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F. BRÜSTLE

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APPARATUS FOR THREADING RADIO COIL CORES

Filed June 26, 1930

3 Sheets-Sheet 1

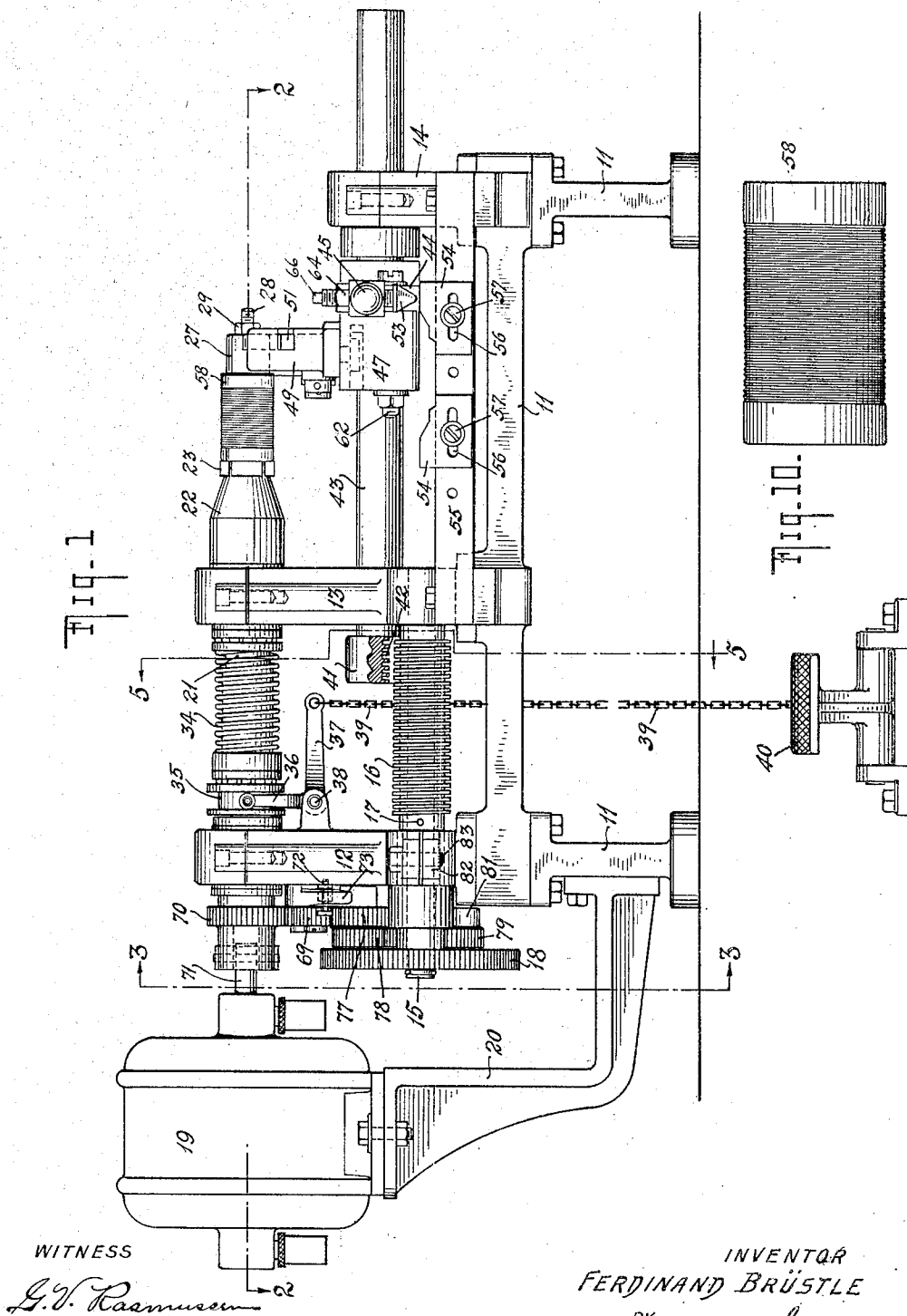


Fig. 1

Fig. 10

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3 Sheets-Sheet 2

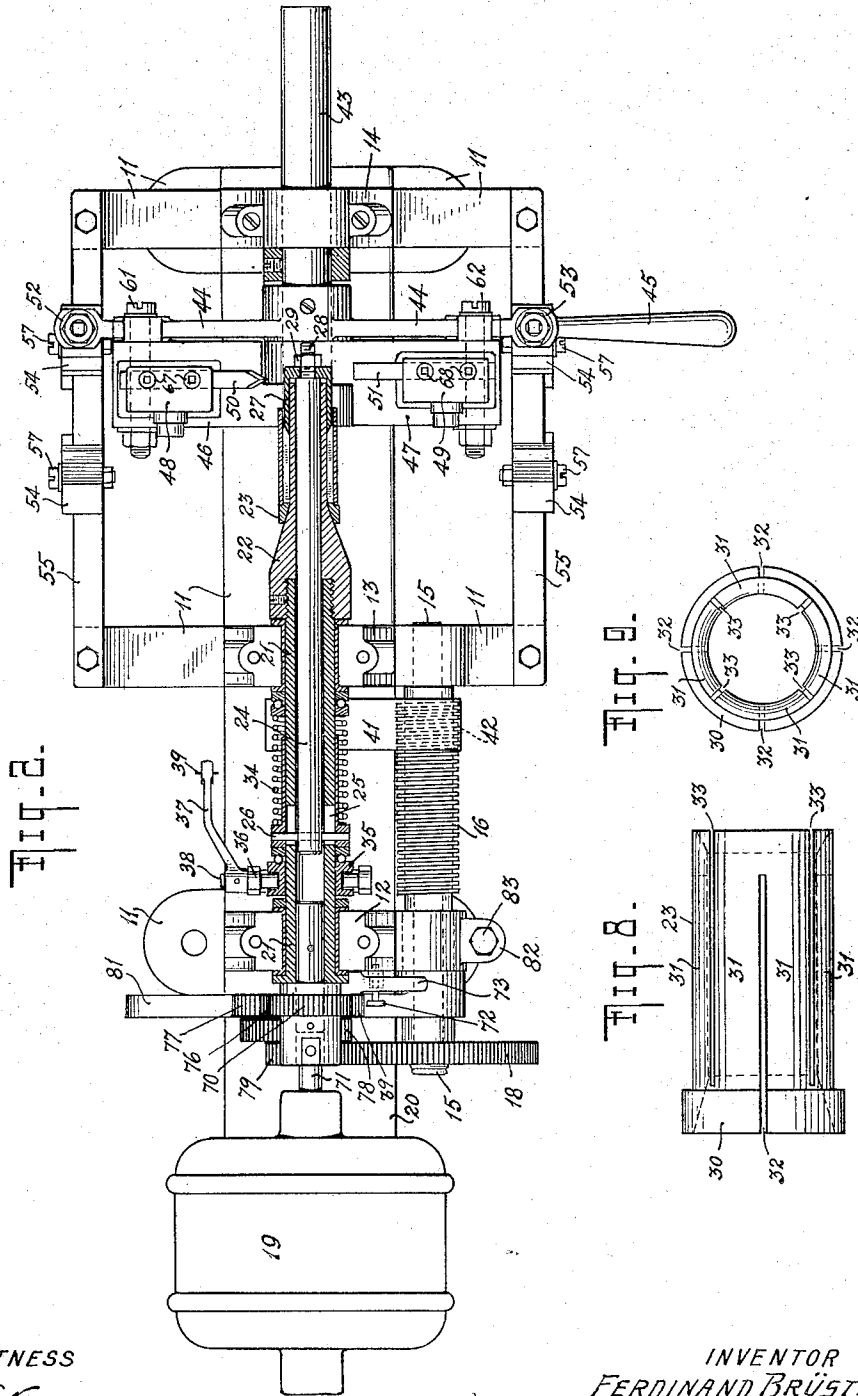


Fig. 2.

Fig. 8.

Fig. 8.

