Nov. 27, 1951 J. S. BURGE ET AL 2,576,568

COIL WINDING MACHINE

Original Filed March 11, 1947 6 Sheets-Sheet 1

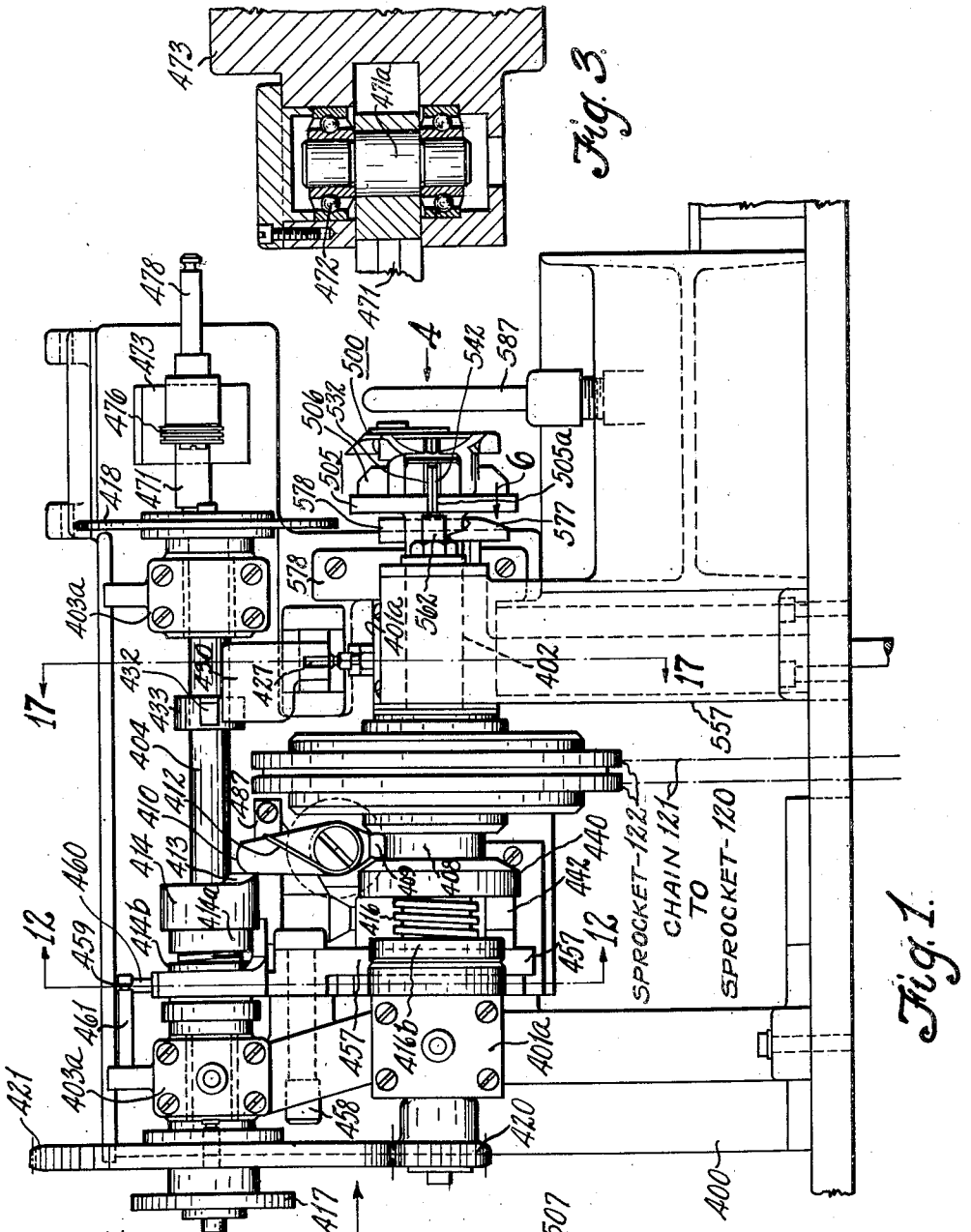


Fig. 1.

Fig. 3.

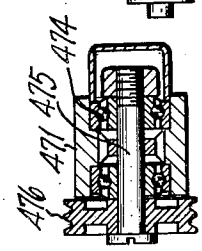


Fig. 2.

