Nov. 24, 1959 J. A. MEANS 2,914,267

PAPER WINDING APPARATUS

Filed Aug. 6, 1956 6 Sheets-Sheet 1

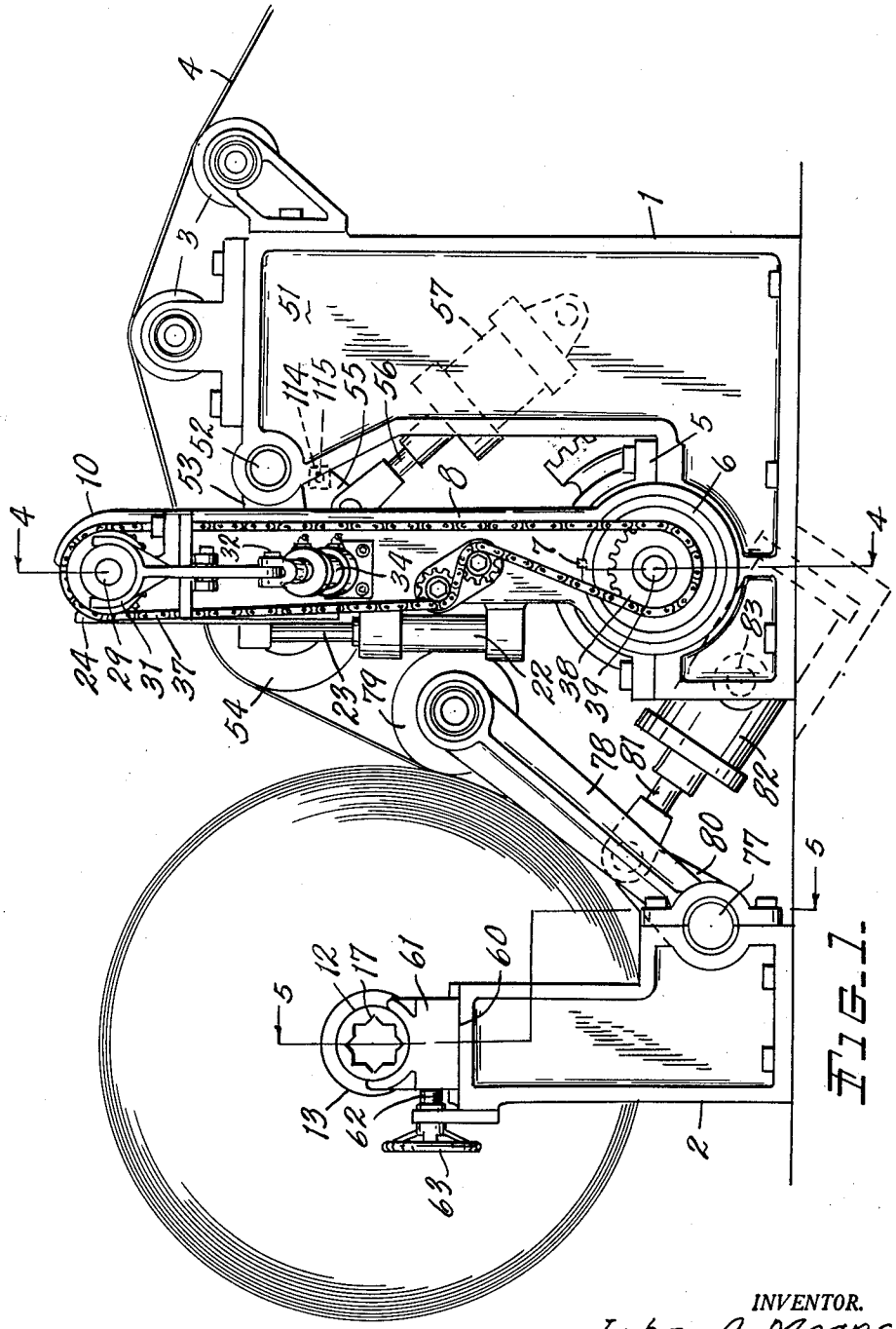


FIG. 1.

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PAPER WINDING APPARATUS

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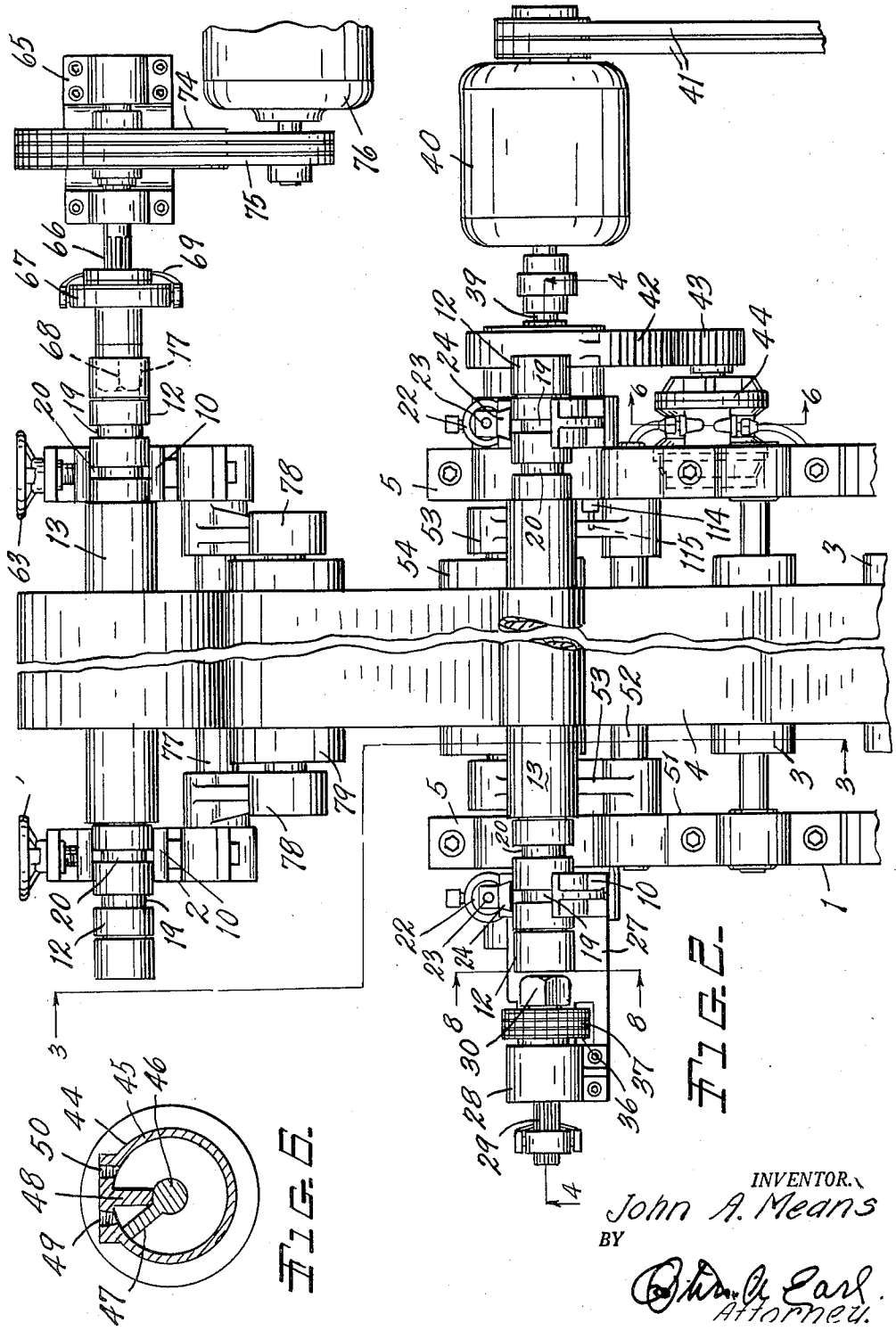


FIG. 2.