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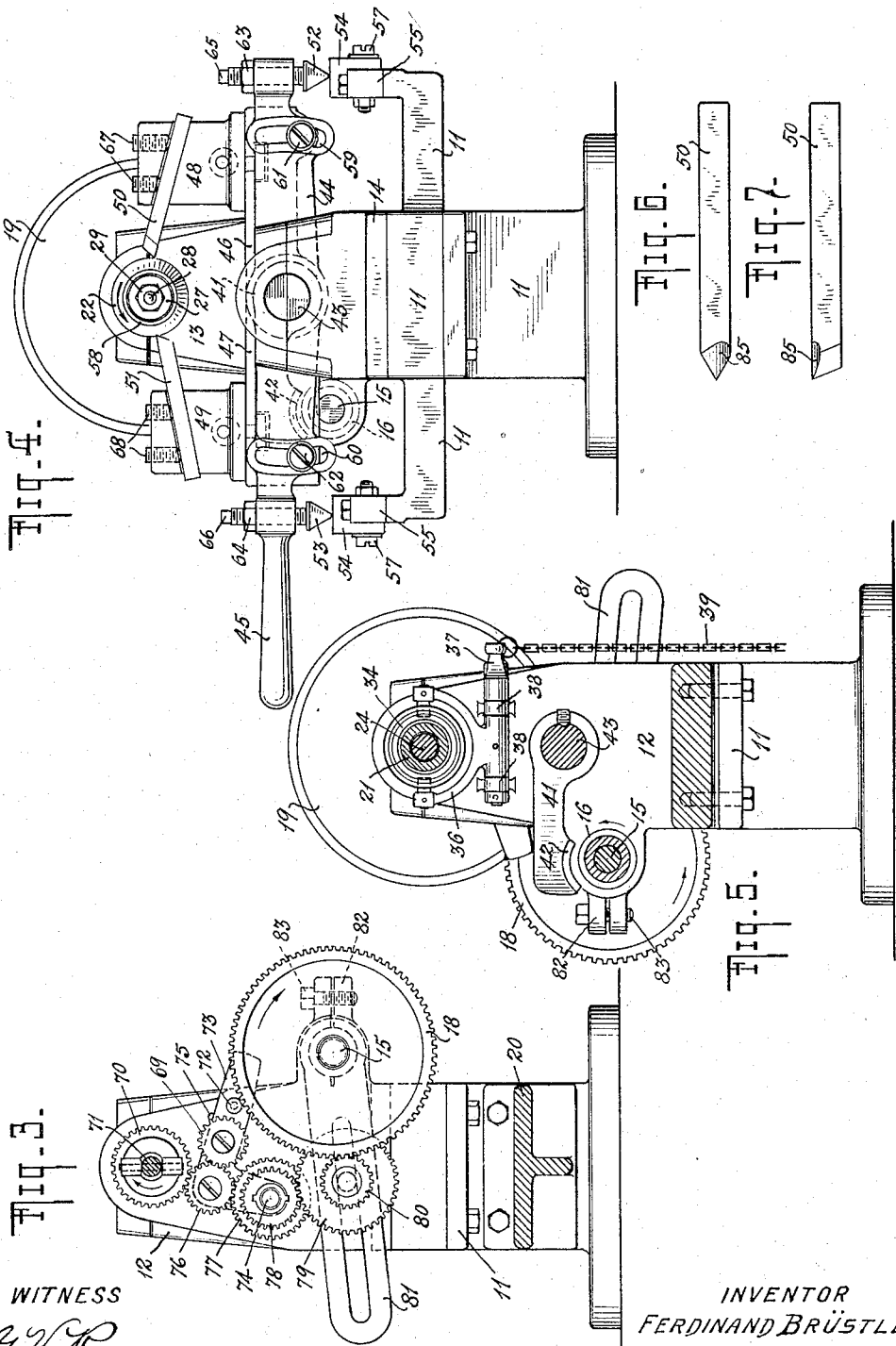
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3 Sheets-Sheet 3



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APPARATUS FOR THREADING RADIO COIL CORES

Application filed June 26, 1930. Serial No. 463,978.

My invention relates to an apparatus for providing cores or tubes to be used for radio coils with recesses, grooves or threading to receive winding of wire. It is a particular
 5 object of my invention to provide an apparatus which is adapted to provide such cores with recesses and/or an intermediate series of depressions for setting and spacing the convolutions of the winding of wire to be
 10 placed on the core. A more particular object of my invention is to provide means for threading radio coil cores.

My invention contemplates the provision of an apparatus of the class described which
 15 is capable of continuous operation, i. e. of receiving coil cores to be threaded continuously without necessitating the stopping of the feeding mechanism and the power supplying means each time a core, after being
 20 threaded, is removed and a new one supplied to the chuck. My invention further contemplates the provision of means for reversing the direction of rotation of the feed screw, by means of which the cutting mechanism and
 25 cutting tools may be adapted to make various forms of grooves or threads upon the blank carried on the chuck. My invention still further contemplates the provision of an apparatus including means whereby the relative
 30 speeds of rotation of the power shaft and work supporting spindle may be varied so as to make the apparatus adaptable for the provision of a variety of kinds of threading both with respect to direction and size of
 35 grooving with only a slight manually made adjustment or substitution of its elements. Furthermore, the continuity of operation of my apparatus makes it possible to provide the blank or work piece with the desired
 40 grooving or threading at a speed which is about six times that of the speed possible of attainment with existing forms of apparatus which necessitates the stopping of the actuating mechanism with each feeding of a new
 45 blank. Thus my improved apparatus is capable of turning out approximately 300 threaded radio coil cores per hour as compared with the turning out of about 50 of such cores with apparatus now used for the
 50 purpose.