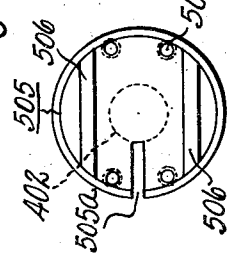


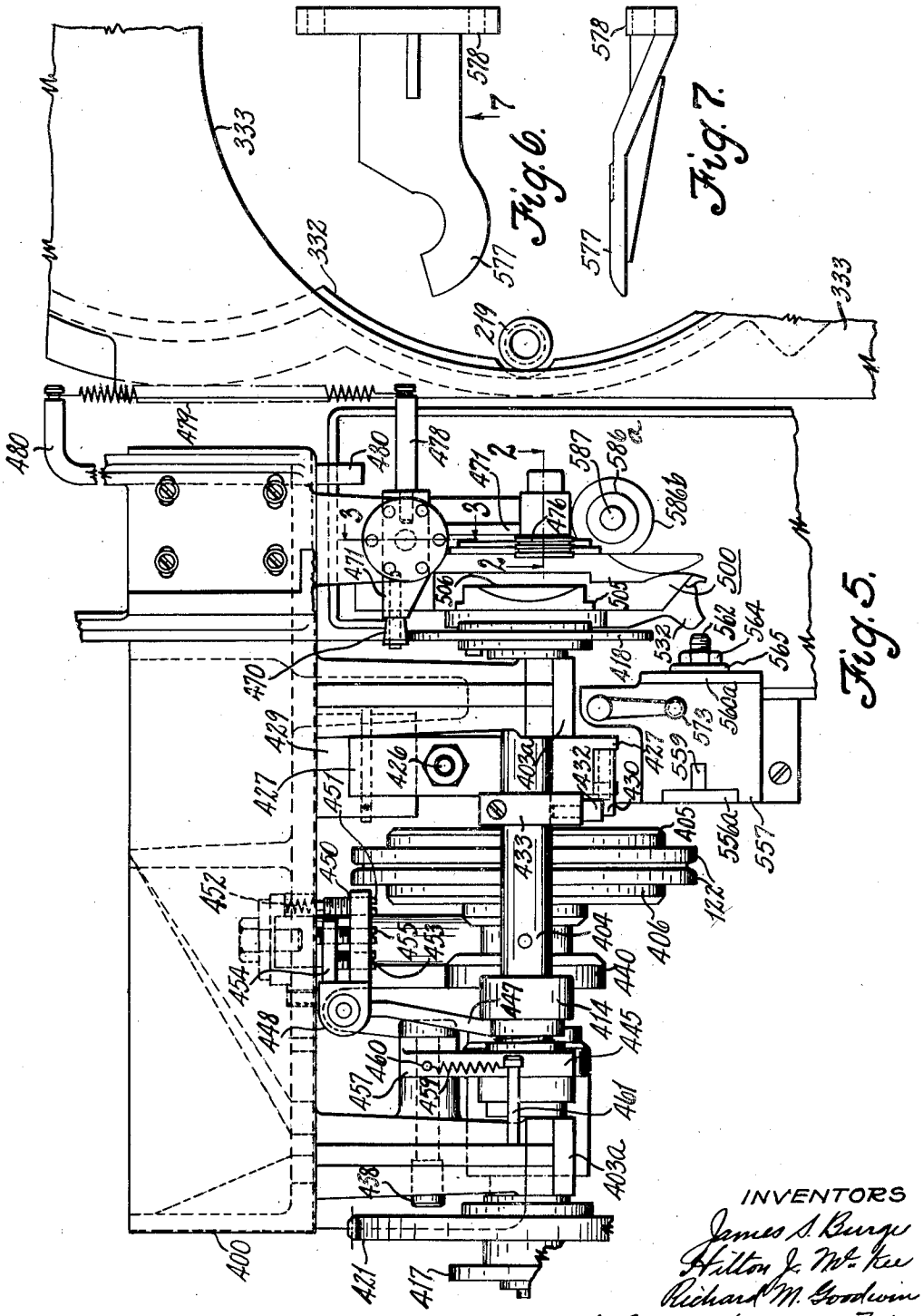
Fig. 4.

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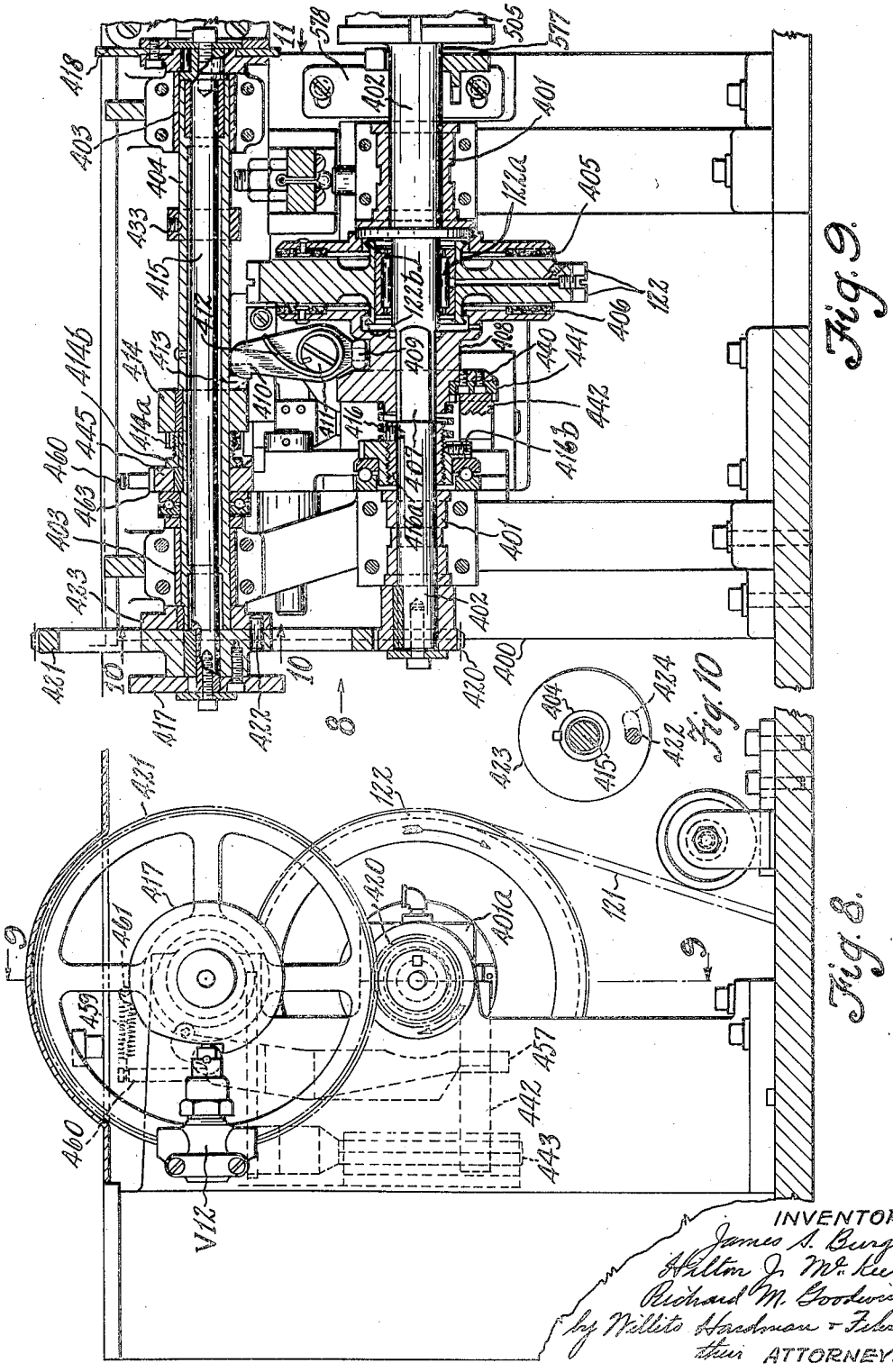


Fig. 9.