FIG. 5.

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Nov. 24, 1959 J. A. MEANS 2,914,267

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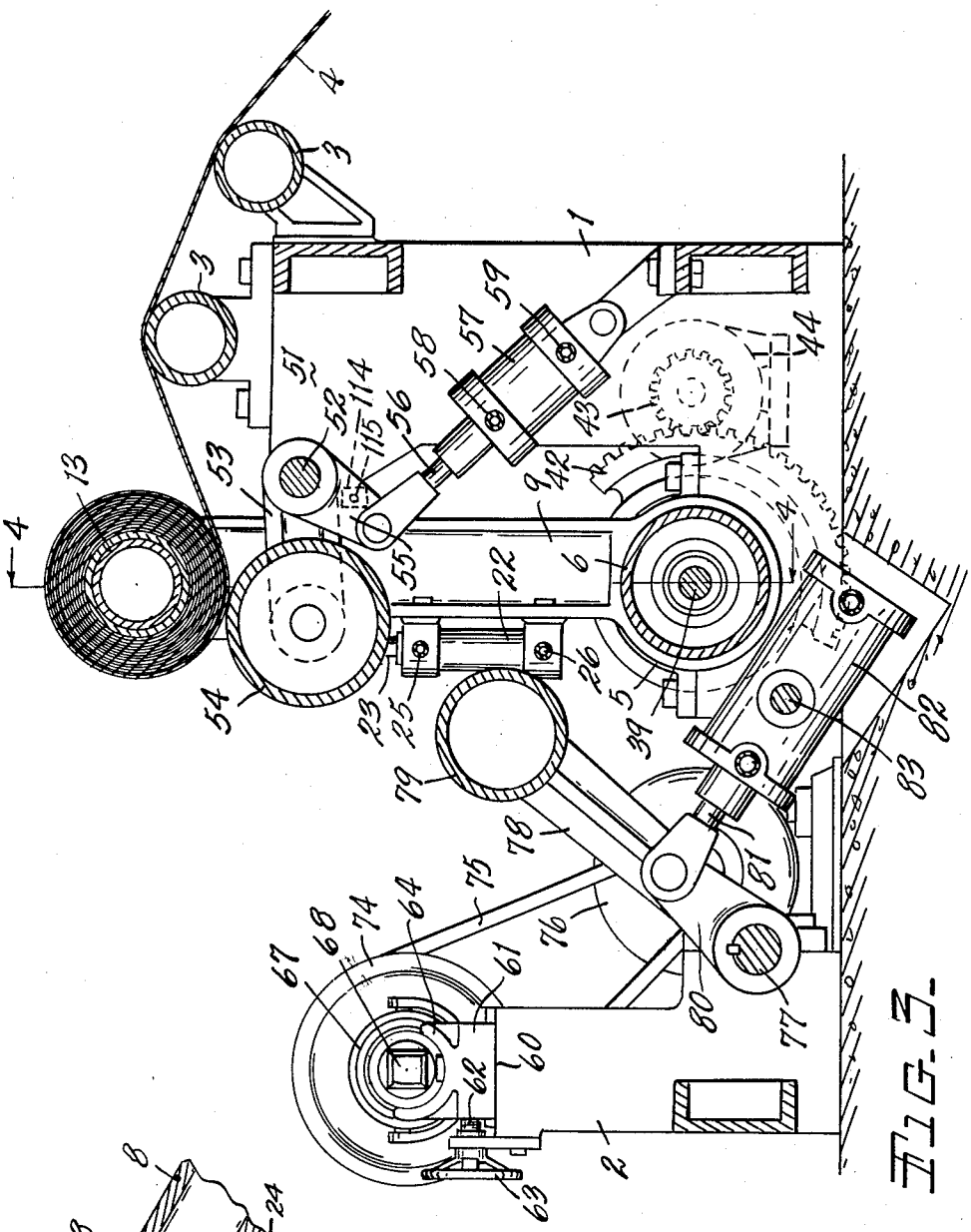


FIG. 3.

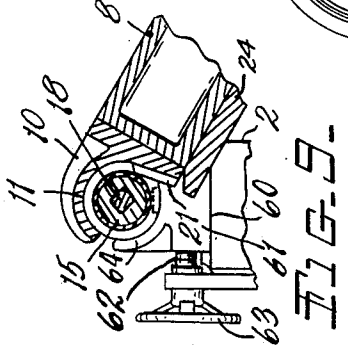


FIG. 5.

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PAPER WINDING APPARATUS

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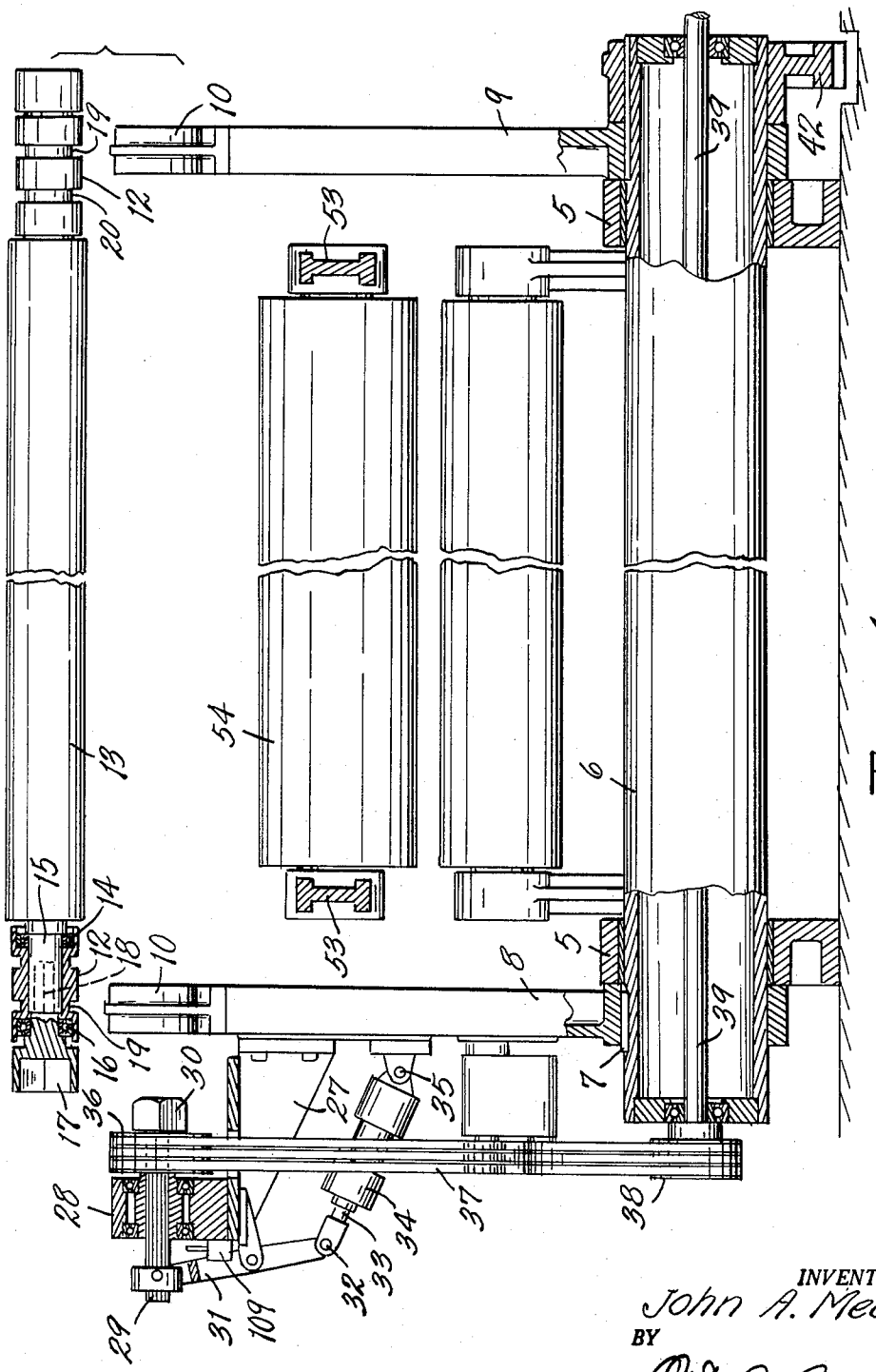


