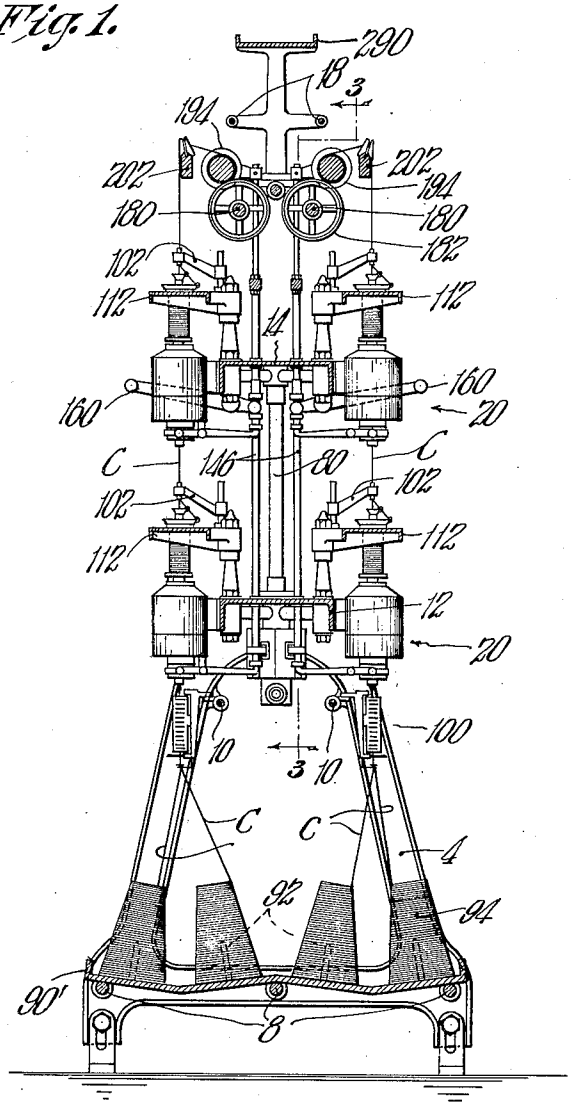
Aug. 14, 1934. R. E. GETCHELL 1,970,228

CORE COVERING MACHINE

Filed March 12, 1931 8 Sheets-Sheet 1

Fig. 1.



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CORE COVERING MACHINE

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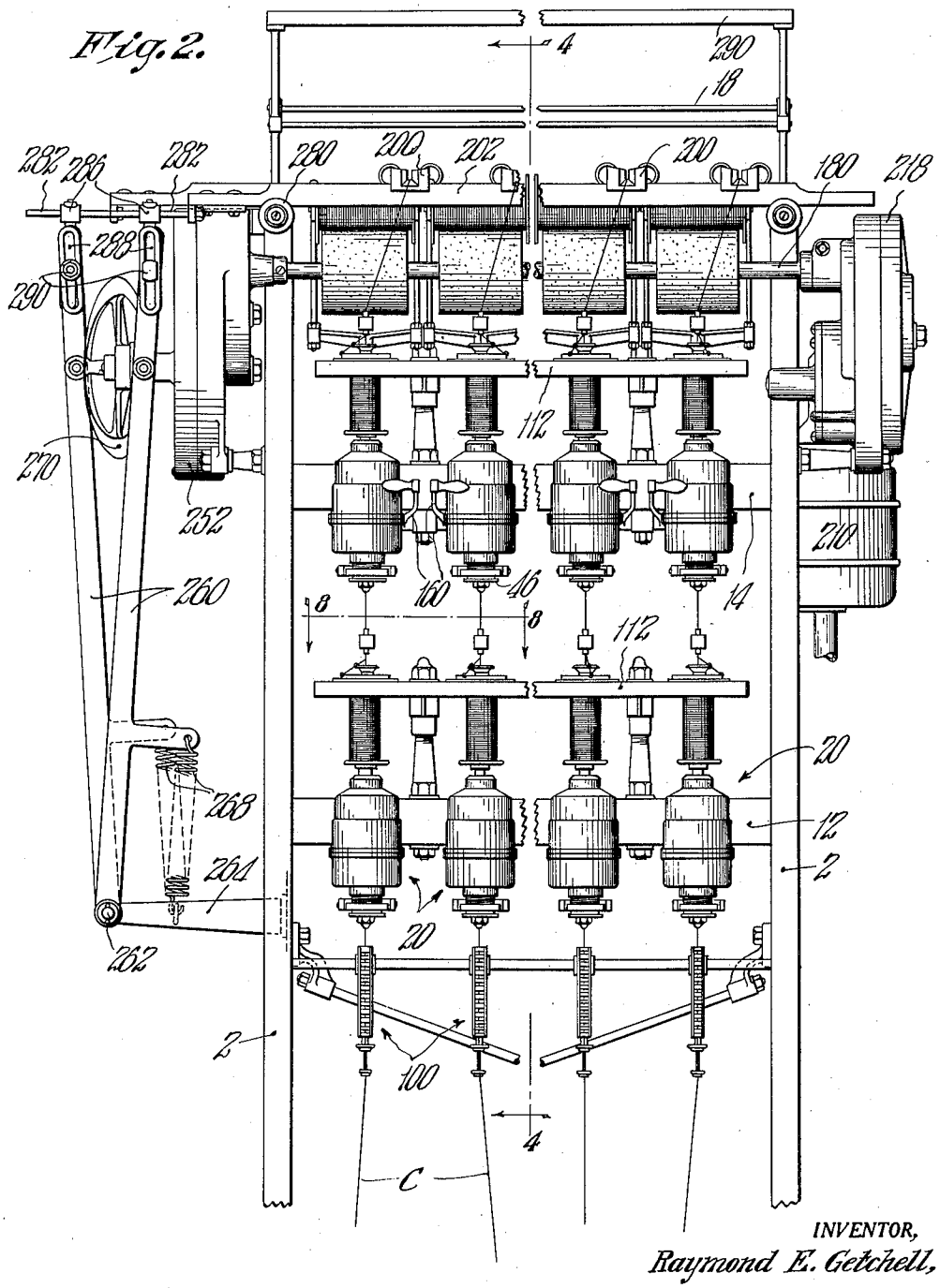
Fig. 2.



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CORE COVERING MACHINE

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Fig. 4.