A particular embodiment of my invention is illustrated in the accompanying drawings in which:

Fig. 1 is a front elevation of the apparatus.

Fig. 2 is a horizontal sectional plan along line 2—2 of Fig. 1.

Fig. 3 is a section along line 3—3 of Fig. 1.

Fig. 4 is a right-hand end view of the apparatus.

Fig. 5 is a section along line 5—5 of Fig. 1.

Figs. 6 and 7 illustrate a type of cutting tool used with the apparatus.

Fig. 8 shows the mandrel supporting the work piece.

Fig. 9 is a side view thereof.

Fig. 10 shows the completed core provided with the threading which my apparatus is designed to impart thereto.

Referring more particularly to the drawings, in which similar reference characters
 70 identify similar parts in the several views, 11 is the frame supporting the apparatus having projecting therefrom pillar blocks 12, 13, and 14. Journalled in the pillar blocks 12 and 13 is a shaft 15 having mounted thereon a
 75 hollow threaded cylindrical feed screw 16 rigidly secured thereto by pin 17. The shaft 15 is provided at one end with gear 18 driven by means of a gear train to be more fully described hereinafter, by motor 19 supported
 80 on a bracket 20 secured to the frame 11. Above the shaft 15 and disposed parallel thereto and in line with the shaft of the motor is hollow sleeve 21 journalled in the pillar blocks 12 and 13 and having at one end there-
 85 of chuck 22 upon which is mounted mandrel 23 for supporting the work piece in position in the course of threading the same. This hollow sleeve and chuck are continuously driven by motor 19 and have disposed with-
 90 in them a spindle 24 likewise rotated continuously, being connected to the hollow sleeve by slot 25 and pin 26. Upon the end of the spindle 24 is mounted a wedge element 27 secured to the threaded end 28 of the spindle 24
 95 by nut 29. The mandrel 23 as shown in Figs. 8 and 9 comprises a head 30 having leaf sections 31 extending therefrom. Slots 32 and 33 are provided within said leaf sections, the former of said slots extending from the
 100

base of said head to a point near the other end of the mandrel, and the latter extending from the end opposite said head to a point adjacent the head, so as to give the mandrel a resilient structure, the resiliency thereof being determined by the capacity of the leaf portions thereof to spread apart and to contract. The wedge element 27 placed at the end of the spindle 24 is designed, when inserted within the end of the mandrel, to spread the leaf portions thereof to a position in which they will assume their maximum degree of expansibility. The wedge element 27 is controlled in its movement into the inner portion of the mandrel by compression spring 34 surrounding the hollow sleeve 21 which in the operable position of the apparatus provides the tension upon the spindle 24 necessary to draw the wedge element into the mandrel to spread the same apart so as to grip the core or tubing placed thereon on its inner surface. The apparatus for withdrawing the wedge element 27 from within the mandrel 23 comprises the collar 35 journaled on the hollow sleeve 21, said collar being engaged by the forked element 36, and the bell crank lever 37, pivoted at 38, and connected by chain 39 to the foot pedal 40 located at a convenient point on the floor.

In engagement with the feed screw 16 is the threading 42 of a half nut 41 forming a part of the arm 41 secured at the end of a slidable and rockable shaft 43 disposed immediately above and parallel to the feed screw 16. This shaft 43 is journaled in the pillar blocks 13 and 14. A rocker arm 44 is adjustably secured to the shaft 43 and provides means for controlling the cutting tools. This rocker arm is provided at one end with a handle 45 whereby a swinging motion of said arm is obtained about the pivot formed by shaft 43. When the handle 45 is moved upwardly or downwardly the arm 44 rocks the shaft 43 into or out of engagement with the feed screw 16. Adjacent the rocker arm 44 and disposed oppositely of the shaft 43 and journaled thereon, are bracket arms 46, 47 upon which are mounted supports 48, 49 for the tools 50, 51 respectively. On the ends of the rocker arm 44 are provided adjustable contact elements 52, 53 resting as shown in Fig. 1 on the top surface of one of the pairs of cams 54 mounted on bars 55, 55 supported on extension arms of the frame 11. The elements of cams 54, 54 are adjustable lengthwise upon the bars 55, 55 by means of slots 56, 56 and bolts 57, 57 passing therethrough. The degree of separation of the two elements of cams 54, 54 determines the length of thread to be formed on the blank 58 mounted on mandrel 23.