FIG. 4.

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Nov. 24, 1959 J. A. MEANS 2,914,267

PAPER WINDING APPARATUS

Filed Aug. 6, 1956 6 Sheets-Sheet 5

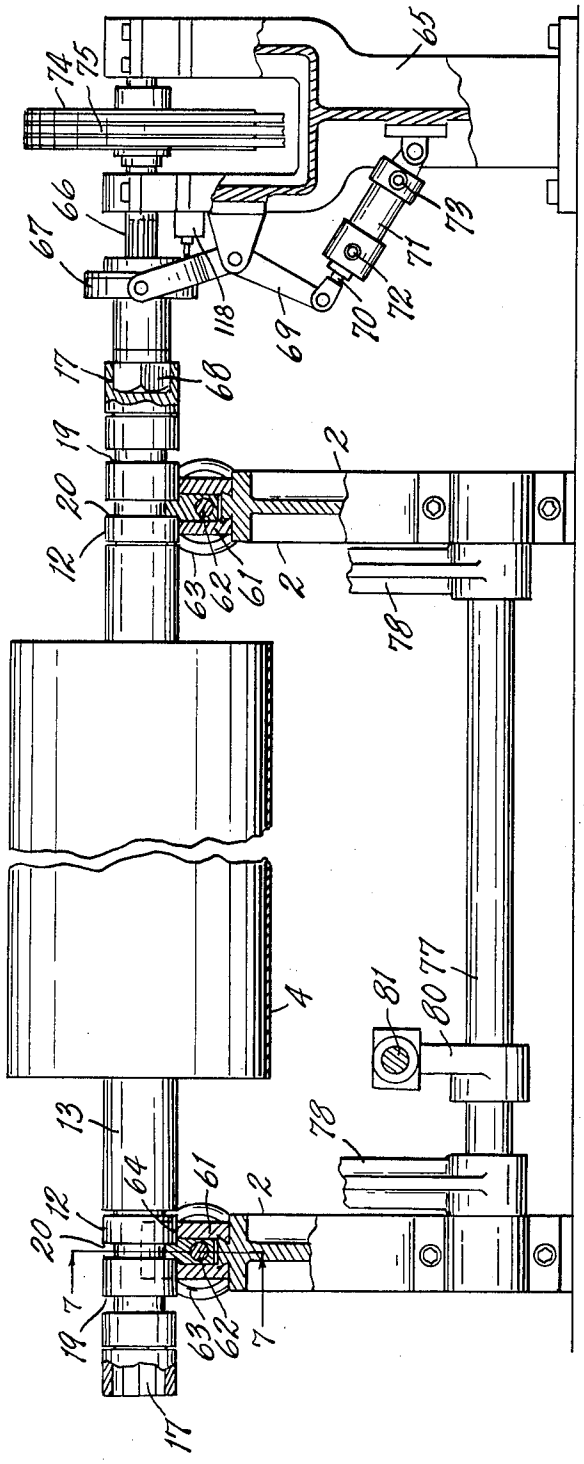


FIG. 5.

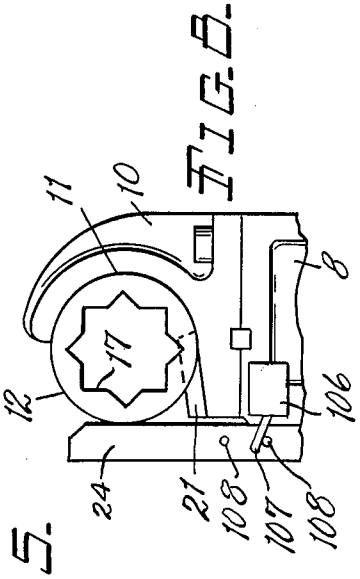


FIG. 6.

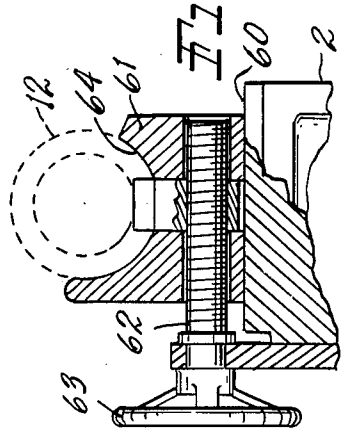


FIG. 7.