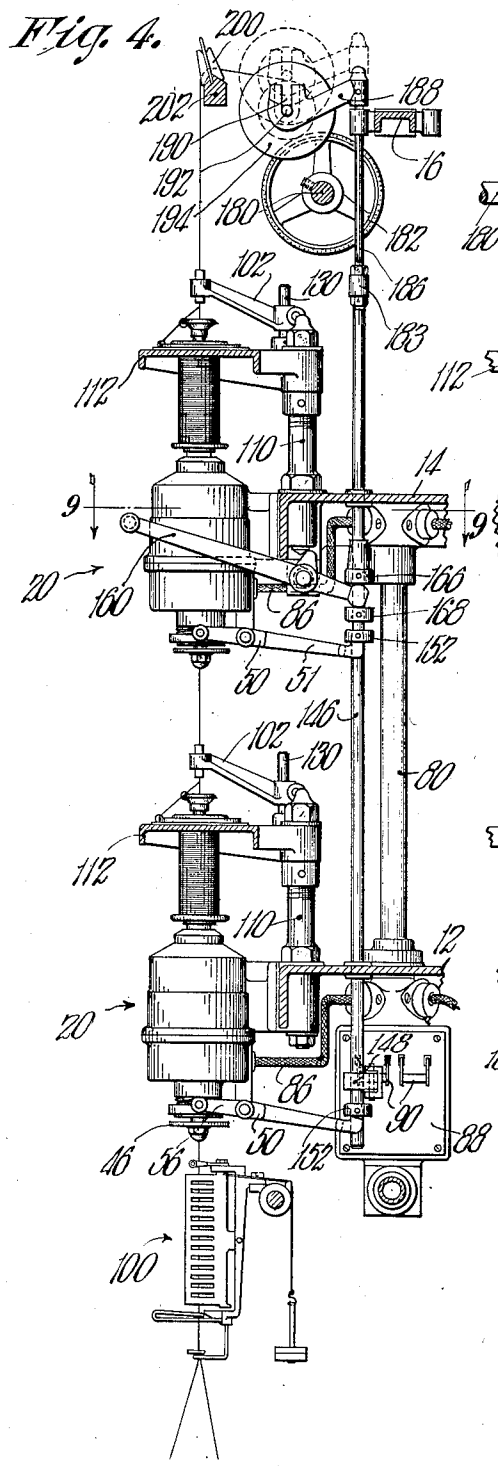
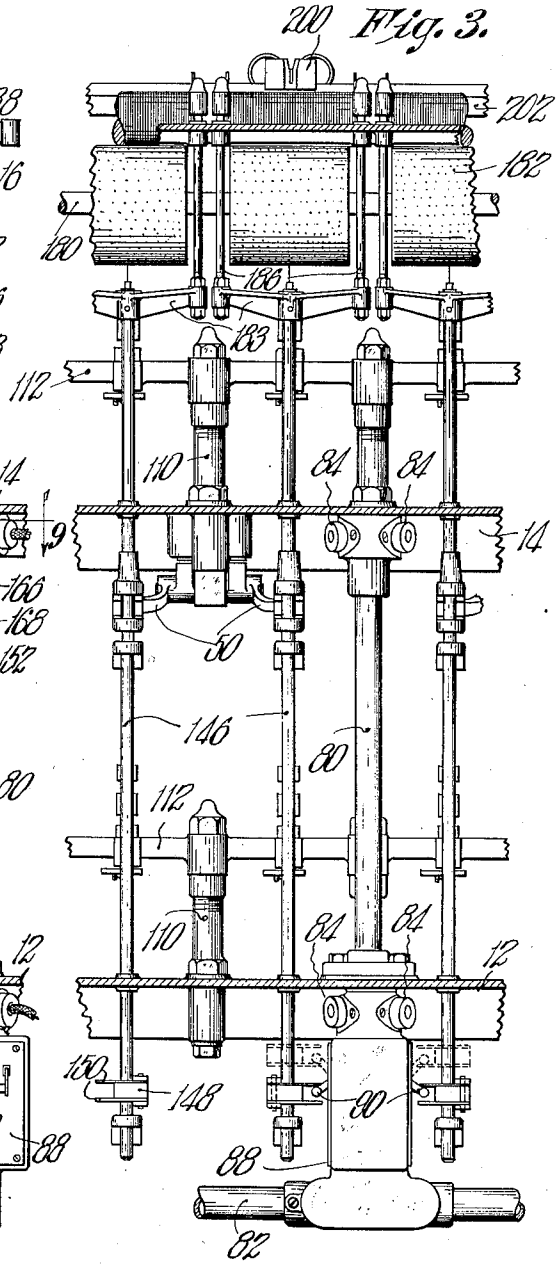


Fig. 3.



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CORE COVERING MACHINE

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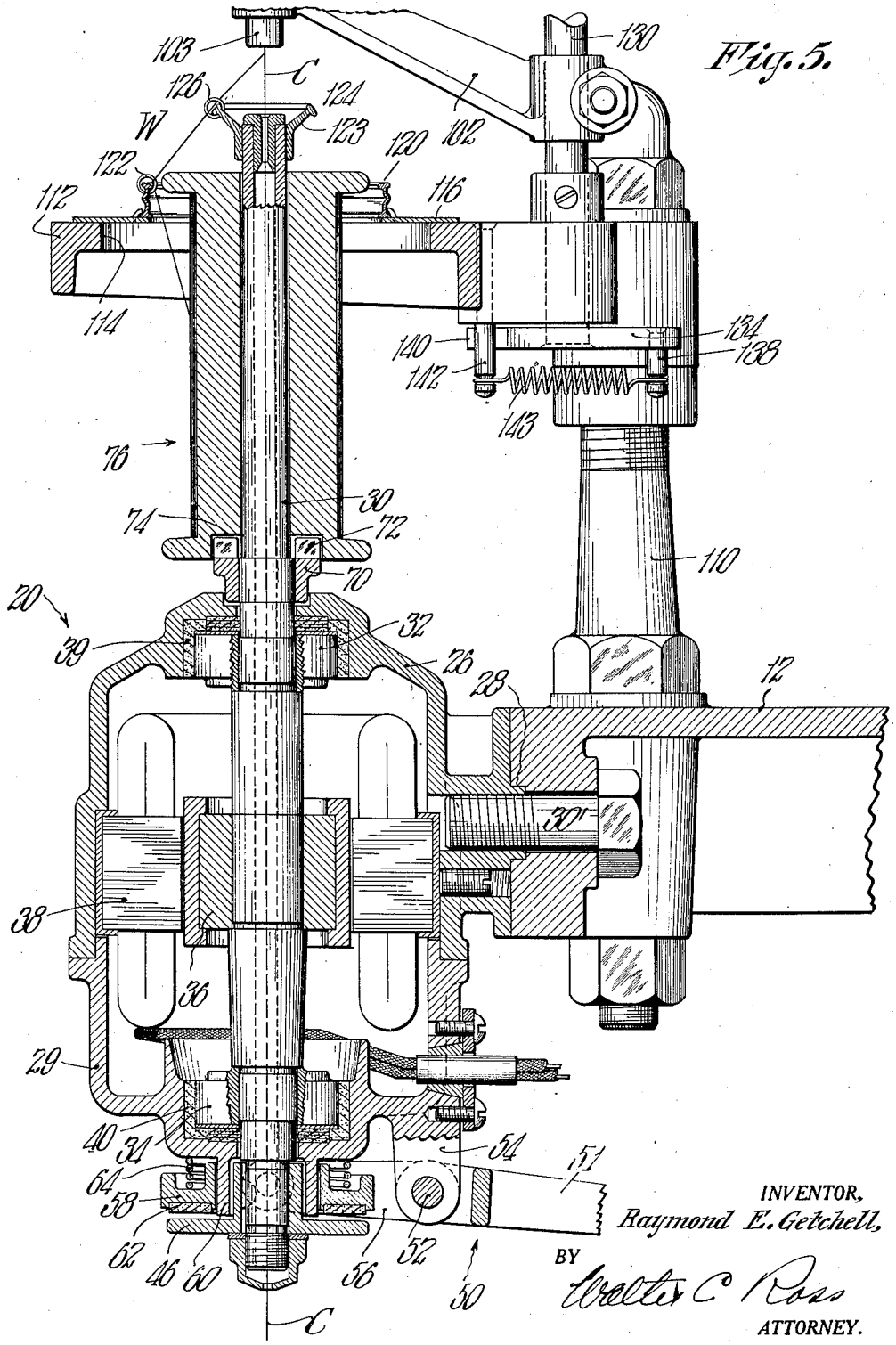
Fig. 5.



