March 8, 1955 R. L. EVANS ET AL 2,703,683

PAPER MACHINERY

Filed June 1, 1953 4 Sheets-Sheet 1

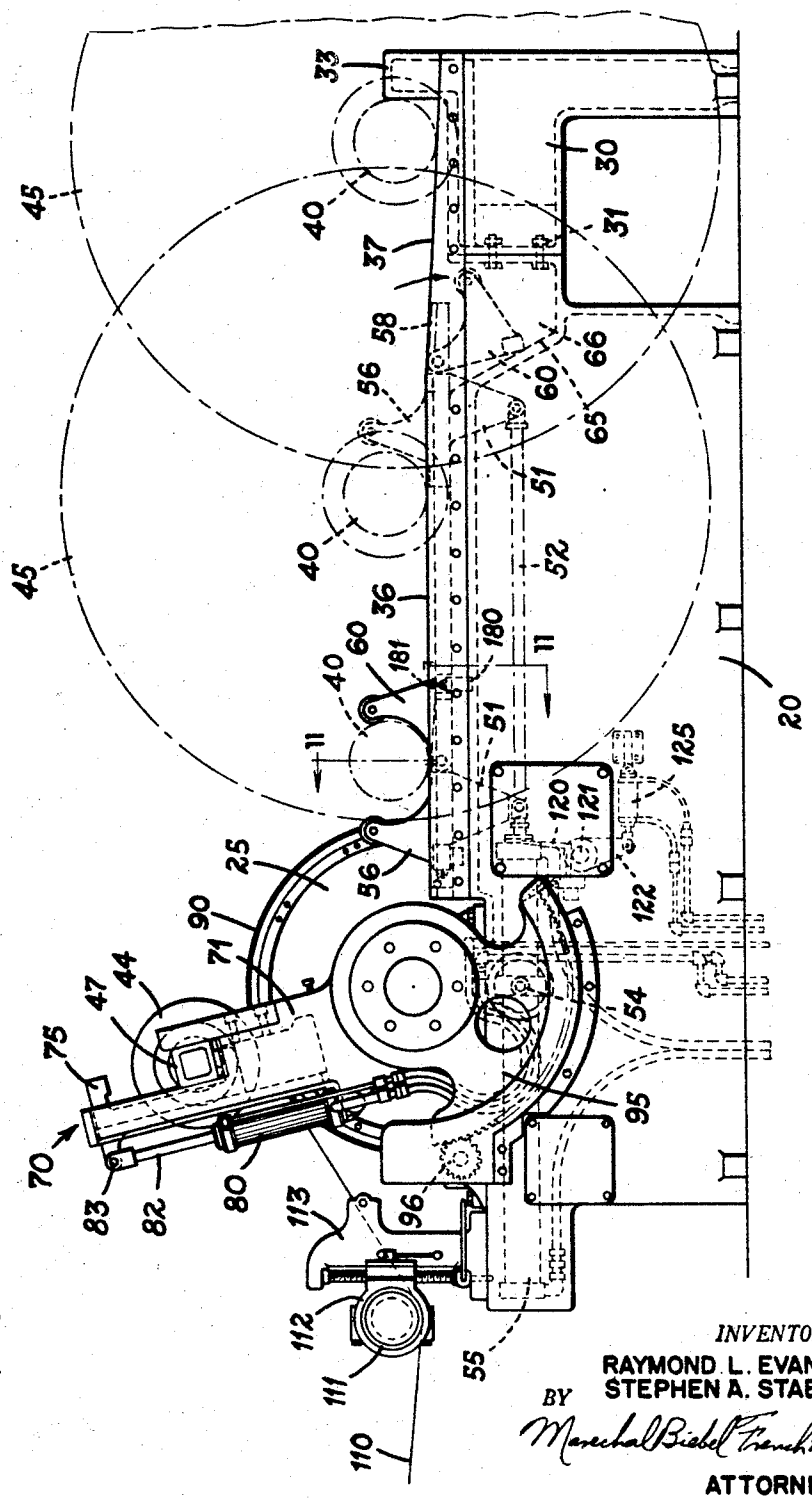


FIG-1

INVENTORS
RAYMOND L. EVANS &
STEPHEN A. STAEGE
BY Marechal Biebel French & Bugg
ATTORNEYS