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PAPER WINDING APPARATUS

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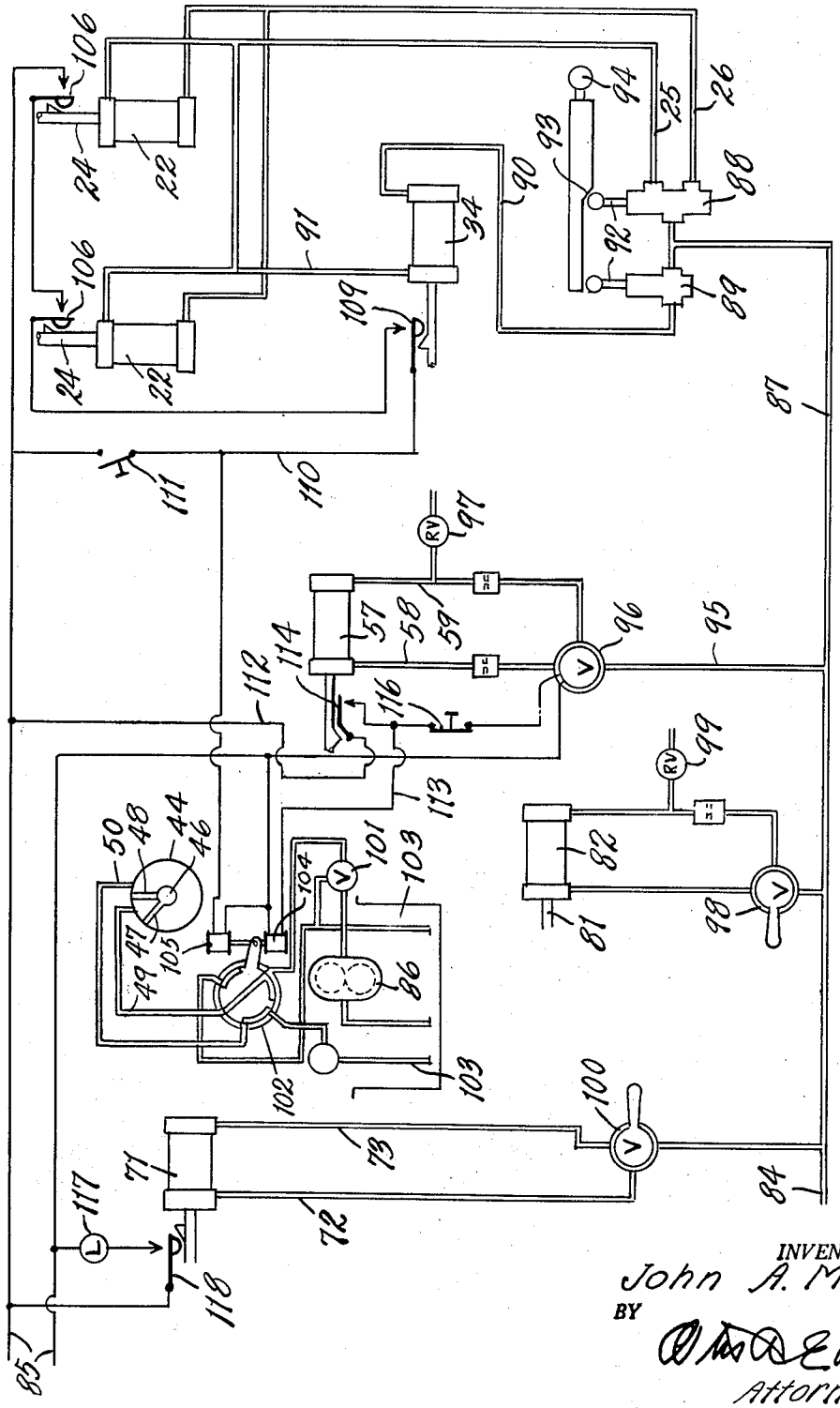


FIG. 10.

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Patented Nov. 24, 1959

2,914,267

PAPER WINDING APPARATUS

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Application August 6, 1956, Serial No. 602,263

9 Claims. (Cl. 242—67.1)

This invention relates to improvements in paper winding apparatus. The principal objects of this invention are:

First, to provide paper winding apparatus that will continuously wind and accumulate a continuous web of paper and transfer the incoming web from a full roll to a new roll when the full roll has reached the desired size.

Second, to provide a paper winding apparatus adapted to shift a partially completed roll of paper to a secondary winding position without interrupting the winding operation to permit the insertion of an empty spool or core shaft in the primary position preparatory to transferring the incoming web from the full roll to the empty spool.

Third, to provide paper winding apparatus having primary and secondary winding positions in which the spool or core of the roll of paper being wound is at all times driven from one end of the core or the other as distinguished from being frictionally rotated from the periphery of the roll being formed.

Fourth, to provide paper winding apparatus in which a paper roll driven from its supporting core functions to provide the necessary tension for drawing in the web of paper and in which pressure rolls coacting with the roll of paper maintain a constant pressure on the roll being formed.

Fifth, to provide a paper rolling machine in which the transfer of a partially formed roll to a secondary winding position for completion of the roll is automatically performed in response to increase in size of the partially formed roll to a predetermined size and in which the transfer mechanism for the roll is automatically returned to a starting position to receive an empty spool or core shaft.

Sixth, to provide a paper winding apparatus having the foregoing features which is relatively simple and inexpensive to construct having in mind the weights of the rolls of paper to be formed.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims. The drawings, of which there are six sheets, illustrate a highly practical form of the paper winding aparatus.

Fig. 1 is a side elevational view illustrating the apparatus near the completion of a full roll of paper and prior to the transfer of the incoming web to a new roll.

Fig. 2 is a fragmentary plan view of the apparatus showing the drive connections to the several parts thereof.

Fig. 3 is a longitudinal cross sectional view taken along the plane of the line 3—3 in Fig. 2 but illustrating the apparatus during the preliminary formation of a new roll of paper.

Fig. 4 is a fragmentary transverse cross sectional view taken along the plane of the line 4—4 in Figs. 1, 2 and 3 and illustrating the apparatus prior to the installation of a new spool or core shaft therein.

Fig. 5 is a transverse elevational view of the secondary winding position and mechanism of the apparatus partially broken away in cross section along the plane of the line 5—5 in Fig. 1.

Fig. 6 is a fragmentary cross sectional view through the motor for transferring the roll being formed from primary to secondary winding positions and taken along the plane of the line 6—6 in Fig. 2.

Fig. 7 is a fragmentary cross sectional view through the support for the roll in its secondary winding position, the view being taken along the plane of the line 7—7 in Fig. 5.

Fig. 8 is a fragmentary end elevational view of the structure for supporting the roll in primary winding position, the view being taken along the plane of the line 8—8 in Fig. 2.

Fig. 9 is a fragmentary cross sectional view illustrating the position of the parts of the apparatus in transferring the roll from primary to secondary positions.

Fig. 10 is a schematic wiring and piping diagram conventionally illustrating the electrical and fluid operated control connections to the several parts of the apparatus.

As is best illustrated in Fig. 1 the apparatus consists of a primary supporting frame 1 and a secondary supporting frame 2 positioned rearwardly therefrom. The primary supporting frame 1 supports guide rolls 3 for directing a continuous incoming web of paper 4 to the primary and secondary winding positions of the apparatus.

Primary winding structure

The primary frame 1 supports transversely aligned bearings 5 at a relatively low level on the supporting frame and these bearings rotatably support a hollow rock shaft 6. Secured to the end of the hollow rock shaft as by the keys 7 are a pair of radially extending arms 8 and 9. The upper swinging ends of the arms are provided with fixtures 10 that define rearwardly opening spool seats 11 (see Fig. 9). The seats 11 are adapted to supportingly receive and engage cylindrical spools 12 on the ends of heavy core shafts 13 on which the rolls of paper are to be wound. Mounted interiorly of the spools 12 are inner roller bearings 14 (see Fig. 4) that rotatably receive and support the journal portions 15 on the core shaft. Other bearings 16 at the outer ends of the spools rotatably support chambered clutch head 17 that has a squared or non-circular inner neck 18 projecting into driving engagement with the journal 15 of the core shaft. The spools 12 have external annular grooves 19 and 20 and the spool seats 11 have central ribs 21 that register with the longitudinal outer grooves 19 in the spools.

Mounted on the rear sides of the arms 8 and 9 are a pair of fluid actuated cylinders 22 having piston rods 23 that project upwardly along side of the arms and function to reciprocate flat slides or gates 24 partially across the open side of the seats 11 to retain the spools 12 and the core shaft 13 on the seats. The cylinders 22 are connected by means of hoses or conduits 25 and 26 to a source of fluid pressure and control valves as will be described in greater detail presently.