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CORE COVERING MACHINE

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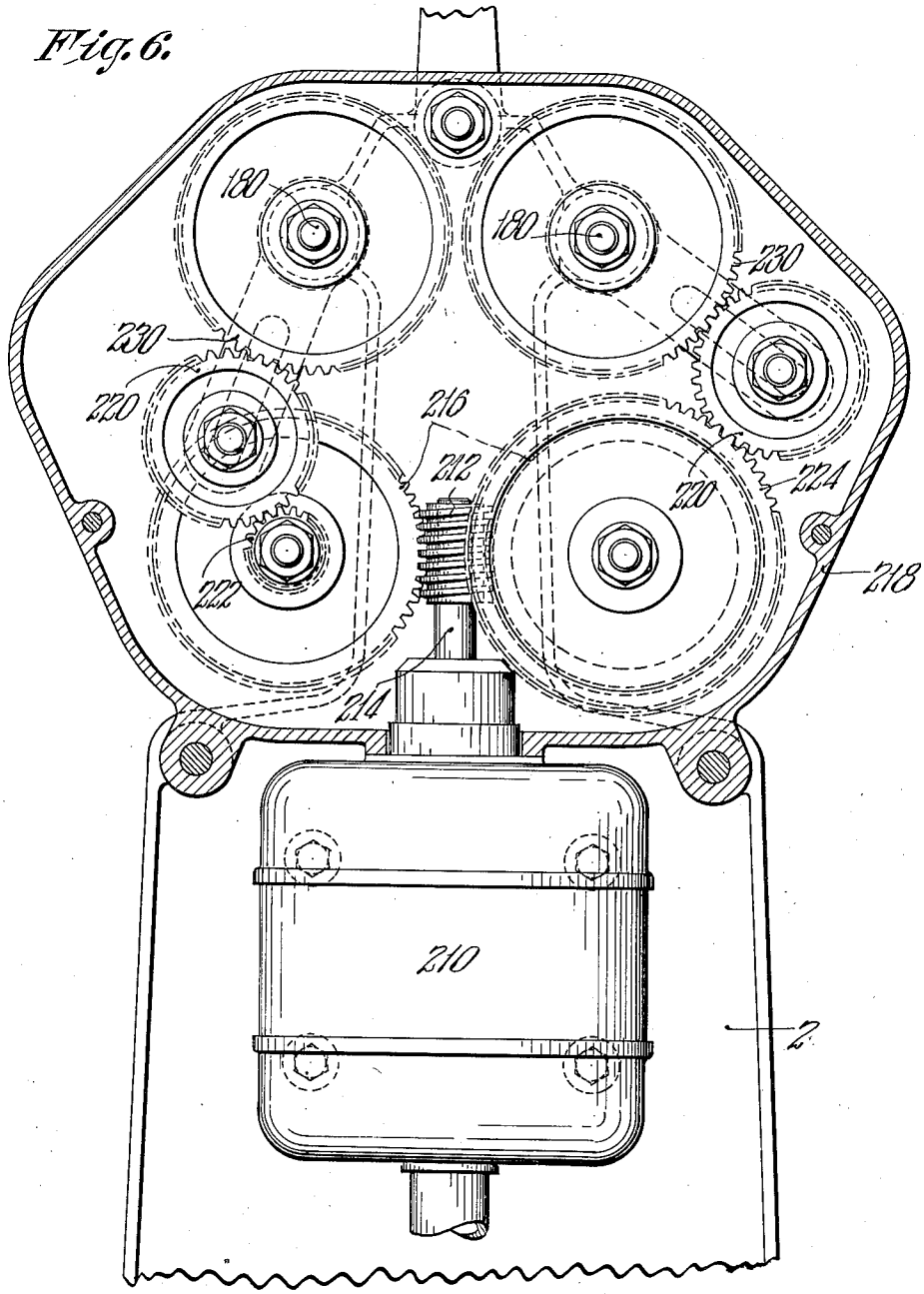
Fig. 6.



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CORE COVERING MACHINE

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Fig. 7.

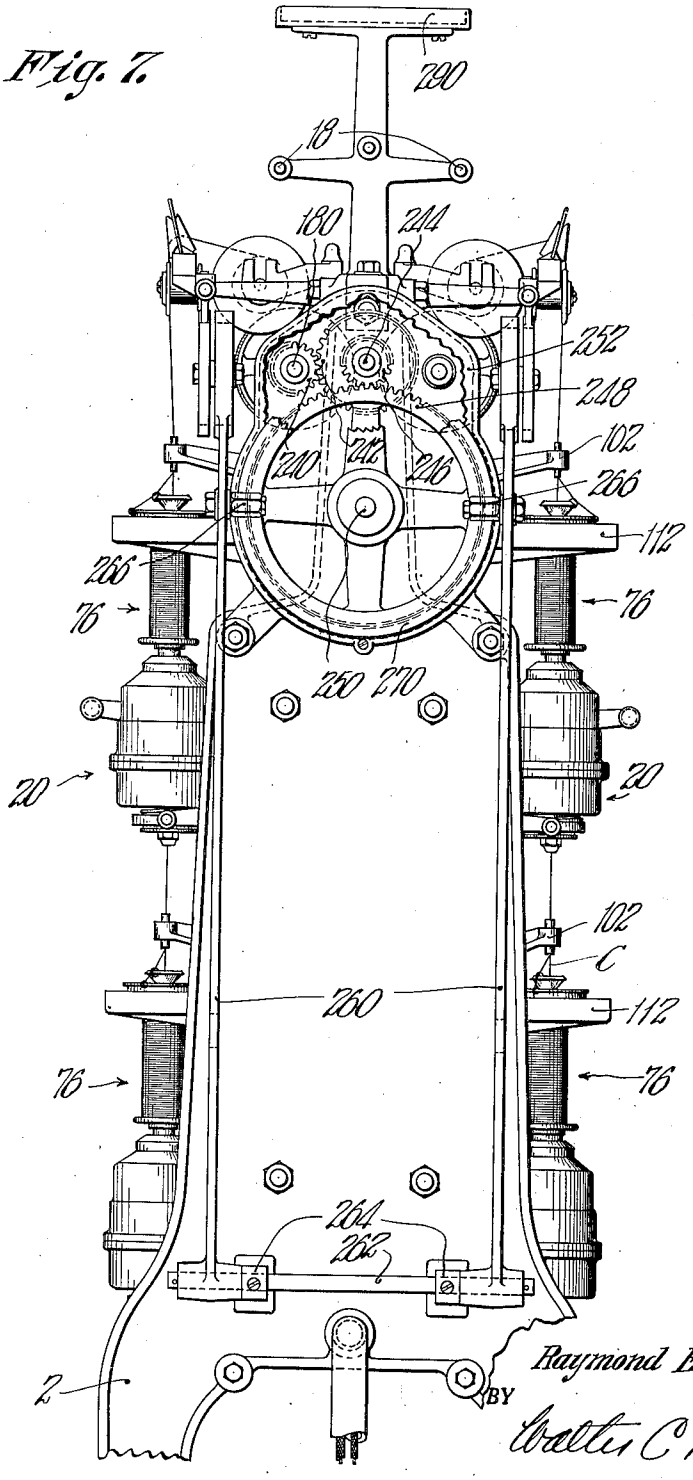

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Fig. 8.