Fig. 10

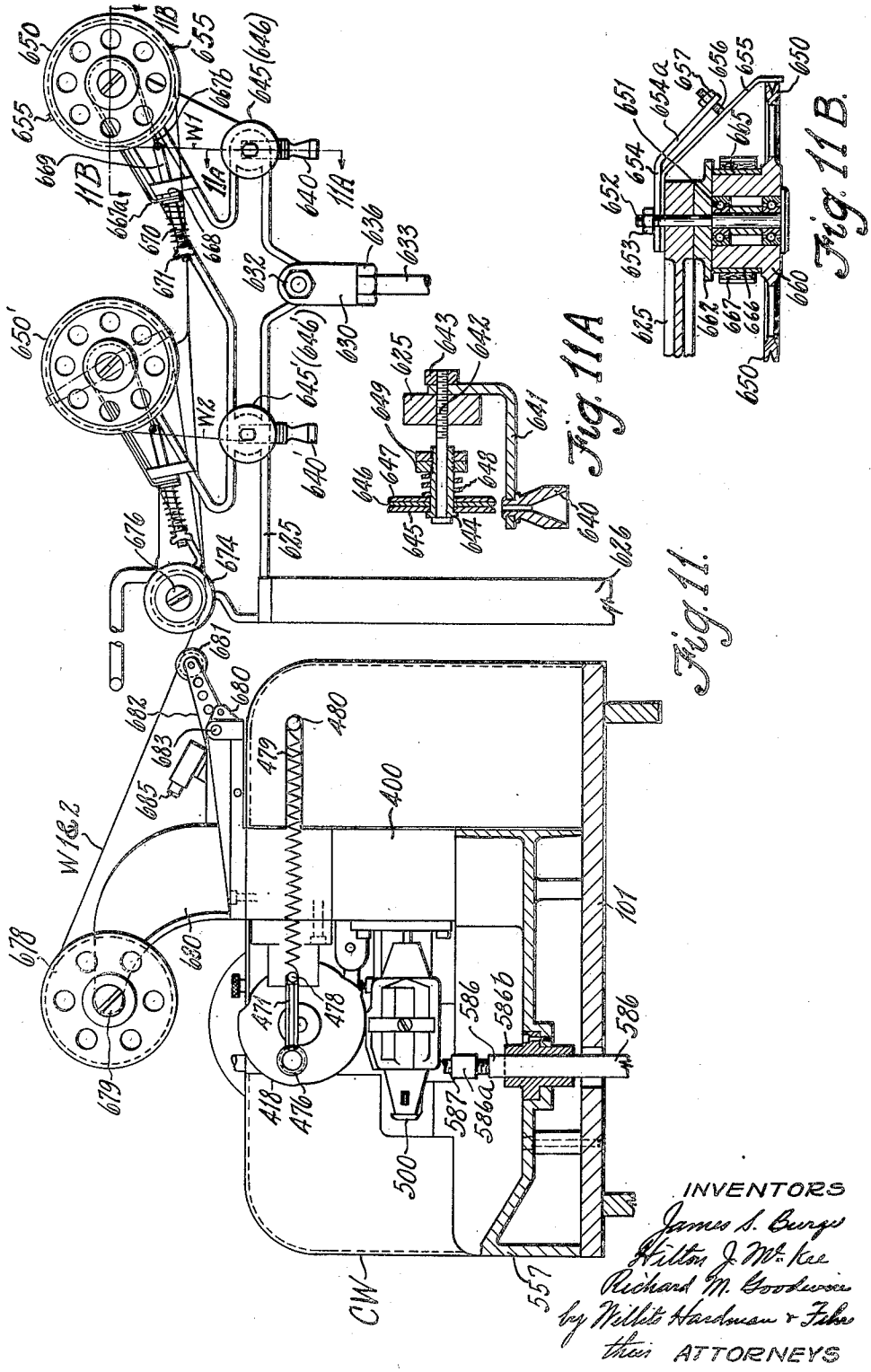
Fig. 8.

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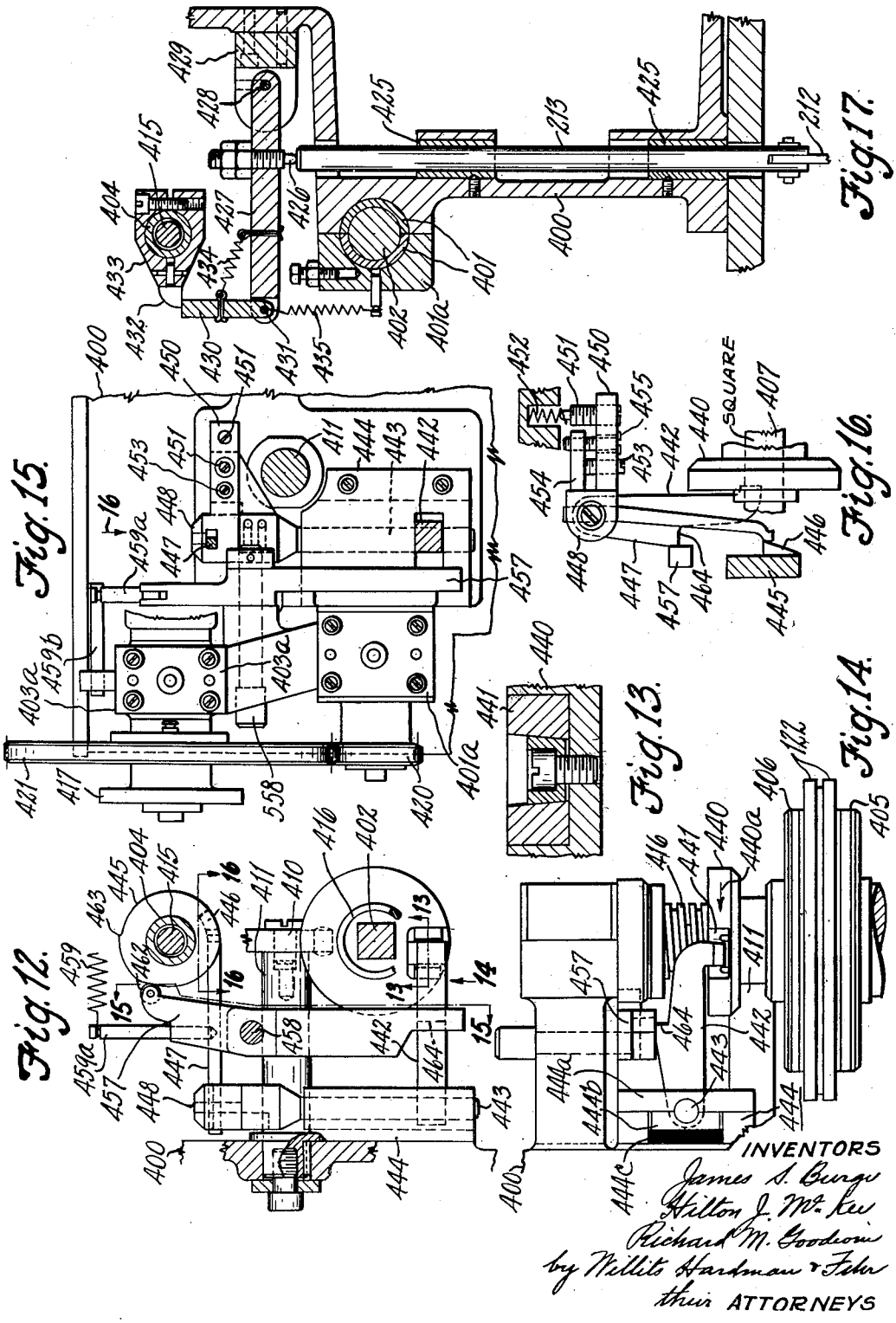
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COIL WINDING MACHINE