The machine operates under the supervision of an operator who controls and directs the cutting action of the tools 50 and 51 which are brought into operative engagement with the work piece when the handle 45 is de-

pressed or raised depending upon which of the two cutting tools is desired to engage the work piece. If the handle 45 is depressed, the tool 50 will be in engagement with the blank while when the handle 45 is raised, such tool will be disengaged from the surface of the blank and upon further raising of the handle the tool 51 may be brought into cutting engagement with the blank for the purpose of cutting a circumferential recess in the work piece. The manipulation of the handle 45 thus determines which of the two cutting tools is brought into engagement with the blank and the degree of such engagement, thereby varying the depth to which recesses or threads are cut therein. When the under side of the handle 45 is over the surface of the cam 54 and such handle is depressed it will rock the threading tool against the work piece and as the slidable and rockable shaft 43 is moved along above the cam surface the contact element 52 will ride over the surface of the cam 54, the configuration of such cam surface determining the character of the threads cut into the blank by the tool in engagement therewith. When the necessary length of thread has been formed the contact element 52 will ride up on the camway and the tool will be thrown out of engagement with the blank.

Various means for the adjustment of parts of the cutting tool mechanism and support therefor are shown in detail in Fig. 4. For instance, the bracket arms 46, 47 may be adjusted to any position about the rocker arm by means of the arcuate slots 59, 60 provided with lock bolts 61, 62 respectively. The contact elements 52, 53 may likewise be adjusted by releasing lock nuts 63, 64 provided on the threaded stems 65, 66 respectively, of such contact elements and turning said stems. The cutting tools 50 and 51 may be adjusted to any desired position with respect to the work piece which they are to engage by means of studs 67 and 68.

The various means of adjustment described immediately hereinabove permit of the tools being at all times of their condition operative upon the work piece to be disposed radially with respect thereto, i. e. along a radius of the core being threaded, so as to assume the best cutting position.

Turning now to a description of the gear train illustrated in detail in Fig. 3, such gear train is designed to adapt the apparatus for operation in the direction reverse to that hereinabove described, i. e. instead of the shaft 43 (Fig. 1) being adapted to move from the right-hand end of the threaded portion of the feed screw 16 to the left-hand portion thereof, to have such shaft come into engagement with the threaded portion of feed screw 16 at the extreme left-hand end of such threaded portion and to be carried in the course of the threading of the work piece to

the right. This is accomplished by reversing the direction of rotation of the shaft 15, driven by gear 18 (Fig. 3) in the direction indicated by the arrow when the apparatus operates in the manner illustrated by the drawings, i. e. the feed arm 45 being moved from the right-hand end to the left-hand end of the feed screw 16. In order to reverse the direction of rotation of the gear 18 and therefore of the shaft 15 an extra gear 69 is provided in the gear train which may be brought into engagement with the gear 70, directly coupled to the shaft 71 of the motor 19, by removing the pin 72 from its position as indicated in Fig. 3, raising the arm of the bell-crank lever 73 pivoted at 74 until the aperture in said arm through which the pin 72 is passed engages the aperture 75, and passing the pin 72 therethrough to lock the bell-crank lever 73 into a position in which the gear 69 is in engagement with the gear 70 and in which position the gear 76 is disengaged from gear 70. By this operation an extra gear 69 has been placed into the gear train which will have the effect of reversing the direction of rotation of the gear 18 as desired, the power from the motor 19 being then transmitted through the gears 70, 69, 76, 77, 78, 79, 80, to the gear 18. When the gears are in the position illustrated in Fig. 3, the gear 69 runs idle.

In order to adapt my apparatus to different speeds of rotation of the feed screw 16, and therefore to different rates of movement of the shaft 43 and resultant varying speed of operation upon the core 58, which is rotated at constant speed on the chuck 22, I provide the slotted arm 81 secured in the split housing 82 of the pillar block 12 by means of the clamping bolt 83. When it is desired to change the speed of rotation of the feed screw 16, this can be accomplished by loosening the bolt 83, so that the arm 81 may be lowered and the gears 79 and 80 removed to permit gears of different ratio to be substituted therefor. Thus, without changing the speed of the motor, it is possible to vary the speed of the rotating parts of my apparatus, adapting it for various speeds of threading of the work piece. The speed at which such work piece should be threaded depends upon its composition, the degree of hardness of the material and the accuracy of the threading desired. By means of the gear train hereinabove described, I am thus enabled to vary the speed ratio between the feed screw 16 and the chuck 24 supporting the work piece.