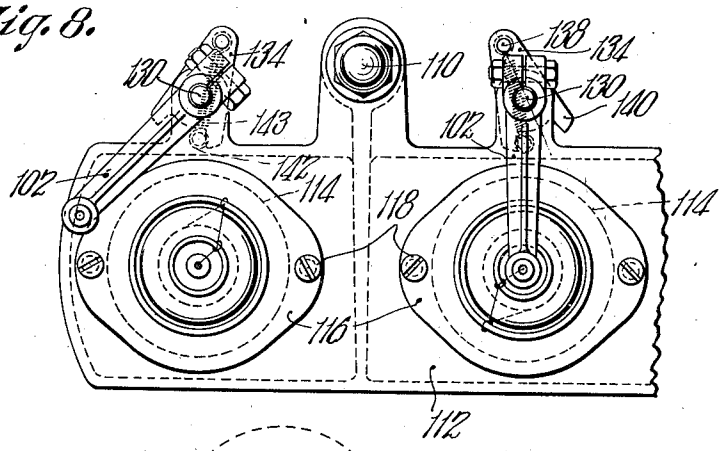


Fig. 9.

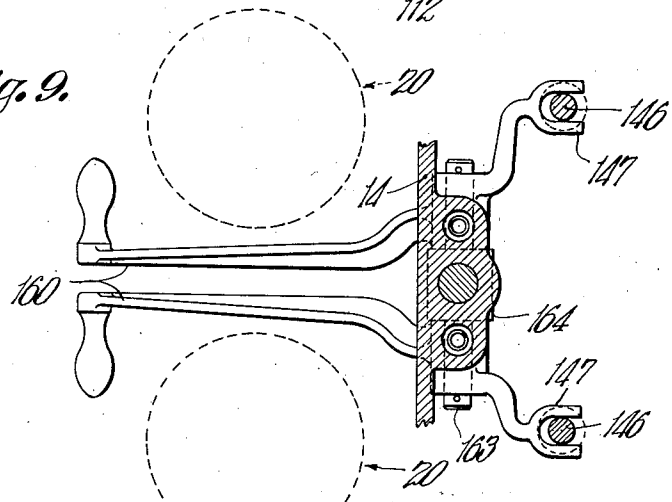
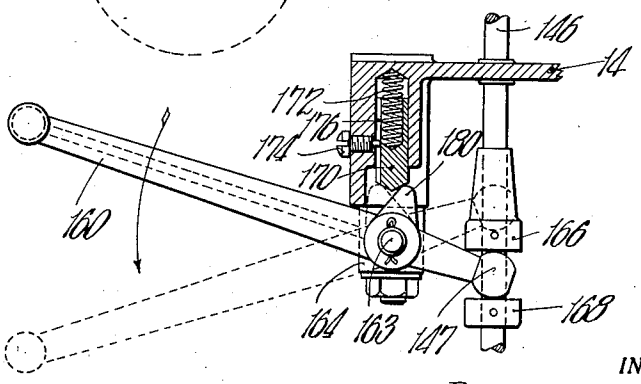


Fig. 10.



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CORE COVERING MACHINE

Filed March 12, 1931 8 Sheets-Sheet 8

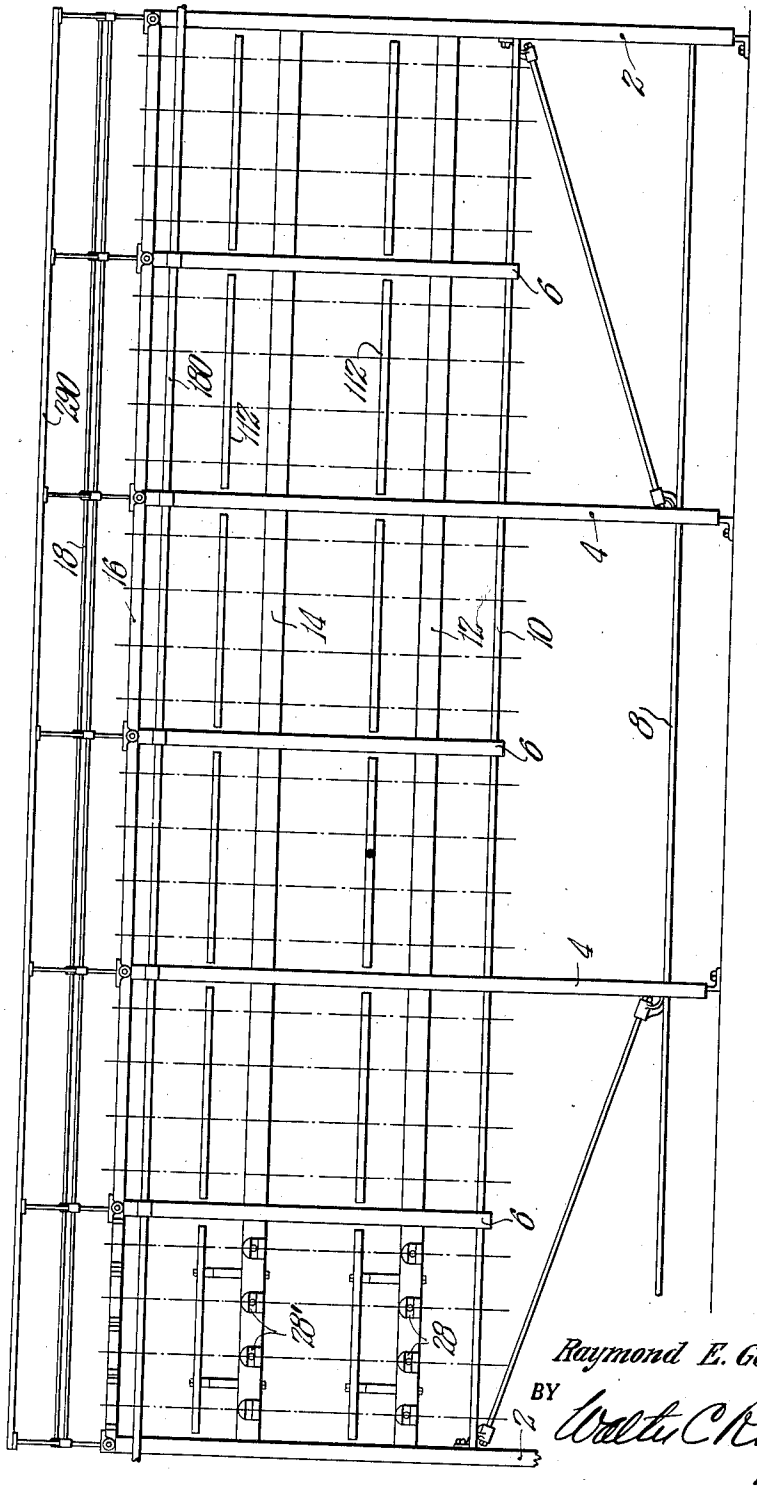

Fig. 11.

