magazine for removing the winding material from the magazine and guiding said material on a core;

(h) means (**19**, **19A**, etc) for mounting said head in winding relation over said slidable plate and adapted for easy and quick replacement of said head; and

(i) separable coupling means (**158**, **159**) for operatively connecting said second shaft to said head to reversibly rotate said magazine;

(j) said manually operable means for said slidable plate including two pairs of parallel slots (**73**, **78**, **69**) in said slidable plate (**16A**) each pair being mutually perpendicular, and a stud slidable in a slot of each of said slot pairs and fixedly connected to said stationary plate (**15**) on said housing (**10**), said stationary plate (**15**) slidably supporting said slidable plate (**16A**), said stud being mounted on the periphery of a rotatable disc (**75**, **77**, **80**) rotatably mounted in said stationary plate, whereby rotation of said disc effects linear horizontal movement of said slidable plate relative to said stationary plate to simultaneously move thereby said pedestals as a group relative to said head.

3. A machine according to claim **2** including means (**26**) for laterally extending the surface of said slidable plate for supporting core-support pedestals (**232**, **222**), means including a detachable bracket for mounting a second plurality of core-support pedestals and means for adjustably positioning said pedestals whereby the core-size capability of said machine is increased.

4. A machine according to claim **2** including means for measuring the length of material wound on the magazine, means for cutting said material automatically to a desired length, and means for advancing said material automatically after it has been cut.

5. A machine according to claim **2** including a manual operable lever associated with each pair of slots for manual positioning of said pedestals from one location to

another location along any desired path by coordinated manual operation of said levers.

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