In order to positively rotate or drive the core shaft 13 supported on the seats 11 the front arm 8 as viewed in Fig. 1 is provided with a forwardly projecting bracket 27 on which is supported a bearing 28 arranged coaxially with the spool seats 11. Rotatably and axially slidably mounted in the bearing 28 is a clutch shaft 29 having a squared or non-circular clutch head 30 adapted to be received and drivingly engaged in the recess 17 of the clutch head on the core shaft 13. A lever 31 pivoted on the bracket 27 and connected to the clutch shaft 29 has its lower end pivotally connected at 32 to the piston rod 33 of a fluid actuated cylinder 34. The cylinder 34 is swingably mounted on the arm 8 by the pivot 35 (see Fig. 4) and functions to engage and disengage the clutch

head 30 with the clutch head 17 regardless of the position of the arm 8. A sprocket 36 slidably but non-rotatably connected to the clutch shaft 29 is connected by drive chains 37 to a sprocket 38 on the end of a drive shaft 39 that extends rotatably through the center of the hollow rock shaft 6. The shaft 39 projects from the opposite end of the rock shaft and is connected by a magnetic clutch or other variable speed drive connection 40 to a source of power such as the chains 41 from a motor. The core shaft 13 swingably supported on the arms 8 and 9 can thus be rotated at controlled speeds in any inclined position of the arms 8 and 9.

In order to oscillate the arms 8 and 9 from the upright primary position illustrated in Fig. 1 the back or far end of the hollow rock shaft is provided with a gear sector 42 non-rotatably connected to the rock shaft and drivingly meshed with a pinion 43 on a hydraulically operated motor 44. The motor 44 is mounted on and anchored to the supporting frame 1 and is of the type designed to provide reciprocating rotary movement through angles of less than 360°. As is conventionally illustrated in Fig. 6 this type of motor consists of a cylindrical housing 45 in which a shaft 46 and movable vane 47 are rotatably mounted. A fixed vane 48 extends between the wall of the casing and the shaft to divide the motor chamber into two compartments on opposite sides of the moveable vane 47. Fluid inlet connections 49 and 50 on opposite sides of the fixed vane selectively admit hydraulic or other fluid under pressure to rotate the shaft 46 a limited distance under extremely high torque. The fluid connections 49 and 50 are connected to control and supply connections as will be described in greater detail presently. It will be seen that rotation of the shaft 46 of the motor 44 will cause the arms 8 and 9 to swing in an arc between the rearwardly inclined positions shown in Fig. 9 and the upright position shown in the other figures.

In order to maintain the incoming web of paper 4 in winding connection with the core shaft 13 and to maintain constant pressure on the outside of the roll being formed, the elevated portion 51 of the supporting frame 1 carries a rock shaft 52 from which arms 53 project to swingably and rotatably support a pressure or rider roll 54. A crank 55 on the rock shaft is connected to the piston rod 56 of a fluid actuated cylinder 57 pivoted to the supporting frame. Fluid under pressure may be admitted to opposite ends of the cylinder 57 through conduits 58 and 59 to selectively raise or lower the pressure roll 54 relative to the core shaft 13 and the roll of paper being formed thereon. The control of the cylinder 57 will be described in greater detail presently.

Secondary winding position

The secondary supporting frame 2 is provided with two elevated seats 60 on which the bearing blocks 61 are slidable longitudinally of the apparatus and toward and away from the primary supporting frame 1. Screws 62 operated by the hand wheels 63 function to adjust the positions of the bearing blocks 61. The bearing blocks 61 at opposite sides of the apparatus are provided with upwardly opening segmental spool seats 64. The spool seats 64 are spaced transversely closer together than the spool seats 11 on the arms 8 and 9 and so are arranged to receive the longitudinally inner ends of the spools 12 on the core shaft 13 as the shaft is swung in an arc from the upright primary winding position rearwardly to the secondary spool seats. Adjustment of screws 62 accurately registers the secondary spool seats 64 with the position of the spools as they are released from the primary spool seats 11 by retraction of the gate slides 24 as appears most clearly in Fig. 9. In order to continue driving of the core shaft 13 while supported at the secondary winding position and after the arms 8 and 9 have been retracted to upright position a secondary drive mechanism is set up at the opposite end of the secondary winding position from the driving end of the primary winding apparatus. As appears most clearly in Figs. 2 and 5 this secondary driving apparatus consists of a pedestal 65 supporting a spline shaft 66 coaxially with the seats 64. A sleeve 67 drivingly and slidably mounted on the shaft 66 is provided with a squared clutch head 68 adapted to be drivingly received and engaged in the recessed clutch head 17 at the opposite end of the core shaft from the primary winding clutch 30. The sleeve 67 and clutch head 68 are actuated by a lever 69 operated by the piston rod 70 of a fluid actuated cylinder 71. Operation of the cylinder 71 is controlled through supply conduits 72 and 73 as will be described later. A drive sprocket or pulley 74 on the shaft 66 is connected by chains 75 to a secondary driving motor 76 or other adjustable speed mechanism which can be synchronized with the drive speed of the primary drive connection 41.

In order to continue the external pressure on the surface of the roll being formed the secondary support frame 2 carries a rock shaft 77 having arms 78 projecting therefrom and supporting a second pressure or rider roll 79. A crank 80 on the rock shaft is connected to the piston rod 81 of another fluid actuated cylinder 82 swingably supported at 83 on the primary supporting frame. Actuation of the cylinder 82 by the control connections, to be described, functions to raise or lower the pressure roll 79 relative to the roll of paper being formed at the secondary winding position. The cycle and mode of operation of the apparatus will be discussed in connection with the control apparatus of the winding mechanism.

Controls and cycle of operation

Control of the winding apparatus is obtained by pneumatic or other fluid pressure connections and electrical connections appearing most clearly in the conventional diagram in Fig. 10. A source of compressed air is indicated at 84 and a source of electrical energy is indicated at 85. A hydraulic pump is indicated at 86 for supplying hydraulic pressure to the reciprocating rotary motor 44. Compressed air is directed through the conduit 87 to a valve 88 that alternately admits air to the pipes 25 and 26 for reversely actuating the cylinders 22 that open and close the gate slides 24. The pipe 87 also supplies a valve 89 that delivers through the pipe 90 to the cylinder 34 for engaging the primary drive clutch 30. Retraction or disengagement of the drive clutch 30 is effected by air directed through the pipe 91 from the pipe 25 that delivers air for retracting the gate slides. The actuating members 92 of the valves 88 and 89 are positioned to be successively actuated by the cam 93 on a manually operable control slide 94. The slide 94 first actuates the valve 88 to admit pressure to the pipe 26 and close the gate slides after which the valve 89 is actuated to engage the primary clutch. The valves are reversely actuated in opposite sequence when the control 94 is retracted.

Air is also supplied through the pipe 95 to a magnetically operated valve 96 that delivers air alternately to the pipes 58 and 59 for reversely actuating the cylinder 57 and raising and lowering the first pressure roll 54. Pressure in the pipe 59 that holds the pressure roll elevated against the roll of paper being formed at the primary winding position is regulated to a predetermined constant amount by the pressure regulating exhaust valve 97. The pressure roll 54 will thus maintain a uniform pressure against the new roll of paper while descending as the size of the paper roll increases.