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Patented Aug. 14, 1934 1,970,228

UNITED STATES PATENT OFFICE

1,970,228

CORE COVERING MACHINE

Raymond E. Getchell, Holyoke, Mass., assignor to B. F. Perkins & Son, Inc., Holyoke, Mass., a corporation of Massachusetts

Application March 12, 1931, Serial No. 521,940

25 Claims. (Cl. 117—34)

This invention relates to improvements in apparatus for uniting a plurality of threads, cords or the like by a winding or wrapping operation.

According to the novel features of this invention, there is provided an apparatus of the class described which in its broad aspect is adapted to wind or cover a central core member with an outer covering or coverings. The central core may consist of fibrous material or of more or less rigid material such as wire or the like. The core may also be of extensible or flexible material and a covering may be applied thereto in one or more layers or servings. The coverings may in any case include fibrous or extensible material or even relatively more rigid material, such as a metal thread or the like.

The principal objects of the invention are directed to the provision, in an apparatus of the class described, of novel features of construction and arrangement of parts whereby the apparatus may not only operate at high speeds to obtain large production and favorably effect the manufacturing costs of material produced thereby, but at the same time the apparatus is simple in construction so as to not only contribute to its efficiency but facilitate ease in the operation thereof.

The machine as will later appear embodies various novel details of construction which cooperate with one another in producing a novel apparatus. The advantages thereof will be more fully hereinafter referred to in connection with the following description of the preferred form of the invention which for purposes of disclosure will be shown in the accompanying drawings wherein:

Fig. 1 is a transverse sectional elevational view through the machine of the invention showing the relation of certain of the various component parts thereof.

Fig. 2 is a side elevational view of one side of the machine at a somewhat larger scale than that of Fig. 1, with parts intermediate the ends omitted.

Fig. 3 is a partial sectional view taken on the line 3—3 of Fig. 1, with the parts shown at a larger scale than in Fig. 1.

Fig. 4 is a partial transverse sectional elevational view showing the parts at one side only of the machine and is taken on the line 4—4 of Fig. 2.

Fig. 5 is a sectional elevation view at a large scale, taken through one of the motor driven spindle assemblies and showing certain of the other parts of the machine in relation thereto.

Fig. 6 is an end elevational view, with parts in section, of the right hand end of the machine shown in Fig. 2.

Fig. 7 is a somewhat enlarged elevational view looking at the left-hand end of the machine shown in Fig. 2.

Fig. 8 is a plan view showing certain details of construction and is taken on the line 8—8 of Fig. 2.

Fig. 9 is a plan view with certain of the parts in section and is taken on the line 9—9 of Fig. 4.

Fig. 10 is an end elevational view of the parts shown in Fig. 9, with certain parts in section, and

Fig. 11 is a diagrammatic side elevational view of the machine showing certain frame parts to illustrate the relative positions of said parts.

Referring now to the drawings in detail, the novel features of the invention will be fully described.

In describing the apparatus or machine of the invention, reference will be made to a core element which is served or covered by winding a covering element therearound. It will be understood that the core may consist of fibrous thread or yarn, a stretchable or resilient element, or a more rigid relatively non-stretchable member, and that the covering may be a yarn or thread of fibrous material or some more stretchable material or even a metallic ribbon or the like.

In a general way the separate units or parts of the apparatus or machine of the invention are carried by a supporting structure which includes end frames 2, intermediate frames 4 and sub-frames 6, which are disposed vertically in a spaced relation. The end frames and intermediate frames are and the sub-frames may be extended to rest upon the floor for supporting the structure. These frames are suitably fixed to lower longitudinally extending rods 8, rods 10 thereabove, a lower rail 12, an upper rail 14, a bar 16, and upper rods 18.

Motor driven spindle assemblies are mounted in spaced relation on the members 12 and 14 at both sides of the machine. They are spaced apart on the dot-dash lines in Fig. 11 and so arranged that the motor driven spindle assemblies of the lower rail are in alignment with the motor driven spindles of the upper rail. In this way the spindles one above the other constitute what may be called a pair of spindles. Each pair with its associated parts may be termed a complete core covering unit.

The motor driven spindles will now be described with particular reference to Fig. 5.

Housings 26 are provided the rear side of which carry tongues 28 for fitting within grooves

28' of the rails, 12 and 14. Bolts 30' extend through the rails and engage threaded openings in the tongues so as to securely clamp the housings to the rails and hold them in correct relative position and against displacement.

Caps 29 are suitably secured to the housings 26 and spindles 30 are journalled in the housings and caps by means of suitable bearings such as ball bearings 32 and 34. Rotors 36 are carried by the spindles and stators 38 are held within the housings. These constitute motors to rotate the spindles when electrical current is supplied thereto.

In order to obtain the desired efficiency in a machine of this kind it is necessary to construct the motor elements to rotate the spindles at very high speed, and anti-friction bearings are provided for their desirable characteristics. Yieldable washers 39 and 40 of cork or the like are disposed around and between the spindle bearings and the housing and cap and function to dampen and absorb vibrations and thereby eliminate noise and excessive wear.

The spindles 30 are hollow whereby a core C may pass upwardly therethrough and discs or flanges 46 are carried at the lower end thereof below the caps. Levers 50 are pivoted at 52 to ears 54 of the caps and have diverging arms 56 which extend around and actuate collars 58 slidable on extensions 60 of the caps. These carry friction shoes in the form of washers 62 and the members 58 are urged downwardly by means of springs 64 disposed between the caps and collars. These levers 50, as will later appear, are arranged to hold the collars 58 in an upper non-braking position and when released or actuated the springs 64 force the collars down so that they bear on the members 46. The members 58 are non-rotatable so that when they bear on the members 46 there is a braking action to stop the rotation of the spindles. It will be understood that the tension of the spring may be varied to vary the braking action, all as may be desired.

Drivers 70 above the housings are rotated by and with the spindles 30 and upwardly extending driving lugs 72 are receivable in slots 74 at the lower sides of spools 76. The spools 76 are adapted to slip over the spindles 30 and may carry the materials with which it is desired to serve or cover the cores. In the drawings a covering element is represented by W.

Upwardly extending conduits 80 are provided between the rails 12 and 14 at a point intermediate adjacent pairs of spindles and are connected at their lower ends to the longitudinally extending conduits 82. These conduits carry wires for supplying current to the spindle motors and receptacles 84 on the conduits are adapted to receive the connecting leads 86 of the motors. It is desired that each vertical pipe or conduit supply two adjacent pairs of motors on each side of the machine and switch boxes 88 on the lower ends of the vertical conduits 80 are provided with four switches 90. On each side of the boxes there are two switches, one switch to control current to one pair of motors and the adjacent switch for controlling current to the adjacent pair of motors.

A lower platform 90' extends longitudinally of the machine just above the floor and is provided with studs or pins 92 which are receivable in openings of caps or spools 94 of core material. The core material C is carried upwardly through tension devices 100 of usual form which are located below the lowermost spindle and then through the pairs of spindles.

Studs 110 are fixed to the rails 12 and 14 and support separate plates 112 thereabove. These plates 112 are provided with suitable openings 114 and are preferably located adjacent the upper ends of the spindles. Guide plates 116 are fixed by means of screws 118 to the upper side of the plates 112 and carry annular guideways 120 disposed concentrically with respect to the axis of rotation of the spindles. Rings or travelers, 122 are rotatable on the guideways 120 as best shown in Fig. 5. Other guide or ring members 123 are removably carried by the upper ends of the spindles and have enlarged outer ends or guideways 124 around which rings 126 travel.