The operation of the apparatus is as follows, a description of the operation being given for imparting a left-handed thread to the work piece:

The operator depresses the foot pedal 40 and places the core or tube upon the mandrel 23 after which he releases the foot pedal to

cause the spindle 24 to be moved to the left (Fig. 2) by the compression spring 34, thereby permitting the wedge element 27 to enter the interior of the mandrel, and abut against the outer surface of the chuck, causing the leaf portions of the mandrel to expand against the interior surface of the core and to lock the same securely thereon. The operator then depresses the handle 45, at the same time bringing the contact element 53 over the cam portion 54, and then moves the same longitudinally until the element 53 rides down over the depressed cam surface, thus bringing the threads 42 into engagement with the feed screw 16. The rotation of the shaft 15 will then cause the slidable and rockable shaft 43 to move to the left, the contact element 53 riding along the surface of the cam 54. When such contact element reaches the depressed portion of the cam 54, the cutting tool 50 will be brought into engagement with the surface of the work piece and as the contact element rides over the surface of the bar 55, said tool will thread the core. When the contact element 53 starts to ride up onto the raised portion of the cam 54, i. e. when the entire surface of the core to which threading is to be imparted has been so threaded, the cutting tool 50 is brought out of engagement from the work piece and the threading 41 out of engagement with the feed screw 16 by lifting the handle 45. The operator then removes the threaded core by once more depressing the foot pedal 40 which will cause the wedge element 27 to be withdrawn from the interior of the mandrel 23 and allow the leaf portions thereof to collapse and the core to be removed from the mandrel and a new work piece substituted therefor, after which the operation on such new work piece is repeated as hereinabove described. The tools and the shaft 43 are returned to starting position by hand, the operator grasping handle 45, raising the same, and bringing the tool supporting carriage to its starting position in which the nut 42 is at the starting end of the feed screw 16.

When only a recess, in the form of a circumferential ring is to be cut in the work piece, the operation is the same, except that the handle 45 is raised to bring the tool 51 into cutting engagement with the work piece when the particular portion thereof at which such recess is to be cut has been reached, as determined on the cam surface.

The character of the threading to be formed upon the work piece is to be determined by the configuration of the surface of the cam 54. Thus, if the threading is to be interrupted at any point along the length of the core a raised surface (not shown) may be provided at the corresponding point along the bar 55, so that the contact element 53 will ride over such raised portion and disengage the cutting tool 50 from the work piece.

If a right-handed thread is desired to be imparted to the work piece the operation as hereinabove described is substantially the same, except that the direction of rotation of the shaft 15 is reversed as hereinabove indicated and the threading 40 of the half nut at the end of the feed shaft 43 is brought into engagement with the feed screw 16 at the left-hand end thereof, so that the feed arm 43 moves from the left to the right.

As it will be noted from Figs. 6 and 7 the cutting tool to be used with my apparatus has a novel type of cutting point. As the cores for radio coils are usually made of a comparatively soft material such as compressed paper or fibre or a phenolic condensation product, I have found it necessary to provide a tool which will permit the material which is being cut from the work piece to be removed from the point at which it leaves the surface of the work piece so as not to interfere with the proper cutting action of the tool against the surface of the core. I have therefore provided my novel cutting tool with a depression or cavity 85 which permits the ribbon of material as it is cut from the core to be curled away from the surface of the core and thus be readily removed without interfering with the proper contact of the cutting point of the tool with the surface with which it is in engagement.

While I have described a specific embodiment of my invention, it is obvious that various modifications therein may be made in the arrangement and configuration of its parts without departing from the spirit of my invention.

I claim:

1. In an apparatus for threading radio coil cores, the combination of a motor, a rotatable shaft having rigidly secured thereto a threaded cylindrical feed screw, a hollow shaft driven by said motor disposed parallel to said feed screw and having mounted on one end thereof a chuck and a mandrel for supporting the work piece, the axes of said hollow shaft and said feed screw being spaced from each other, a continuously rotating spindle within said hollow shaft, a slidable and rockable shaft adapted to engage said feed screw and to be moved longitudinally thereof when brought into engagement with the same, and a tool supporting carriage mounted on said shaft and adapted to permit said work piece to be operatively engaged by a tool in the course of the longitudinal movement of said shaft when in engagement with the feed screw.