The second pressure roll 79 is manually regulated by a valve 98 that controls the delivery of air to the opposite ends of the cylinder 82. A pressure relief valve 99 predetermines the pressure with which the second pressure roll engages the roll of paper at the secondary winding position on the secondary support frame 2. The secondary pressure roll is normally not adjusted during op-

eration of the winding apparatus except as it is retracted by the increasing size of the paper roll.

The secondary drive clutch member **68** and its actuating cylinder **71** are controlled by a manually operable valve **100** that directs air alternatively to the pipes **72** and **73** to engage and disengage the clutch. Control of the secondary clutch is manual because the operation of transferring the incoming web from a full roll at the secondary position to a new roll at the primary winding position requires the attendance and action of an operator to cut the web as it is delivered to the full roll. Disengagement of the secondary drive clutch is manually effected after the transfer of the web to the new roll.

The hydraulic pump **86** delivers through a pressure relief valve **101** to a fourway valve **102**. The valve **102** delivers alternatively to the connections **49** and **50** of the motor **44** and vents the unsupplied connection to return pipes **103** that return hydraulic fluid to the sump of the pump. The valve **102** has oppositely operating solenoids conventionally illustrated at **104** and **105** to shift the valve between its opposite positions. Once in either position the valve will remain in its adjusted position until the oppositely operating solenoid is energized.

Carried by the arms **8** and **9** are a pair of limit switches **106** (see Figs. 8 and 10) having actuating levers **107** positioned to be engaged and moved by pins **108** on the gate slides **24**. The switches **106** are connected in electrical series with a switch **109** mounted on the bearing blocks **28** (see Fig. 4) adjacent to the primary clutch operating lever **31** and arranged to be closed when the primary clutch **30** is disengaged. The series connected switches **106** and **109** forming energizing circuit **110** to the solenoid **105** that actuates the valve **102** to admit hydraulic pressure to the pipe **50** and actuate the hydraulic motor **44** to raise the arms **8** and **9** to primary winding position. It will thus be noted that the arms cannot be elevated and moved away from the secondary winding position until the gate slides **24** and the primary drive clutch **30** are disengaged so that retracting motion of the arms will not interfere with continued rotation and support of a core shaft at the secondary winding position. A normally open manually controlled push button switch **111** is connected to the circuit **110** to selectively effect elevation of the arms **8** and **9** independently of the position of the gate slides if desired.

A second energizing circuit **112** is connected by a branch conductor **113** to the opposite solenoid **104** of the valve **102** to initiate downward swinging motion of the arms and the partially completed roll of paper. The circuit **112** is also connected to the solenoid operated valve **96** that regulates the position of the first pressure roll **54**. In the deenergizing position of the circuit **112** and the valve **96**, the valve is positioned to admit air to the pipe **59** and hold the pressure roll in elevated position. The second energizing circuit **112** is controlled by an automatically operated limit switch **114** that is positioned on one of the primary support frames as shown in Figs. 2 and 3 with its actuating lever **115** in the path of the supporting arms **53** for the primary pressure roll. The switch **114** is closed when the increasing size of the roll of paper being formed depresses the pressure roll and the arms **53** a predetermined distance to engage the lever **115**. Closing of the switch **114** causes the valve **96** to be shifted to actuate the cylinder **57** to further lower the primary pressure roll to the lower limit of its movement. Once lowered the primary pressure roll thus tends to remain in its lowered position. In order to effect elevation of the primary pressure roll to operative position a normally closed manually open push button switch **116** is connected in series in the energizing circuit **112**.

A signal light **117** is connected across the electrical source through a limit switch **118** positioned on the pedestal **65** (see Figs. 5 and 10) and arranged to be opened by movement of the secondary clutch operating lever **69** to clutch engaging position. The signal **117** thus indicates to the operator when the secondary drive clutch is in operation and when it will be safe to disengage the primary drive clutch by actuation of the valve control member **94**.

Starting with the winding apparatus in empty condition and with an empty core shaft in the primary seats **11** and with the arms **8** and **9** elevated to primary winding position the cycle of operation of the machine is as follows. The manual valve control **94** will be in retracted position shown in Fig. 10 and the gate slides **24** will be in retracted open position. The primary drive clutch **30** will be disengaged and the primary pressure roll **54** will be lowered. The operator first moves the manual control **94** to actuate the valve **88** to close the gate slides on the core shaft in the primary shaft seats. Further actuation of the control **94** operates the valve **89** and cylinder **34** to engage the primary drive clutch **30**. The series switches **106** and **109** are then open so the valve **102** and rotary motor **44** remain in a condition to hold the arms and core shaft elevated. After the core shaft is retained on the primary seats by closing of the gate slides **24**, the operator momentarily opens the switch **116** conditioning the valve **96** and cylinder **57** to elevate the primary pressure roll into contacting relation with the core shaft. The pressure roll rotates by friction from the core shaft that is being driven by the primary clutch and the leading edge of the web of paper is fed into the nip between the core shaft and the pressure roll to start the formation of the new roll of paper on the core shaft.

As the new roll of paper is being built up the operator may check manual valves **98** and **100** to see that the secondary pressure roll is in elevated position and that the secondary clutch **68** is in retracted position. As the increasing size of the new roll of paper depresses the primary pressure roll a predetermined distance, for example 9 or 10 inches, the arm **53** contacts and actuates the limit switch **114** to energize the circuit **112** and the solenoid valve **96** so that the pressure roll roves to its lower most position and so that the branch circuit **113** to the solenoid **104** is energized. Solenoid **104** moves the valve **102** to reverse the delivery of hydraulic fluid from the pump **86** to the opposite side of the rotary motor **44** and the arms **8** and **9** with the new roll of paper still being wound thereon are tilted rearwardly and downwardly until the sleeves on the core shaft are supported in the secondary winding seats **64** as shown in Fig. 9. In moving past the elevated secondary pressure roll **79** the new roll of paper simply presses the secondary pressure roll against the regulated pressure in the cylinder **82**.

The roll of paper will remain supported by both sets of seats and driven through the primary clutch **30** until the operator engages the secondary clutch **68** by operation of the manual valve **100**. After the signal lamp **117** indicates engagement of the secondary driving clutch, the operator can retract the manual valve control **94** to first disengage the primary clutch **30** and thereafter retract the gate slides **24**. The primary seats **11** and the arms **8** and **9** are then free of the core shaft and automatic closing of the series switches **106** and **109** completes the energizing circuit **110** to the solenoid **105** that moves the valve **102** to reverse the rotation of hydraulic motor **44** and reelevate the now empty arms **8** and **9**. The roll of paper continues to build up at the secondary winding position and the primary support seats **11** are ready for the installation of a second core shaft to start a second cycle.

Transfer of the incoming web from the first roll to a second roll can be accomplished without interrupting the feed of the incoming web. After the second shaft is installed on the arms **8** and **9** the primary pressure roll **54** can be raised into contacting relation with the shaft as previously described with the moving web of paper traveling uninterrupted between the new shaft and the primary pressure roll to the first roll still being formed. The operator has only to break the web between the pri-

mary and secondary rolls as by an air blast directed edgewise across the taut reach of the web and the free end of the web will wrap quickly around the second core shaft and immediately start to build up a second roll. After the web is severed the secondary drive to the first roll can be disconnected by operation of the valve **100** and the first roll which is large and heavy can be removed from the secondary seats **64** by a crane to ready the apparatus for a second transfer of a roll from primary to secondary winding positions.