These members 123 are preferably removable from the spindles and are held thereon by friction so that they are rotated by and with the spindles while at the same time the rings 126 may rotate relative thereto.

Covering material W is led from the spools 76 through the travelers or rings 122 and 126 on to the core C. As the spindles rotate the spools the travelers guide the covering material directly on to the core.

It will be noted that the upper rings 126 are closely adjacent the core and that the parts are so arranged that the covering W from the rings 122 to the core C is guided in a substantially straight line. These travelers function to give to the winding material the desired tension, but guide the covering material in such a way that accurate winding is possible. This is due to the fact that by means of the co-operating rings and their annular guideways the covering material is prevented from whipping in the rotation thereof at the high speed at which the spindles are operated.

Guides 102 are fixed to rods 130 oscillatable at inner marginal sides of the plates 112. These guides carry at their outer ends bushings 103, which may be of porcelain or the like and which are provided with central axial openings therethrough for receiving the cores. Levers 134 are affixed to the lower ends of the rods 130 and carry studs 138 at their outer ends and are also provided at their other end with spaced stop portions 140.

Springs 142 are connected between studs 138 and other studs 142 depending from the plates. The parts are so arranged that the guides 102 may swing between non-guiding positions at the left of the spindles as in Fig. 8 to guiding positions exactly above the spindles as shown at the right in Fig. 8. Since the levers 134 are limited in swinging movements by the stop portions 140, the levers and consequently the rods 130 are held in one position or the other by action of the springs.

Operating rods 146 are provided for each pair of spindles and are vertically disposed at the rear of said pairs of spindles. These rods are movable up and down in the plates 12 and 14. Members 148 adjacent the lower ends of the rods have outwardly extending fingers 150 arranged to engage and operate the switches 90 of the switch boxes 88. As the rods are reciprocated up or down, the switches are moved by them between on and off positions and thereby they control the current supply to the motors.

Collars 152 fixed to the rods are arranged to bear on the inner ends 51 of the brake levers 50. When the rods 146 are moved upwardly the springs of the brake mechanism of the motors are allowed to operate the disks 58 and apply the brakes to the flanges of the spindles. When the rods are moved downwardly the levers 50 are

acted upon to hold the members 58 in their upper non-braking position. The rods 146 are moved up and down by the operator by means of levers 160.

These levers 160 (see Figs. 9 and 10) are pivoted for swinging movement on pins 163 extending from block 164 affixed to the under side of the upper rail 14. Inner bifurcated ends 147 of the levers 160 partly surround the rods 146 between upper and lower collars 166 and 168 carried by the rods 146. Detents 170 in the rail have their lower ends projecting from the rail 14 and are spring pressed downwardly by springs 172. They are held against rotative movements by means of screws 174 which have their inner ends in slots 176 of the detents. Cam or pawl members 180 associated with each of the levers are arranged to bear on the spring pressed detents to force the detents inwardly accordingly as the levers 160 are swung between upper and lower positions. The ends of the detents are so arranged as to bear on the cams 180 to yieldingly hold the levers 160 at either their upper or lower position, all as shown more particularly in Fig. 10.

The parts are so arranged that there is an operating rod 146 for each pair. Likewise a rod operating lever 160 is provided for each rod 146 with the operating levers for adjacent pairs of spindles being disposed side by side between said pairs of spindles. With a lever 160 in its upper position the brake mechanisms for a pair of spindles are held out of frictional contact so that the spindles are free to rotate while the member 148 holds a switch 90 in an on position so that current is supplied to the motors. When a lever 160 is moved from its upper to its lower position a switch is moved to an off position and simultaneously therewith the brakes are applied to stop rotation of the motor spindles.

Longitudinally extending shafts 180 are rotatable above the uppermost spindles at either side of the machine and carry winding up drums 182. These drums may be covered with some more or less yieldable material such as rubber, cork or the like, the desirability of which will depend more or less upon the nature of the work being performed by the machine.

Cross bars 183 are carried by the upper ends of the previously described rods 146 and have upwardly extending rods 186 at their upper ends to which are secured arm members 188. These have slots 190 at the outer ends thereof which receive trunnions 192 of take-up spools 194.

As the rods 146 are raised and lowered the take-up spools 194 are moved towards and away from the rolls 182 by the arms 188. The covered cores are led from the upper guide 102 to and through guides 200 carried by traversing guide bars 202. These members 202 move back and forth to lead the covered core back and forth or from end to end of the take-up spools 194.

While the spindles are in operation for covering the core, it is desired that the take-up spools 194 rest on the drums 182 whereby they are rotated. The parts are so arranged that when the rods 146 are in their lower position the take-up spools will be allowed to rest on and be rotated by the drums. When, however, the rods 146 are elevated to move the switches to an off-position and to apply the brakes to the spindles the take-up spools are simultaneously moved away from the drum so that the rotation of the spool is arrested and the upward travel of the core is stopped.

The shafts 180 are driven by means of the mechanism now to be described. A motor 210 carried by frame 2 at the right hand of the machine has a worm 212 affixed to a shaft 214 thereof which meshes with worm gears 216 rotatable in a gear box 218. Idler gears 220 mesh with gears 222 and 224 associated with the gears 216 and with gears 230 on the ends of shafts 180. It will be noticed that the gear 222 is of different size than the gear 224. This is to illustrate that various gears may be employed so that the shafts 180 may be rotated at alike or different speeds.

The traversing bars 202 are reciprocated back and forth by means of the mechanism now to be described, with particular reference to Figs. 2 and 7.

One of the shafts 180 carries a gear 240 in mesh with the gear 242 rotatable on a stud 244. A pinion 246 associated with the gear 242 meshes with a gear 248 so as to rotate a shaft 250 journalled in a housing 252 which is carried by the frame 2 at the left-hand end of the machine.

Levers 260 are pivoted on a rod 262 of brackets 264 extending from the left-hand frame 2 and are provided with rolls 266. Springs 268 connected between the levers 260 and the members 264 urge the levers to the right so that the said rolls 266 ride upon the outer face of a cam 270 fixed to the shaft 250.

The rails previously mentioned are guided for reciprocating movements by means of guide rolls 280 carried by the frames and on their left-hand end carry rods 282 on which are adjustable members 286 having slots 288 in the lower ends thereof. Bolts 290 adjustable along said slots pass through similar slots in the upper ends of the levers 260. In this way the said levers are connected to the members 286 and as the levers 260 are oscillated back and forth by action of the cam the traverse bars 202 are also reciprocated back and forth for guiding the covered core to the take-up spool.

A shelf 290 extends along the machine at the upper side thereof and is suitably arranged for receiving take-up spools and other material.

In the operation of the apparatus as many pairs of the motor-driven spindles may be employed as may be desired. Each pair is independently operable so that various core-covering operations may be simultaneously carried on. And as has been explained, the take-up shaft 180 on one side of the machine may be driven at a different speed than that at the other side.