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COIL WINDING MACHINE

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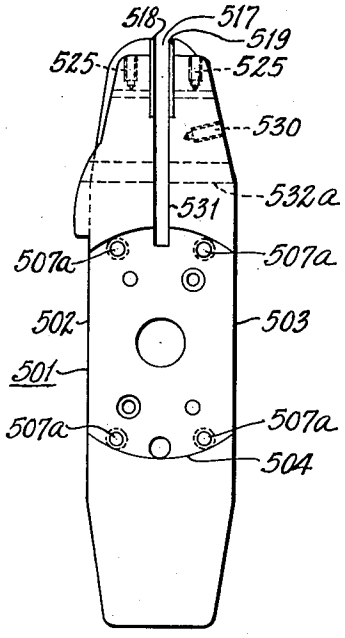


Fig. 20.

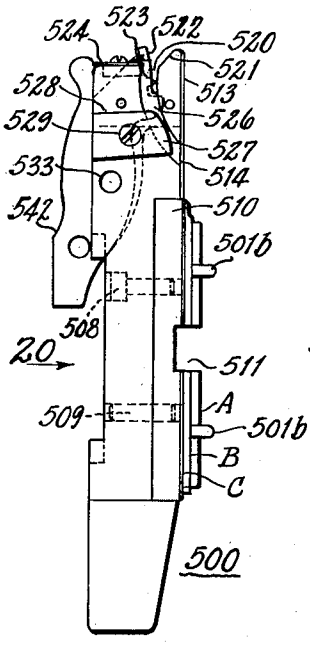


Fig. 19.

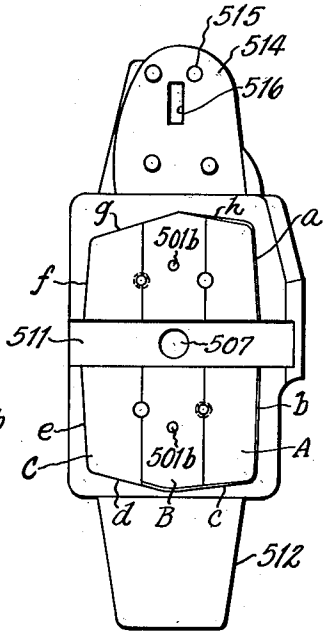


Fig. 18.

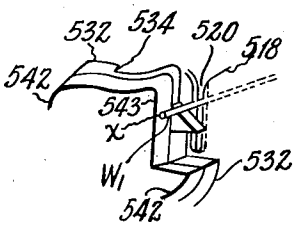


Fig. 22.

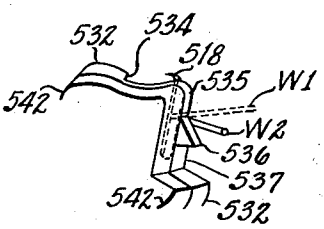


Fig. 23.

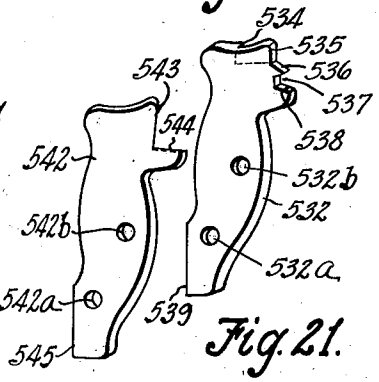


Fig. 21.

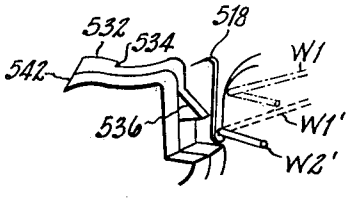


Fig. 24.

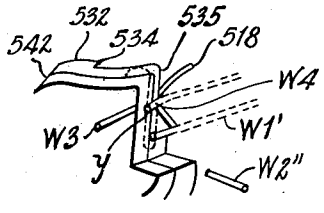


Fig. 25.

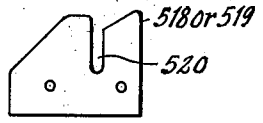


Fig. 26.

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UNITED STATES PATENT OFFICE

2,576,568

COIL-WINDING MACHINE

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Original application March 11, 1947, Serial No. 733,758. Divided and this application June 23, 1950, Serial No. 169,936

6 Claims. (Cl. 140—92.2)

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This application is a division of application Serial No. 733,758, filed March 11, 1947, which discloses a machine for winding and taping electrical coils.

The invention claimed in this application relates to the power operated mechanism for rotating a form upon which wire is wound to make an electrical coil and for guiding the wire to the form from a wire supply.