2. In an apparatus for threading radio coil cores, the combination of a motor, a rotatable shaft having rigidly secured thereto a threaded cylindrical feed screw, a hollow shaft driven by said motor disposed parallel to said feed screw and having mounted on one end thereof a chuck and a mandrel for supporting the work piece, a rotating spindle within said

hollow shaft, a wedge element secured to the end of said spindle, a compression spring surrounding said hollow shaft, a slidable and rockable shaft adapted to engage said feed screw and to be moved longitudinally thereof when brought into engagement with the same, and a tool supporting carriage mounted on said shaft and adapted to permit said work piece to be operatively engaged by a tool in the course of the longitudinal movement of said shaft when in engagement with the feed screw.

3. In an apparatus for threading radio coil cores, the combination of an axially rotatable feed screw, a slidable and rockable shaft adapted to engage said feed screw and to be moved longitudinally thereof, a tool supporting carriage mounted on said shaft, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, the axes of said hollow shaft and said feed screw being spaced from each other, a chuck mounted on said hollow shaft and a mandrel on said chuck for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said slidable and rockable shaft, said mandrel comprising a head and a plurality of leaf portions extending therefrom provided with slots substantially throughout the length of said leaf portions whereby a degree of resiliency is imparted to the mandrel.

4. In an apparatus for threading radio coil cores, the combination of a motor, a rotatable shaft having rigidly secured thereto a threaded cylindrical feed screw, a hollow shaft disposed parallel to said feed screw and having mounted on one end thereof a chuck and an expansible mandrel for supporting the work piece, the axes of said hollow shaft and said feed screw being spaced from each other, a spindle within said hollow shaft continuously driven by said motor, a slidable and rockable shaft adapted to engage said feed screw and to be moved longitudinally thereof when brought into engagement with the same, and a tool supporting carriage mounted on said shaft and adapted to permit said work piece to be operatively engaged by a tool in the course of the longitudinal movement of said shaft when in engagement with the feed screw.

5. In an apparatus for threading radio coil cores, the combination of a motor, a rotatable shaft having rigidly secured thereto a threaded cylindrical feed screw, a hollow shaft driven by said motor disposed parallel to said feed screw and having mounted on one end thereof a chuck and a mandrel for supporting the work piece, a continuously rotating spindle within said hollow shaft, a wedge element secured to the end of said spindle, a compression spring surrounding said hollow shaft adapted to draw said

wedge element into the mandrel to expand the same thereby gripping the work piece placed thereon on its inner surface, a collar journaled on the hollow shaft and operatively connected to said spindle, a forked element and a bell-crank lever engaging said collar, means for pivoting said lever to cause said collar and therefore said spindle to move longitudinally of said hollow shaft, a slidable and rockable shaft adapted to engage said feed screw and to be moved longitudinally thereof when brought into engagement with the same, and a tool supporting carriage mounted on said shaft and adapted to permit said work piece to be operatively engaged by a tool in the course of the longitudinal movement of said shaft when in engagement with the feed screw.

6. In an apparatus for threading radio coil cores, the combination of an axially rotatable feed screw, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a rocker arm adjustably secured to said feed shaft provided with a handle for imparting a swinging motion to said shaft about the pivot formed by the feed shaft, a plurality of tool supports on said rocker arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, a spindle within said hollow shaft, and a chuck mounted on said hollow shaft for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said feed shaft.

7. In an apparatus for threading radio coil cores, the combination of an axially rotatable feed screw, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a rocker arm adjustably secured to said feed shaft, a handle on said rocker arm adapted to be moved upwardly or downwardly to rock said feed shaft into or out of engagement with said feed screw, a plurality of tool supports on said rocker arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation thereof, and a chuck mounted on said hollow shaft for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said feed shaft.

8. In an apparatus for threading radio coil cores, the combination of an axially rotatable feed screw, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a rocker arm adjustably secured to said feed shaft, bracket arms adjacent said rocker arm disposed oppositely of said feed shaft and journaled thereon, tool supports mounted on said bracket arms, a handle on said rocker arm for imparting a swinging motion thereto about the pivot formed by the feed shaft,

a plurality of tool supports on said rocker arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, and a chuck mounted on said hollow shaft for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said feed shaft.

9. In an apparatus for threading radio coil cores, the combination of a supporting frame, a feed screw mounted for axial rotation therein, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a rocker arm adjustably secured to said feed shaft, a plurality of bracket arms adjacent said rocker arm disposed oppositely of said feed shaft and journaled thereon, a plurality of tool supports mounted on said bracket arms, a cam on said frame having elements adjustable lengthwise of said frame, a plurality of contact elements mounted on said rocker arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, and a chuck mounted on said hollow shaft for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said feed shaft.