Core material is carried upwardly from the supply thereof through the tension devices 100 through the spindles and guides, and finally through the guides 200 on to the take-up spools. Spools of covering material are placed on the different spindles and strands thereof are led in each case through the travelers 122 and 126 Any one of the levers 160 may be moved from a lower inoperative position, thereby releasing the brakes and moving current supply switch to an on position and at the same time lowering the take-up spool on to the take-up drum. In this way the covering material is rotated by the spindle so as to be wrapped or served around the core in an even accurate manner. If for any reason it is desired to stop the operation of any particular pair of spindles the operating lever 160 associated with said spindles may be depressed to operate the switch to an off position, apply the brakes and elevate the take-up spools above the drum. In this way not only is the winding operation arrested, but an upward movement of the

core is likewise arrested so that in the case of breakage of either the core, or covering element, a minimum of material is wasted.

The guides 102 are oscillatable between guiding and non-guiding positions and are yieldingly held in either of said positions to facilitate easy manipulation of the core and covering elements preparatory to a winding operation. Likewise the levers 160 are yieldingly held in operative and inoperative positions and are readily movable from one position to another. The machine is characterized by independently operable units and is easily and readily manipulated according to the will of the operator.

The shafts 180 may be driven at any desired speed by selecting the proper gears. This is important because it is thereby possible to take up the covered core at any predetermined rate relative to the speed of the spindles. Therefore it is possible to apply the covering material at any desired number of turns per inch, all to the end that various effects may be brought about thus adapting the machine for the covering or serving of various materials with coverings of various kinds.

Having described the invention in the form at present preferred what I now desire to claim and secure by Letters Patent of the United States is:

1. The combination in a machine of the class described of, a housing and cap having a spindle rotatable therein, a brake disc on said spindle, a brake member slidable on a part of said cap towards and away from said disc, means to urge said member towards said disc, a lever acting on said member and yieldable means to hold said lever in operative and inoperative positions.

2. The combination in a machine of the class described of, a spindle rotatable on a vertical axis, brake mechanism associated therewith, a member for actuating the same, a rotatable take-up drum above said spindle, a rod slidable up and down, arms on the upper end of said rod provided with slots for receiving trunnions of a take-up spool and a lever for actuating said rod whereby the brake actuating member is moved up and down and the take-up spool is moved towards and away from said drum, means acting on said lever to yieldingly hold the same against movement.

3. The combination in a machine of the class described of, spindles rotatable on vertical axes, brake mechanism associated therewith, members for actuating the same, a rotatable take-up drum above said spindle, a rod slidable up and down, arms on the upper end of said rod provided with slots for receiving trunnions of a take-up spool and a lever for actuating said rod whereby the brake actuating members are moved up and down and the take-up spool is moved towards and away from said drum, means acting on said lever to yieldingly hold the same against movement.

4. The combination in a machine of the class described of, a spindle rotatable on a vertical axis, brake mechanism associated therewith having means for urging the same into braking engagement, a member to hold said braking mechanism against a braking action connected to a rod slidable up and down, a take-up drum above said spindle, spaced arms connected to said rod for rotatably supporting a take-up spool so that it may engage or move away from said drum as the rod is moved up or down and an operating lever for said rod, and means for yieldingly holding said lever against movement.

5. The combination in a machine of the class described of, a motor driven spindle, a switch included in a circuit to said motor, brake mechanism associated with said spindle, means urging the same into braking engagement, a lever to hold said mechanism out of braking engagement, an operating rod slidable up and down connected to said lever, a take-up drum, arms on said rod rotatably receiving a take-up spool for engaging said drum, a lever actuating said rod and means carried thereby for actuating said switch, all adapted and arranged whereby the said switch, brake mechanism and take-up spool are simultaneously acted upon accordingly as the rod is moved up or down.

6. The combination in a machine of the class described of, rotatable spindles one above the other, starting and stopping mechanism therefor including movable actuating parts, a rotatable take-up drum for contacting with a spool, a movable operating member for supporting a spool, connections between said member and actuating parts whereby the spool is moved towards and away from the drum and the actuating member is moved as the operating member is moved.

7. The combination in a machine of the class described of, a spindle rotatable on a vertical axis, brake mechanism associated therewith, a member for actuating the same, a winding up drum above said spindle, a reciprocable rod, connections between said rod and member whereby the latter is actuated by the former, means on said rod for supporting a take-up spool adapted and arranged to move said spool towards and away from said drum, means to yieldingly hold the actuating parts in certain positions and means to hold said operating member in certain positions.

8. A machine for successively applying helical windings of yarn to a core comprising in combination, a pair of hollow spindles, independent means for rapidly rotating each of said hollow spindles at a predetermined number of revolutions and in opposite directions, means for drawing a core to be covered successively through each of said hollow spindles, independent brake means each including an operating member for quickly stopping the rotation of each hollow spindle, and means for controlling the operation of the machine acting on said operating members whereby the drawing of the core through the pair of hollow spindles and the rotation of the hollow spindles may be substantially simultaneously started or stopped.

9. A machine for successively applying helical windings of yarn to a core comprising in combination, a pair of hollow spindles, independent means for rapidly rotating each of said hollow spindles at a predetermined number of revolutions and in opposite directions, means for drawing a core to be covered successively through each of said hollow spindles, independent brake means each including an operating member for quickly stopping the rotation of each hollow spindle, and means for controlling the operation of the machine acting on said operating members whereby the drawing of the core through the pair of hollow spindles and the rotation of the hollow spindles may be substantially simultaneously started or stopped, said hollow spindles being each constructed to receive hollow yarn packages adjacent an end thereof.

10. A machine for successively applying helical windings of yarn to a core comprising in combination, a pair of hollow spindles, independent means for rapidly rotating each of said hollow spindles

at a predetermined number of revolutions and in opposite directions, means for drawing a core to be covered successively through each of said hollow spindles, independent brake means each including an operating member for quickly stopping the rotation of each hollow spindle, and means for controlling the operation of the machine acting on said operating members whereby the drawing of the core through the pair of hollow spindles and the rotation of the hollow spindles may be substantially simultaneously started or stopped, said means for drawing a core through the spindles being constructed to move the core at a substantially uniform rate.

11. A machine for successively applying helical windings of yarn to a core comprising in combination, a pair of hollow spindles, independent means for rapidly rotating each of said hollow spindles at a predetermined number of revolutions and in opposite directions, means for drawing a core to be covered successively through each of said hollow spindles, independent brake means each including an operating member for quickly stopping the rotation of each hollow spindle, and means for controlling the operation of the machine acting on said operating members whereby the drawing of the core through the pair of hollow spindles and the rotation of the hollow spindles may be substantially simultaneously started or stopped, said hollow spindles being disposed in approximate axial alignment, and a guide located in close proximity to the delivery end of each hollow spindle.

12. A machine for successively applying helical windings of yarn to a core comprising in combination, a pair of hollow spindles, independent means for rapidly rotating each of said hollow spindles at a predetermined number of revolutions and in opposite directions, means for drawing a core to be covered successively through each of said hollow spindles, independent brake means for quickly stopping the rotation of each hollow spindle, and means for controlling the operation of the machine whereby the drawing of the core through the pair of hollow spindles and the rotation of the hollow spindles may be substantially simultaneously started or stopped, said hollow spindles being disposed in approximate axial alignment, a guide substantially coaxial with said hollow spindles in close proximity to the delivery end thereof, and means permitting said guides to be shifted to a non-axial position.