An object of the present invention is to provide improved means for effecting the engagement and disengagement of a clutch which connects a power source with a winder shaft and which causes the shaft to stop in a definite position automatically after a predetermined number of revolutions. To accomplish this object, the machine comprises a shaft, a coil winding form driven thereby, a power operated driving clutch member, a driven clutch member connected with the shaft, a first spring for urging the driven clutch member into engagement with the driving clutch member, a wire-guide control shaft, gears connecting the shafts for driving the second shaft continuously at a speed less than the speed of the first shaft, a cam driven by the second shaft, a wire guide under control by the cam, a device carried by the form for cutting the end lead of a wound coil and for anchoring to the form the start lead of the next succeeding coil, a mechanism adapted to operate said device when the form stops in a predetermined angular position, a control shaft driven by the second shaft through a lost motion connection which provides for movement of the control shaft independently of the second shaft, a clutch disengaging member connected with the clutch driven member, a cam operated by the third shaft to operate upon said clutch disengaging member to disengage the clutch against the action of said first spring slightly in advance of movement of the form to stopping position, a disc connected with the clutch driven member and providing a notch, a first shaft-locking member for engaging the notch after the clutch is disengaged, a second spring urging said locking member away from said disc, means operated by the control shaft for biasing said locking member against the notched member ahead of disengagement of the clutch whereby the first shaft coasts into position in which the notch receives the locking member, and means for operating the control shaft independently of the second shaft to cause said cam of the third shaft to release said clutch disengaging member whereby said first spring is released to engage the clutch and to cause retraction of the

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locking member biasing means whereby the second spring is released to retract the locking member from said notch.

A further object of the present invention is to provide for guiding the wire to the form rotated by the winder shaft in a manner such that the wire is biased for ready conformation to a form of oblong contour. This is accomplished by causing the wire to be received in succession by two guide wheels before it is received by the form. The wire bends on the first wheel in the same direction as it is bent when received by the form and the wire bends on the second wheel in the opposite direction. Thus the wire is reversely bent before being received by the form and it is biased to conform to the form more readily.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a front elevation of the coil winding mechanism.

Figs. 2 and 3 are sectional views taken respectively on lines 2—2 and 3—3 of Fig. 5 . Fig. 4 is an end view of shaft 402 in the direction of arrow 4 of Fig. 1 with the form 500 removed.

Fig. 5 is a plan view of the coil winding mechanism.

Fig. 6 is a view of cam 577 looking in the direction of arrow 6 of Fig. 1.

Fig. 7 is a view of said cam looking in the direction of arrow 7 of Fig. 6.

Fig. 8 is an end view taken in the direction of arrow 8 of Figs. 1 and 9.

Fig. 9 is a sectional view on line 9—9 of Fig. 8.

Fig. 10 is a sectional view on line 10—10 of Fig. 9.

Fig. 11 is an end view taken in the direction of arrow 11 of Fig. 9.

Figs. 11A and 11B are sectional views taken, respectively, on lines 11A—11A and 11B—11B of Fig. 11.

Fig. 12 is a fragmentary sectional view on line 12—12 of Fig. 1.

Fig. 13 is a fragmentary sectional view on line 13—13 of Fig. 12.

Fig. 14 is a view in the direction of arrow 14 of Fig. 12.

Fig. 15 is a fragmentary sectional view on line 15—15 of Fig. 12.

Fig. 16 is a view in the direction of arrow 16 of Fig. 15 the part in section being on line 16—16 of Fig. 12.

Fig. 17 is a fragmentary sectional view on line 17—17 of Fig. 1.

Fig. 18 is a front view of the winding head half of the winding form.

Fig. 19 is a side view thereof.

Fig. 20 is a view of the frame of the winding form looking in the direction of arrow 20 of Fig. 19.

Fig. 21 shows in perspective two of the cutter bars in disassembled relation.

Figs. 22, 23, 24 and 25 show successive operations performed by the cutter bars.

Fig. 26 is a side view of a stationary cutter.

Referring to Figs. 1 and 9, a frame 400 carries bearings 401 (retained by caps 401*a*) for a winding shaft 402 and bearings 403 (retained by caps 403*a*) for a tubular shaft 404 which supports a shaft 415. The sprocket 122 carries a roller bearing 122*a* journalled on the shaft 402. Normally the sprocket 122 is loose on the shaft 402 and is free to move axially between the clutch disc 405 fixed to the shaft 402 and a clutch disc 406 whose hub is splined to squared portion 407 of the shaft 402 and is provided with a groove 408 for receiving a roller 409 carried by lever 410 pivoted on a screw 411 and urged counterclockwise by coil spring 412 toward a cam 413 provided by disc 414 keyed to the shaft 404. When the cam 413 is rotated away from the lever 410, a spring 416 causes the clutch plates 405 and 406 to engage the sprocket 122 so that it will drive the shaft 402.

Shaft 402 drives shaft 415 at one-fourth speed of the former through gears 420 and 421. Shaft 415 rotates a cam 417 for controlling a valve V12, and a cam 418 for controlling a wire guide to be described. Shaft 404 is a control shaft which has limited movement independent of shaft 415; and shaft 415 drives shaft 404. For this purpose a lost motion connection is provided comprising a pin 422 carried by a disc 423 keyed to shaft 404 and received by an arcuate slot 424 in the hub of gear 421. Trip rod 213 (Fig. 17) which is guided by bushing 425 in frame 400 is raised at the proper instant to push against a screw 426 and raise a lever 427 pivoted at 428 on a bracket 429 to cause a bar 430, pivoted at 431 thereon, to push against a finger 432 attached to a lever 433 clamped to the shaft 404. This will cause shaft 404 to move clockwise (Fig. 17) and counterclockwise (Fig. 8) and cam 413 to move away from lever 410 so that spring 416 will cause the clutch to engage and shaft 402 drives shaft 415. As shaft 415 turns, it picks up shaft 404, and after one turn of shaft 415, cam 413 is returned to home position to cause lever 410 to move counterclockwise (Fig. 9) to cause the clutch to disengage. At that time, lever 433 (Fig. 17) returns to "home" position. As it returns, it pushes against lever 430, being urged clockwise by a spring 434; and lever 430 is brought by spring 434 under the finger 432. Spring 435 urges lever 427 downward.