Having thus described the invention, what is claimed as new and is desired to be secured by Letters Patent is:

1. In a paper winding machine, support members rotatably supporting a rock shaft, a gear sector connected to said rock shaft, means connected to oscillate said rock shaft, arms connected to said rock shaft to be oscillated thereby between an upright forward position and a rearwardly inclined position, seats formed on the tops of said arms and open at the rear sides thereof, and having the ends of a core shaft rotatably mounted therein, clutch elements on the ends of said core shaft, gate slides slidable on said arms across the open rear sides of said seats to retain said core shaft in said seats, means on said arms and connected to reciprocate said gate slides between open and closed positions, a clutch shaft on one of said arms having a clutch head engageable with the clutch element of the core shaft in the adjacent seat, means on said one arm connected to oscillate said clutch head between engaged and disengaged position, a drive shaft rotatably mounted in coaxial relation to said rock shaft and connected to said clutch shaft on said arm, a rider roll rotatably and swingably mounted on said support members parallel to the axis of said seats, means connected to swing said rider roll in converging relation to said core shaft in the elevated position of the core shaft, a second pair of seats on supporting members spaced rearwardly from said first seats and in the arc of said core shaft to receive the core shaft as it is swung rearwardly by said arms, a second clutch shaft mounted coaxially with said second seats and at the opposite end of a core shaft thereon from said first clutch shaft, a second clutch head on said second clutch shaft engageable with the clutch element at the adjacent end of said core shaft, means connected to shift said second clutch head between engaged and disengaged positions, a power source connected to said drive shaft, a variable speed motor connected to drive said second clutch shaft, automatic control means connected to lower said arms in response to predetermined downward swing of said rider roll and to raise said arms in response to opening of said gates and disengagement of said first clutch, and manual control means to open and close said gates and engage and disengage said clutches.

2. In a paper winding machine, support members rotatably supporting a rock shaft, a gear sector connected to said rock shaft, a hydraulically operated reciprocating rotary motor gear connected to said gear sector to oscillate said rock shaft, arms connected to said rock shaft to be oscillated thereby between an upright forward position and a rearwardly inclined position, seats formed on the tops of said arms and open at the rear sides thereof and having the ends of a core shaft rotatably mounted therein, clutch elements on the outer ends of said core shaft, gates on said arms movable across the open rear sides of said seats to retain said core shaft in said seats, first cylinders and pistons mounted on said arms and connected to reciprocate said gate slides between open and closed positions, a first clutch shaft on one arm having a clutch head engageable with the clutch head of the core shaft in the adjacent seat, a second cylinder and piston on said one arm connected to oscillate said clutch head between engaged and disengaged position, a drive shaft rotatably mounted in coaxial relation to said rock shaft and connected to said clutch shaft, a rider roll rotatably and swingably mounted on said support members parallel to the axis of said seats, a third cylinder and piston on said support members connected to swing said rider roll in converging relation to said core shaft in the elevated position of the core shaft, a second pair of seats spaced rearwardly from said first seats and in the arc of said core shaft received the core shaft as it is swung rearwardly by said arms, said second seats being open at the top and spaced longitudinally differently from said first seats to clear said arms, a second clutch shaft supported coaxially with said second seats and at the opposite end of a core shaft thereon from said first clutch shaft, a second clutch head on said second clutch shaft and engageable with the clutch element at the adjacent end of said core shaft, a fourth cylinder and piston connected to shift said second clutch head between engaged and disengaged positions, a power source connected to drive said first drive shaft, and a variable speed motor connected to drive said second clutch shaft.

3. A paper winding machine comprising support arms swingably in parallel vertical planes between an upright primary winding position and a secondary inclined winding position, seats on the ends of said arms adapted to releasably receive the ends of a core shaft, gate members on said arms, means on said arms connected to open and close said gate members relative to said seats, an axially shiftable clutch member carried by one of said arms coaxially with respect to said shaft and adapted to be drivingly engaged therewith, a driving member mounted coaxially with the pivot axis of said arms and connected to said axially shiftable clutch member, a pressure roll swingably mounted to swing in upwardly converging relation to the primary winding position of the shaft carried by said arms, a fluid actuated cylinder connected to the swingable mounting of said pressure roll to swing said pressure roll, open seats supported along the arc of the shaft carried by said arms to receive the ends of the shaft in the advanced inclined position of said arms, a second axially shiftable clutch member mounted coaxially with respect to said open seats, means mounted on said one arm and connected to engage said first clutch member with the shaft held in said first seats, other means connected to engage said second clutch member with the opposite end of the shaft carried by said arms from said first clutch member, a reversely operative means connected to reversely swing said arms, manually operable valves connected to actuate said means for operating said gate members and said first clutch member, a manually operable control arranged to first actuate the valve to close said gates and then actuate the valve to engage said first clutch member and to reversely actuate the valves upon reverse actuation of the control, an electrically actuated valve connected to actuate said cylinder for swinging said pressure roll, a double acting electrically actuated valve connected to reversely operate said means for swinging said arms, a first energizing circuit connected to energize the valve of said pressure roll operating cylinder to lower said pressure roll and including a manually operative normally closed switch and a switch closed by movement of the pressure roll away from said shaft to a predetermined distance away from said shaft, a second energizing circuit controlled by said pressure roll operated switch and connected to actuate said double acting valve to energize said valve to lower said arms, limit switches positioned to be closed by movement of said gate members, to their open position and by movement of said first clutch member to disengaged position, a third energizing circuit connected through said limit switches to said double acting valve to energize said valve to raise said arms, a manually operated valve connected to reversely actuate said other means to engage and disengage said second clutch member, and a signal indicating engagement of said second clutch member.

4. A paper winding machine comprising support arms swingable in parallel vertical planes between an upright

primary winding position and a secondary inclined winding position, seats on the ends of said arms adapted to releasably receive the ends of a core shaft, gate members on said arms, means on said arms connected to open and close said gate members relative to said seats, a first shiftable clutch member carried by one of said arms and adapted to be drivingly engaged with said shaft, a driving member connected to said first clutch member, a pressure roll swingably mounted to swing in converging relation to the primary winding position of the shaft carried by said arms, open seats supported along the arc of the shaft carried by said arms to receive the ends of the shaft in the advanced inclined position of said arms, a second shiftable clutch member mounted adjacent to said open seats, reversable means connected to move said pressure roll towards and away from said core shaft, means mounted on said one arm and connected to engage said first clutch member with the shaft held in said first seats, other means connected to engage said second clutch member with the opposite end of the shaft carried by said arms from said first clutch member, a reversely operative fluid actuated means connected to reversely swing said arms, manually operable controls connected to actuate said means for operating said gate members and said first clutch member, a manually operable control member arranged to first actuate the control to close said gates and then actuate the control to engage said first clutch member and to reversely actuate the controls upon reverse actuation of the control member, an electrically actuated control connected to actuate said means for operating said pressure roll, a double acting electrically actuated valve connected to reversely operate said reversely operative means, a first energizing circuit connected to energize said pressure roll operating means to lower said roll and including a manually operative normally closed switch and a switch closed by movement of the pressure roll away from said shaft to a predetermined distance away from said shaft, a second energizing circuit controlled by said pressure roll operated switch and connected to actuate said double acting valve to lower said arms, limit switches positioned to be closed by movement of said gate members to their open position and by movement of said first clutch member to disengaged position, a third energizing circuit connected through said limit switches to said double acting valve to actuate said valve to raise said arms, and a manually operated control connected to reversely actuate said other means to engage and disengage said second clutch member.