13. In a machine for helically winding yarn about a core, a winding unit comprising in combination, a hollow spindle, an electric motor for rotating said hollow spindle the rotor of which motor is carried by the hollow spindle adjacent one end thereof, the hollow spindle having an end projecting beyond the motor upon which a yarn package may be mounted, a stationary traveler ring and traveler located in proximity to the end of said hollow spindle remote from said electric motor, said electric motor having a housing for substantially completely enclosing it, means for drawing the core through the hollow spindle at a substantially uniform rate, and braking mechanism for quickly stopping the rotation of the hollow spindle comprising a rotating element secured to the hollow spindle and a shoe element secured against rotation to said housing but shiftable relative thereto for engagement with said rotating element, and means for shifting the shoe element to halt the operation of the hollow spindle.

14. In a machine for helically winding yarn about a core, a winding unit comprising in combination, a hollow spindle, an electric motor for rotating said hollow spindle the rotor of which motor is carried by the hollow spindle adjacent one end thereof, the hollow spindle having an end projecting beyond the motor upon which a yarn package may be mounted, a stationary traveler ring and traveler located in proximity to the end of said hollow spindle remote from said electric motor, said electric motor having a housing for substantially completely enclosing it, means for drawing the core through the hollow spindle at a substantially uniform rate, and braking mechanism for quickly stopping the rotation of the hollow spindle comprising a rotating element secured to the hollow spindle and a shoe element secured against rotation to said housing but shiftable relative thereto for engagement with said rotating element, and means for shifting the shoe element to halt the operation of the hollow spindle, said rotating element and said shoe element being disposed concentrically of the axis of said hollow spindle.

15. In a machine for helically winding yarn about a core, a winding unit comprising in combination, a hollow spindle, an electric motor for rotating said hollow spindle, a rotor of which motor is carried by the hollow spindle adjacent one end thereof, the hollow spindle having an end projecting beyond the motor upon which a yarn package may be mounted, a stationary traveler ring and traveler located in proximity to the end of said hollow spindle remote from said electric motor, said electric motor having a housing for substantially completely enclosing it, means for drawing the core through the hollow spindle at a substantially uniform rate, and braking mechanism for quickly stopping the rotation of the hollow spindle comprising an element non-rotatable relative to spindle and a shoe element non-rotatable relative to said housing, the said elements being relatively shiftable into and out of braking engagement and means for shifting the same to halt the operation of the spindle and to permit it to operate.

16. The combination in a machine of the class described of, a housing enclosing a motor, a spindle rotated by said motor, a brake element on said spindle, a cooperating brake element non-rotatable on said housing and slidable towards and away from said first-named element, means to urge the same towards said first-named element, a member acting on said second-named brake element in opposition to said means for urging the same towards the other element.

17. The combination in a machine of the class described of, a housing enclosing a motor, a spindle rotated by said motor, a brake element on said spindle, a cooperating brake element non-rotatable on said housing and slidable towards and away from said first-named element, means to urge the same towards said first-named element, a member acting on said second-named brake element in opposition to said means urging the same towards the other element and means to hold said member in operative and inoperative positions.

18. The combination in a machine of the class described of, a spindle rotatable on a certain axis, brake mechanism associated therewith, a member for actuating the same, a movable operating member, means thereon for rotatably receiving a take-up spool, a take-up drum, a member for actuating said operating member whereby the brake actuating member is operated and the

take-up spool is moved towards and away from said drum accordingly as the operating member is moved.

19. The combination in a machine of the class described of, a spindle rotatable on a certain axis, brake mechanism associated therewith, a member for actuating the same, a movable operating member, means thereon for rotatably receiving a take-up spool, a take-up drum, a member for actuating said operating member whereby the brake actuating member is operated and the take-up spool is moved towards and away from said drum accordingly as the operating member is moved and means yieldingly holding the operating member against movement.

20. In a machine for helically winding yarn about a core, a winding unit comprising in combination, a hollow spindle, an electric motor for rotating said hollow spindle the rotor of which is associated with an end portion of said spindle, the hollow spindle having an end projecting beyond the motor upon which a yarn package may be mounted, means for drawing a core through said spindle at a substantially uniform rate, a core guide located in close proximity to the delivery end of said hollow spindle, annular guideways adjacent the delivery end of the spindle and travelers movable therearound for guiding yarn from a package on said spindle onto a core at a point between said core guide and the delivery end of said spindle.

21. In a machine for helically winding yarn about a core, a winding unit comprising in combination, a hollow spindle, an electric motor for rotating said hollow spindle the rotor of which is associated with an end portion of said spindle, the hollow spindle having an end projecting beyond the motor upon which a yarn package may be mounted, means for drawing a core through said spindle at a substantially uniform rate, a core guide located in close proximity to the delivery end of said hollow spindle, annular guideways adjacent the delivery end of the spindle and travelers movable therearound for guiding yarn from a package on said spindle onto a core at a point between said core guide and the delivery end of said spindle, the said guideways being located adjacent the delivery end of the spindle and a yarn package on said spindle.

22. In a machine for helically winding yarn about a core, a winding unit comprising in combination, a hollow spindle, an electric motor for rotating said hollow spindle the rotor of which is associated with an end portion of said spindle, the hollow spindle having an end projecting beyond the motor upon which a yarn package may be mounted, means for drawing a core through said spindle at a substantially uniform rate, a core guide located in close proximity to the delivery end of said hollow spindle, annular guideways adjacent the delivery end of the spindle and travelers movable therearound for guiding yarn from a package on said spindle onto a core at a point between said core guide and the delivery end of said spindle, the said guideways being of relatively different diameters.

23. In a machine for helically winding yarn about a core, a winding unit comprising in combination, a hollow spindle, an electric motor for rotating said hollow spindle the rotor of which is associated with an end portion of said spindle, the hollow spindle having an end projecting beyond the motor upon which a yarn package may be mounted, means for drawing a core through said spindle at a substantially uniform rate, a core guide located in close proximity to the delivery end of said hollow spindle, annular guideways adjacent the delivery end of the spindle and travelers movable therearound for guiding yarn from a package on said spindle onto a core at a point between said core guide and the delivery end of said spindle, the said guideways being disposed one above the other and being of relatively different diameters.

24. In a machine for helically winding yarn about a core, a winding unit comprising in combination, a hollow spindle, an electric motor for rotating said hollow spindle the rotor of which is associated with an end portion of said spindle, the hollow spindle having an end projecting beyond the motor upon which a yarn package may be mounted, means for drawing a core through said spindle at a substantially uniform rate, a core guide located in close proximity to the delivery end of said hollow spindle, annular guideways adjacent the delivery end of the spindle and travelers movable therearound for guiding yarn from a package on said spindle onto a core at a point between said core guide and the delivery end of said spindle, the said guideways being disposed one above the other and the upper one being of less diameter than the lower one.

25. In a machine for helically winding yarn about a core, a winding unit comprising in combination, a hollow spindle, an electric motor for rotating said hollow spindle the rotor of which is associated with an end portion of said spindle, the hollow spindle having an end projecting beyond the motor upon which a yarn package may be mounted, means for drawing a core through said spindle at a substantially uniform rate, a core guide located in close proximity to the delivery end of said hollow spindle, annular guideways adjacent the delivery end of the spindle and travelers movable therearound for guiding yarn from a package on said spindle onto a core at a point between said core guide and the delivery end of said spindle, the said guideways being of relatively different diameter and one being rotatable with said spindle and the other being non-rotatable with respect thereto.

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