When the clutch is engaged, shaft 402 must stop "dead." This is accomplished by providing the hub flange 440 of clutch disc 406 with a hardened metal socket-piece 441 (Fig. 13) for receiving a locking lever 442 (Fig. 4) attached to a shaft 443 journaled vertically in a bracket 444. As shown in Figs. 12 and 16, there is a cam disc 445 driven by shaft 404 which provides a cam 446 for engaging a spring metal lever 447 attached to a hub 448 pivotally supported by shaft 443 in axial alignment therewith but axially adjustable relative thereto. Hub 448 has an arm 450 carrying a screw 451 which is engaged by a spring 452

to urge levers 450 and 447 clockwise (Fig. 16). Arm 450 carries a screw 453 for engaging an arm 454 attached to shaft 443. A screw 455 having a head for engaging the arm 450 passes loosely through arm 450 and is threaded into arm 454. Adjustments of screws 453 and 455 provide for the proper angular spacing of arms 450 and 454. When cam 446 engages spring lever 447, arm 450 is urged counterclockwise (Fig. 16) and, hence, arm 454, shaft 443 and lever 442 which is caused to snap into the recessed block 441. Hence shaft 402 is stopped "dead" at the end of four revolutions or whatever its cycle may be. Shaft 402 is not stopped when the power is on. The winder clutch is opening ahead of the end of the winding cycle and the shaft 402 coasts under momentum into its stop position. Arrow 440*a* (Fig. 14) indicates the motion of part 440 which is arrested. The shock of engagement of parts 441 and 442 is taken up by a rubber block 444*c* confined under compression between frame 400 and a shiftable bearing block 444*b* and urging the same normally against bearing block 444*a*. These bearing blocks are parts of the bracket 444.

Precaution is taken against rebound of lever 442, as spring lever 447 is substantially stressed before lever 442 snaps into locking position. Therefore, just as lever 442 snaps into the recessed block 441, a lever 457 arrives at the position shown in Figs. 12, 14 and 16 to overlap lever 442 and prevent rebound. Lever 457 is attached to a rod 458 pivotally supported by frame 400. A spring 459 attached to a stud 460 of lever 457 and to a stud 461 attached to frame 400 (Fig. 5) urged a roller 462 carried by lever 458 against a cam lobe 463 provided by disc 445. When disc 445 is rotated counterclockwise (Fig. 12) in response to upward movement of rod 213 (Fig. 17), cam lobe 463 pushes lever 457 counterclockwise so that its lower end will be to the right of a shoulder 464 of lever 442 and below said shoulder in Fig. 16. Concurrently, cam lobe 446 leaves lever 447, leaving spring 452 free to rotate lever 442 clockwise out of locking engagement with the clutch hub 440; and, concurrently, cam 413 leaves lever 410 (Fig. 9), so that shafts 402 and 415 and 404 start rotation. Shafts 415 and 404 rotate counterclockwise in Fig. 12. While lever 457 clears the shoulder 464 of lever 442 due to rotation of cam 463 about 50°, lever 442 is in unlocking position. After 50° of cam rotation, lever 457 is pulled against shoulder 464 by spring 459; and lever 457 is cocked ready to move into blocking position when lever 442 is forced by cam 446 and spring lever 447 into locking position at the end of one turn of shaft 415.

Cam 418 (Fig. 11) operated by shaft 415 contacts a roller 470 (Fig. 5) on arm 471 journaled in bearing 472 supported by bracket 473 (Fig. 3). Arm 471 supports bearings 474 for a shaft 475 carrying a wire guide pulley 476 which guides two wires to a form comprising winding head half-form 500, which is engaged by any one of the four dial half forms 350. Arm 471 carries a stud 478 (Fig. 5) connected by a spring 479 with a spring support 480 attached to frame 400. Spring 479 urges roller 470 against cam 418. Cam 418 causes the wire to be placed upon the form halves in a predetermined manner such as shown by the Cullin Patent 1,926,331 dated September 12, 1933.

The winding head half 500 of the coil form will now be described with reference to Figs. 1, 4 and 18 through 26. This form includes a frame 501 having parallel sides 502 and 503 and a counter-

bored portion 504 adapted to receive a disc 505 provided by shaft 402. From disc 505 extends two lugs 506 spaced apart to receive the side surfaces 502 and 503 of frame 501 when the latter is attached to shaft 402 by screws which pass through counterbored holes 507 in disc 505 (Fig. 4) and which thread into holes 507a (Fig. 20) in part 501. Notch 505a in disc 505 provides clearance for levers 532, 542 to be described. Screws 508 and dowels 509 attach to frame 501 a form 510 having stepped surfaces A, B and C adapted to match with similar surfaces provided by the companion half of the coil form as shown in application Ser. No. 733,758. The form 510 is provided with edge surfaces *a* through *h* which match with similar surfaces provided by said companion half of the form. Across the plate 510 there extends a notch 511 for the purpose of providing clearance for parts of said companion half of the form. As the coil form is rotated about the axis of the shaft 402 in a counterclockwise direction as viewed in Fig. 11, wire is guided on the form by guide wheels 476. The guiding of the wire upon the form is assisted by surfaces 512 and 513, the latter being provided by a plate 514 attached by screws 515, said plate having an oblong hole 516 in alignment with a notch 517 provided by the frame 501. The notch 517 receives two plates 518 and 519 (Fig. 20) of hardened and ground steel shaped substantially alike as shown in Fig. 26 and each having a notch 520. When the plates 518 and 519 are attached to the frame 501 as indicated in Fig. 20, their notches 520 will be in alignment. At the end of a winding operation the wires are guided by the wire guide wheels 476 into the notches 520 of the plates 518 and 519. The guiding of the wires into these notches is assisted by surface 521 provided by the frame 501 and by the surface 522 provided by bracket 523 attached to the frame by screws 524 received by the tapped holes 525 of the frame (Fig. 20). The wires which provide the end leads of the coil after it is wound will be located in a groove 526 into which the wires are directed by surface 527 of a bracket 528 attached by a screw 529 threaded into a tapped hole 530.