10. In an apparatus for threading radio coil cores, the combination of a supporting frame, a feed screw mounted for axial rotation therein, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a rocker arm adjustably secured to said feed shaft, a plurality of bracket arms adjacent said rocker arm disposed oppositely of said feed shaft and journaled thereon, a plurality of tool supports mounted on said bracket arms, a plurality of pairs of cams on said frame, each pair having elements adjustable lengthwise of said frame, a plurality of contact elements mounted on said rocker arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, and a chuck mounted on said hollow shaft for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said feed shaft.

11. In an apparatus for threading radio coil cores, the combination of a supporting frame, a feed screw mounted for axial rotation therein, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a rocker arm adjustably secured to said feed shaft, a plurality of bracket arms adjacent said rocker arm disposed oppositely of said feed shaft and journaled thereon, a plurality of tool supports mounted on said bracket arms, a pair of cams on said frame having elements adjustable lengthwise of said frame, adjustable contact elements mounted on said rock-

er arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, and a chuck mounted on said hollow shaft for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said feed shaft.

12. In an apparatus for threading radio coil cores, the combination of a supporting frame, a feed screw mounted for axial rotation therein, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a rocker arm adjustably secured to said feed shaft, a plurality of bracket arms adjacent said rocker arm disposed oppositely of said feed shaft and journaled thereon, a plurality of tool supports mounted on said bracket arms, a pair of cams on said frame, each of said cams being provided with a slot and a bolt passing therethrough for adjusting the same longitudinally of said frame, contact elements mounted on said rocker arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, and a chuck mounted on said hollow shaft for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said feed shaft.

13. In an apparatus for threading radio coil cores, the combination of a supporting frame, a feed screw mounted for axial rotation therein, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a rocker arm adjustably secured to said feed shaft, a plurality of bracket arms adjacent said rocker arm disposed oppositely of said feed shaft and journaled thereon, said bracket arms having arcuate slots and being provided with lock bolts passing through said slots for adjusting said bracket arms to any position about the rocker arm, a plurality of tool supports mounted on said bracket arms, a pair of cams on said frame having elements adjustable lengthwise of said frame, contact elements mounted on said rocker arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, and a chuck mounted on said hollow shaft for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said feed shaft.

14. In an apparatus for threading radio coil cores, the combination of a supporting frame, a feed screw mounted for axial rotation therein, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a rocker arm adjustably secured to said feed shaft, a plurality of bracket arms adjacent said rocker arm disposed oppositely of said feed shaft and journaled thereon, a plurality of

tool supports mounted on said bracket arms, a pair of cams on said frame having elements adjustable lengthwise of said frame, contact elements having threaded stems and lock nuts thereon for locking said contact elements in any position with respect to said rocker arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, and a chuck mounted on said hollow shaft for supporting the work piece adapted to be operatively engaged by the cutting tool controlled by said feed shaft.

15. In an apparatus for threading radio coil cores, the combination of a supporting frame, a motor, an axially rotatable feed screw, a gear train driving said feed screw, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a tool supporting carriage mounted on said shaft, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, a chuck mounted on said hollow shaft for supporting the work piece and adapted to be operatively engaged by the cutting tool controlled by said feed shaft, and means for reversing the direction of rotation of the feed screw comprising a gear adapted to be brought into engagement with a gear of the train driving said feed screw, a bell-crank lever, a pin passing through one of the arms of said bell-crank lever and a plurality of apertures on the frame of the apparatus into which said pin is adapted to be inserted.

16. In an apparatus for threading radio coil cores, the combination of a supporting frame, a motor, an axially rotatable feed screw, a gear train driving said feed screw, a slidable and rockable feed shaft adapted to engage said feed screw and to be moved longitudinally thereof, a tool supporting carriage mounted on said arm, a hollow shaft operatively connected to said feed screw and revolving at a fixed ratio to the speed of rotation of said feed screw, a chuck mounted on said hollow shaft for supporting the work piece and adapted to be operatively engaged by the cutting tool controlled by said feed arm, and means for adapting the apparatus to a different speed of operation on the work piece by changing the speed of rotation of the feed screw, comprising a split housing and a slotted arm secured therein, in which is mounted one of the gear elements of said gear train, a clamping bolt engaging the elements of said split housing, said slotted arm being adapted to be lowered to permit the substitution of a gear element of different transmission ratio for the element mounted thereon.

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