5. A paper winding machine comprising support arms swingable in parallel vertical planes between an upright primary winding position and a secondary inclined winding position, seats on the ends of said arms adapted to releasably receive the ends of a core shaft, gate members on said arms, means on said arms connected to open and close said gate members relative to said seats, a first shiftable clutch member carried by one of said arms coaxially with respect to said shaft and adapted to be drivingly engaged therewith, a driving member mounted coaxially with the pivot axis of said arms and connected to said first clutch member, a pressure roll swingably mounted to swing in converging relation to the primary winding position of the shaft carried by said arms, open seats supported along the arc of a shaft carried by said arms to receive the ends of the shaft in the advanced inclined position of said arms, a second shiftable clutch member mounted coaxially with respect to said open seats, means connected to raise and lower said pressure roll, means mounted on said one arm and connected to engage said first clutch member with the shaft held in said first seats, other means connected to engage said second clutch member with the opposite end of the shaft carried by said arms from said first clutch member, a reversely operative fluid actuated means connected to reversely swing said arms, manually operable controls connected to actuate said means for operating said gate members and said first clutch member, an electrically actuated control connected to actuate said means for raising and lowering said pressure roll, a double acting electrically actuated valve connected to reversely operate said reversely operative means, a first energizing circuit connected to actuate said pressure roll operating control to lower said roll and including a manually operative switch and a switch actuated by movement of the pressure roll away from said shaft to a predetermined distance away from said shaft, a second energizing circuit controlled by said pressure roll operated switch and connected to actuate said double acting valve to lower said arms, limit switches positioned to be closed by movement of said gate members to their open position and by movement of said first clutch member to disengaged position, a third energizing circuit connected through said limit switches to said double acting valve to actuate said valve to raise said arms, and a manually operated control connected to reversely actuate said other means to engage and disengage said second clutch member.

6. A paper winding machine comprising support arms swingable in vertical planes between an upright primary winding position and a secondary inclined winding position, seats on the ends of said arms adapted to releasably receive the ends of a core shaft, gate members on said arms, means on said arms connected to open and close said gate members relative to said seats, a first clutch member carried by one of said arms coaxially with respect to said shaft and adapted to be drivingly engaged therewith, a pressure roll swingably mounted to swing in upwardly converging relation to the primary winding position of the shaft carried by said arms, open seats supported along the arc of the shaft carried by said arms to receive the ends of the shaft in the advanced inclined position of said arms, a second clutch member mounted coaxially with respect to said open seats, means mounted on said one arm and connected to engage said first clutch member with the shaft held in said first seats, other means connected to engage said second clutch member with the opposite end of the shaft carried by said arms from said first clutch member, a reversely operative means connected to reversely swing said arms, manually operable controls connected to actuate said means for operating said gate members and said first clutch member, an electrically actuated means connected to operate said pressure roll, a double acting electrically actuated control connected to reversely actuate said means for swinging said arms, a first energizing circuit connected to energize the operating means of said pressure roll to lower said roll and including a manually operative normally closed switch and a switch closed by movement of the pressure roll to a predetermined distance away from said shaft, a second energizing circuit controlled by said pressure roll operated switch and connected to actuate said double acting electrically operated control to actuate the control to lower said arms, limit switches positioned to be closed by movement of said gate members to their open position and by movement of said first clutch member to disengaged position, a third energizing circuit connected through said limit switches to said double acting electrically operated control to actuate the control to raise said arms, and a manually operated control connected to said other means to engage and disengage said second clutch member.

7. A paper winding machine comprising support arms swingable in vertical planes between an upright primary winding position and a secondary inclined winding position, seats on the ends of said arms adapted to releasably receive the ends of a core shaft, gate members on said arms, means on said arms connected to open and close said gate members relative to said seats, a clutch member carried by one of said arms and adapted to be drivingly

engaged with said shaft; a pressure roll swingably mounted to swing in upwardly converging relation to the primary winding position of the shaft carried by said arms, open seats supported along the arc of the shaft carried by said arms to receive the ends of the shaft in the advanced inclined position of said arms, a second clutch member mounted adjacent to said open seats, means mounted on said one arm and connected to engage said first clutch member with the shaft held in said first seats, another means connected to engage said second clutch member with the opposite end of the shaft carried by said arms from said first clutch member, a reversely operative means connected to reversably swing said arms, manually operable controls connected to actuate said means for opening and closing said gate members and for engaging said clutch members, an electrically actuated means connected to raise and lower said pressure roll, a double acting electrically actuated control connected to reversely operate said means for swinging said arms, a first energizing circuit connected to actuate the means for raising and lowering said pressure roll to lower said roll and including a manually operative switch and a switch actuated by movement of the pressure roll to a predetermined distance away from said shaft, a second energizing circuit controlled by said pressure roll operated switch and connected to actuate said double acting control to actuate the control to lower said arms, and a third energizing circuit connected to said double acting control to actuate the control to raise said arms.

8. In a paper winding machine, a pair of arms swingable in vertical planes between an upright primary winding position and a tilted secondary winding position, seats on the swinging ends of said arms adapted to support the ends of a core shaft in the upright position of said arms, gate members on said arms closable relative to said seats to retain the shaft on the seats in tilted positions of the arms, means on one of said arms drivingly engageable with the shaft on said seats to drive the shaft, a second set of seats located along the arc of movement of the shaft carried by said first seats, said second seats being open at the top to receive the shaft released from said first seats, means positioned adjacent one of said second seats and drivingly engageable with the opposite end of the shaft supported therein from said first drive means, and control means for engaging and disengaging both said drive means and for opening and closing said gates and for swinging said arms between primary and secondary winding positions.

9. A paper winding machine comprising support arms swingably in parallel vertical planes between a first primary winding position and a secondary rotated winding position, seats on the ends of said arms adapted to releasably receive the ends of a core shaft, gate members on said arms, means on said arms connected to open and close said gate members relative to said seats, a first clutch member carried by one of said arms and adapted to be drivingly engaged with said shaft, a driving member connected to said axially shiftable clutch member, a pressure roll swingably mounted to swing in converging relation to the primary winding position of the shaft carried by said arms, means connected to said pressure roll to yieldably move said pressure roll towards said core shaft, open seats supported along the arc of the shaft carried by said arms to receive the ends of the shaft in the secondary rotated position of said arms, a second shiftable clutch member mounted adjacent to said open seats, means mounted on said one arm and connected to engage said first clutch member with the shaft held in said first seats, other means connected to engage said second clutch member with the opposite end of the shaft carried by said arms from said first clutch member, a reversely operative means connected to reversely swing said arms, manually operable controls connected to actuate said means for operating said gate members and said first clutch member, a double acting electrically actuated control connected to reversely operate said means for swinging said arms, a first energizing circuit including a switch closed by movement of the pressure roll away from said shaft to a predetermined distance away from said shaft and connected to actuate said double acting control to lower said arms, limit switches positioned to be closed by movement of said gate members to their open position, a second energizing circuit connected through said limit switches to said double acting control to raise said arms, and a manually operated control connected to reversely actuate said other means to engage and disengage said second clutch member.

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