In alignment with the notch 517 there is a groove 531 (Fig. 20) which receives cutter bars 532 and 542 which are made separately of steel hardened and ground and are then attached by a rivet passing through holes 532a and 542a. The holes 532b and 542b receive a fulcrum pin 533 which extends through hole 532a of the frame 501. Bar 532 is notched out at 534 to provide a head 535 having a rounded or dull corner, a nose 536 also having a rounded upper corner surface and wire cutting jaws 537 and 538, which are the full thickness of the metal of the bar 532 which is a greater thickness than that of the head 535 and the nose 536. The cutting surfaces 537 and 538 closely engage the cutter plate 518. The bar 542 has a shape somewhat similar to bar 532, but it is provided with sharp cutting edges 543 and 544 which closely engage the stationary cutter bar 519. When a companion form is advanced to form 500, dowel pins 501b (Figs. 18 and 19) of the latter are received by dowel bushings of the companion form as disclosed in application Ser. No. 733,758.

To start winding a coil upon the form it is necessary to anchor the free end of the wire thereto before starting to wind. The disclosed machine winds two wires simultaneously, but for the sake of convenience, reference will be made only to one wire W1. The wire is pulled from a supply reel and placed across the notch 520. While thus positioned by the operator, a rod 562 (Figs. 1 and 5) to move right so as to engage the bars 532 and 542 and to cause them to move clockwise (Fig. 19). When the bars move right, wire W1 (Fig. 22) will be cut by the coaction of edge 543 and plate 519 at *x* and the head 535 will bend it around the notch 520 of plate 518. The completion of the bend is shown at W2 in Fig. 23. The length of the bent portion is much exaggerated in the drawings as about .025" is sufficient to provide an anchor. By means to be described, the bars 532, 542 are caused to move to the position shown in Fig. 24 and the wire shifts to W1' and W2'. After winding a coil is completed. The bars 532, 542 move to the position shown in Fig. 25. Hook end W2' is cut off as indicated at W2'' and the end lead W3 of the coil just wound is cut at *y* leaving wire W4 which is the start lead of the next coil to be wound. W4 is bent (just as W2 was bent in Fig. 23) to provide the anchor for the next coil to be wound; and winding proceeds as before. Movement of bars 532, 542 from the position of Fig. 24 to the position of Fig. 25 frees the end lead of the wound coil from the form 500 and anchors thereto the start lead of the next coil to be wound thereon. The return of wire cut-off levers 532, 542 to the position shown in Figs. 5 and 24 is effected automatically during rotation of the form 500 by cam 577 provided by a bracket 578 (Figs. 6 and 7) attached to frame 400 (Fig. 1).

To trip the winder clutch, a certain rotary movement of shaft 404 (Figs. 12 and 17) is required. In order to meet this requirement, certain adjustments are provided. Adjustment of nut 414a relative to bushing 414b (Fig. 9) surrounding shaft 404 adjusts cam 413 axially to compensate for wear of the clutch facings of discs 405 and 406 so that the normal spacing of these facings can be maintained. Adjustment of nut 416b relative to threaded sleeve 416a attached to shaft 402 takes up end play of this shaft. In order that the winder clutch will operate in the intended manner, lubricant of the bearing 122a is prevented from contacting the clutch facings by oil slingers 122b.

The required movement of shaft 404 (Fig. 17) is obtained by a certain upward movement of rod 213 effected as shown in application Ser. No. 733,758 by a pressure fluid servo which will operate at the proper time provided the companion form-half with which form 500 cooperates has been moved toward form 500 the correct distance. However, if the movement of said companion form-half toward form 500 is obstructed by a wire, for example, lodged on the face of form 500, the rod 213 cannot be lifted by the servo the distance required to turn shaft 404 (Fig. 17) the angle required to trip the winder clutch.

Referring to Fig. 11 the wires from the pair of reels 621 located below a bracket 625 are threaded through guides 640 supported by brackets 641 (Fig. 11A) attached to bracket 625 by screws 642 and nuts 643. Each screw 642 provides a pivot for a sleeve 644 which supports discs 645, 646 and 647, urged together by spring 648 retained by nuts 649 threaded on sleeve 644. The wire which is threaded through guide 640 is placed between the discs 645 and 646 which offer a slight frictional resistance to the passage of the wire. The two wires are designated by W1 and W2. Wire

W1 passes around a grooved guide wheel 650 (Figs. 11 and 11B) which is journaled on ball bearings 651 supported by a rod 652 passing through the bracket 625 and threadedly engaged by a nut 653 which retains a plate 654 and a flexible metal arm 655 which extends adjacent the groove of the wheel 650 at two places as shown in Fig. 11 in order to retain the wire after it is passed around the pulley 650. Therefore, there are two arms 655 which are adjacent to arms 654a of plate 654 and each arm 655 is resiliently biased against a stop screw 656 threaded through an arm 654a and retained by the locked nut 657. Hub 660 of wheel 650 is confined between the head 661 of rod 652 and a disc 662 supported by rod 652. The hub 660 is provided with a hard metal brake drum 665 engaged by brake lining 666 provided by a brake band 667, the end of which 667a (Fig. 11) is attached to a lug 668 of the bracket 625 and the other end of the band 667b is pivotally connected with a rod 669 which passes through lug 668 and thence through a spring 670 retained in a state of compression by wing nut 671 threaded on the rod 669. By turning the nut 671, the friction exerted by the brake band may be adjusted. The wires W1 and W2 pass from the wheels 650 and 650' around a double-grooved guide wheel 674 which is pivotally supported at 676 by the bracket 625.

The wire W2 is guided in a similar manner by guide 640', wheel 650' and wheel 675. The parts associated with guide 640' and wheel 650' are indicated by the same reference numbers applied to corresponding parts associated with guide 640 and wheel 650, but with a prime affixed.

Referring to Fig. 11, the wires pass from wheels 674, 675 around grooved guide wheels 678 pivotally supported at 679 by a bracket 680 supported by frame 400. From wheels 678, the wires pass to guide wheels 476. Between wheels 674, 675 and wheels 678, the wires respectively contact grooved wheels 681 pivotally supported by arms 682 journaled on a rod 683 carried by bracket 680. If either wire breaks or runs out, the arm 682 carrying the wheel 681 which had engaged the wire is permitted to rotate counterclockwise beyond its normal position to cause a mercury switch 605 carried by that arm to close a circuit for causing the machine to stop at the end of its cycle.

The machine can be readily adapted for winding coils of various sizes and using different guage of wire. The tension of the brakes on wheels 650 and 650' is adjusted to suit the guage of wire. The location of wire guide wheels 678 and 476 (Fig. 11) relative to each other and to the form 500 is such as to put a kink in the wire of such nature that the wire tends to hug the form rather than bow away from it. Due to this feature as well as to the proper wire tension, the coils are compactedly and therefore uniformly wound. There is practically no variation in the lengths of wires in the coils. Therefore the coils wound on the same forms will have substantially identical electrical characteristics.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A coil winding machine comprising a shaft, a coil winding form driven thereby, a power operated driving clutch member, a driven clutch member connected with the shaft, a first spring for urging the driven clutch member into engagement with the driving clutch member, a wire-guide control shaft, gears connecting the shafts for driving the second shaft continuously at a speed less than the speed of the first shaft, a cam driven by the second shaft, a wire guide winder control by the cam, a device carried by the form for cutting the end lead of a wound coil and for anchoring to the form the start lead of the next succeeding coil, a mechanism adapted to operate said device when the form stops in a predetermined angular position, a control shaft driven by the second shaft through a lost motion connection which provides for movement of the control shaft independently of the second shaft, a clutch disengaging member connected with the clutch driven member, a cam operated by the third shaft to operate upon said clutch disengaging member to disengage the clutch against the action of said first spring slightly in advance of movement of the form to stopping position, a disc connected with the clutch driven member and providing a notch, a first shaft locking member for engaging the notch after the clutch is disengaged, a second spring urging said locking member away from said disc, means operated by the control shaft for biasing said locking member against the notched member ahead of disengagement of the clutch whereby the first shaft coasts into position in which the notch receives the locking member, and means for operating the control shaft independently of the second shaft to cause said cam of the third shaft to release said clutch disengaging member whereby said first spring is released to engage the clutch and to cause retraction of the locking member biasing means whereby the second spring is released to retract the locking member from said notch.

2. A machine according to claim 1 having a latch for preventing rebound of the locking member from the disc following reception of the locking member by the notch of the disc, means for biasing the latch toward rebound-preventing position concurrently with the biasing of the locking member against the disc, actual movement of the latch into rebound-preventing position being prevented by the locking member before it moves into the notch of the disc, and means for retracting the latch before for retraction of the locking member from the disc.

3. A coil winding machine comprising a shaft, a driving clutch member journalled thereon, a driven clutch member connected with the shaft and slidable axially thereon to engage the driving clutch member, a first spring urging the driven clutch member against the driving clutch member, a wire-guide control shaft, gears connecting the shaft for driving the second shaft continuously at a speed less than the speed of the first shaft, a coil winding form driven by the first shaft, a cam connected with the second shaft, a wire guide under control by the cam, a device carried by the form for cutting the end lead of a wound coil and for anchoring to the form the start lead of the succeeding coil, a mechanism adapted to operate said device when the form stops in a predetermined angular position, a tubular, control shaft enclosing and supporting the cam-shaft, a lost motion connection between said shafts providing for movement of the control shaft independently of the second shaft, a clutch control lever connected with the clutch driven member, a

cam connected with the control shaft and engaging the lever to disengage the clutch against the action of said first spring slightly in advance of movement of the form to said stopping position, a disc connected with the driven clutch member and providing a notch, a second lever for engaging the notch in order to retain the winder form in said position at the end of winding, a second spring for retracting the second lever from the notch, a cam connected with the control shaft and a third spring operated thereby for moving the second lever against the disc in advance of movement of the winder-form to said stopping position whereby, as the form coasts to stopping position, the second lever is forced by the third spring into the notch, and a controller for imparting movement to the control shaft independently of the second shaft to move the control shaft cams out of control of the first and second levers.

4. A machine according to claim 3 in which the third spring is a flexible arm extending from the hub of the second lever and in which there is a resilient body to which the second lever transmits through its hub the shock of engagement of the disc with said lever as first shaft is stopped by engagement of the lever with the notch of the disc.

5. A machine according to claim 3 and having means for preventing rebound of the second lever from the disc notch when forced by the third spring into engagement therewith, said means comprising a third lever, a fourth spring for urging the third lever into the path of movement of the second lever so as to obstruct a rebound movement thereof and a cam connected with the control shaft and operable during said independent movement of the control shaft to move the third lever out of the path of movement of the second lever.

6. A coil winding machine comprising a shaft, a coil winding form driven thereby, a power operated driving clutch member, a driven clutch member connected with the shaft, a first spring for urging the driven clutch member into engagement with the driving clutch member, a wire-guide control shaft, gears connecting the shafts for driving the second shaft continuously at a speed less than the speed of the first shaft, a cam driven by the second shaft, a wire guide under control by the cam, a device carried by the form for cutting the end lead of a wound coil and for anchoring to the form the start lead of

the next succeeding coil, a mechanism adapted to operate said device when the form stops in a predetermined angular position, a control shaft driven by the second shaft through a lost motion connection which provides for movement of the control shaft independently of the second shaft, a clutch disengaging member connected with the clutch driven member, a cam operated by the third shaft to operate upon said clutch disengaging member to disengage the clutch against the action of said first spring slightly in advance of movement of the form to stopping position, a disc connected with the clutch driven member and providing a notch, a first-shaft-locking lever providing a lug to be received by said notch to stop rotation of the first shaft, a resiliently supported fulcrum member pivotally supporting the locking lever, said fulcrum member yielding to take the shock of stopping rotation of said first shaft, a flexible lever for biasing the locking lever a second cam operated by the control shaft to cause the flexible lever to bias the locking lever yieldingly against the disc in advance of clutch disengagement whereby the locking lever lug will be snapped into the notch of the disc as the first shaft coasts into stop position, a rebound-preventing lever a third cam operated by the control shaft for positioning the rebound-preventing lever in the path of rebound-movement of the locking lever from the disc as its lug is received by the notch of the disc, means for operating the control shaft independently of the second shaft to cause the cams respectively to release the clutch disengaging member, the flexible lever and the rebound-preventing lever and spring means for retracting rebound-preventing lever from the locking lever and the locking lever from the disc.

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