March 8, 1955 R. L. EVANS ET AL 2,703,683

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FIG-2

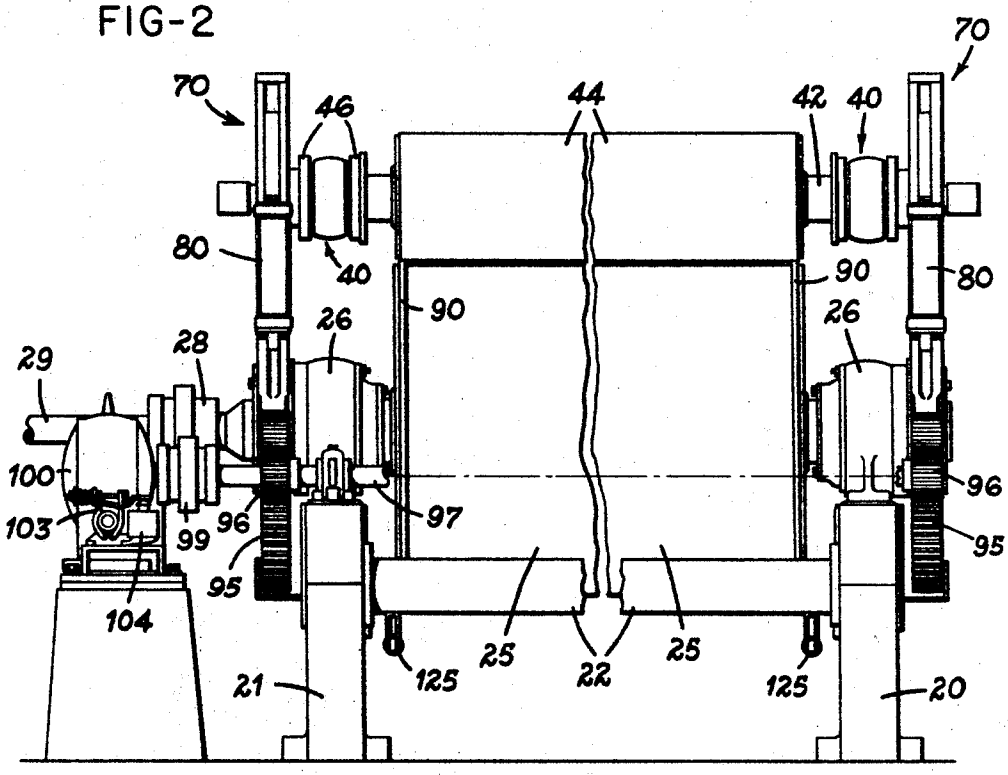


FIG-3

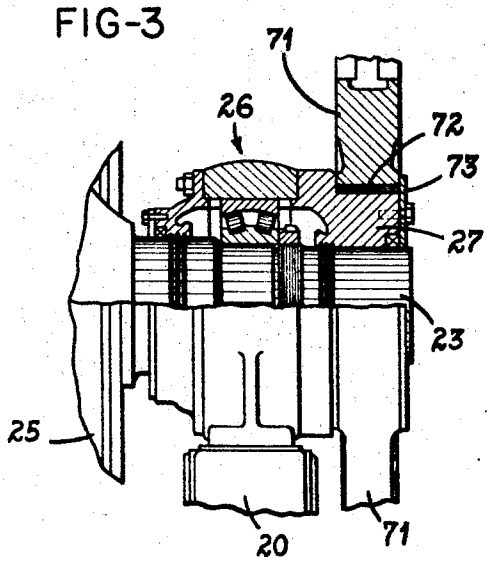
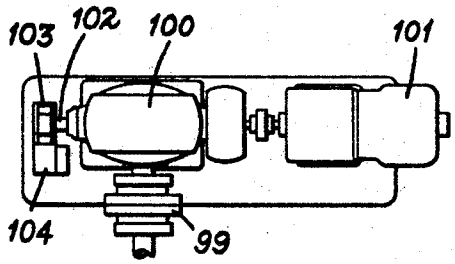


FIG-4



INVENTORS
RAYMOND L. EVANS &
STEPHEN A. STAEGE
BY Marechal Biebel French & Bugg
ATTORNEYS

March 8, 1955 R. L. EVANS ET AL 2,703,683

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FIG-5

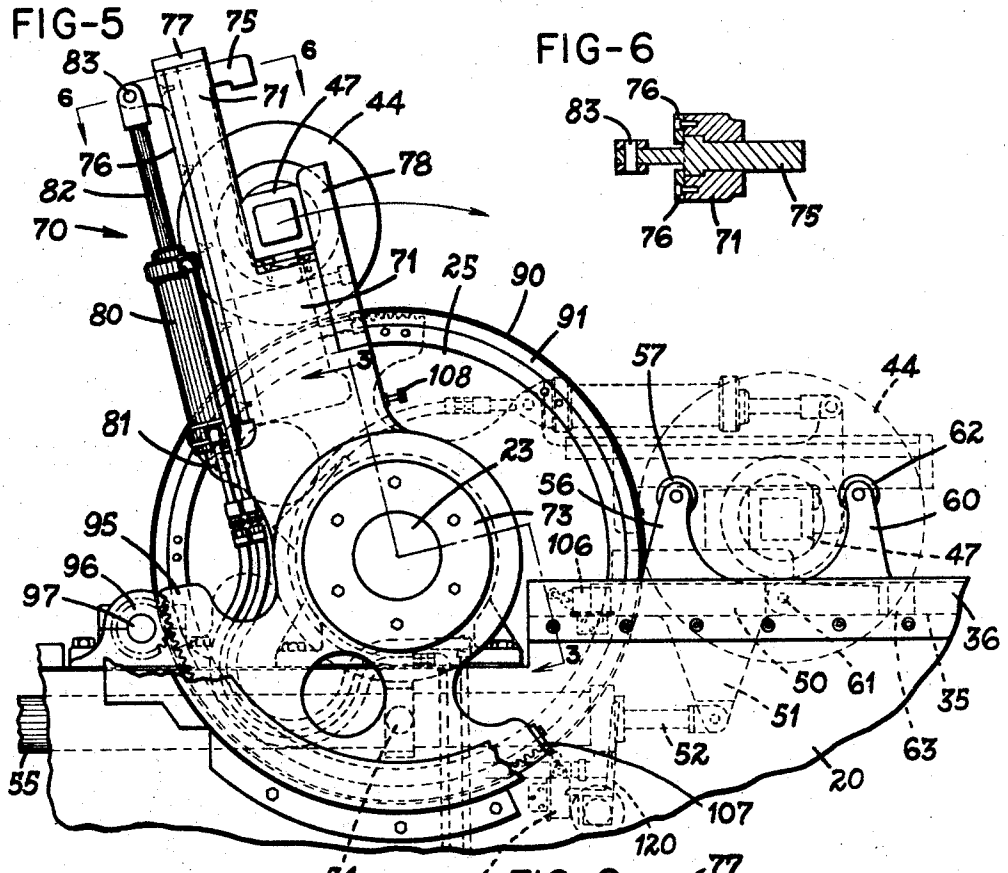


FIG-6

FIG-7

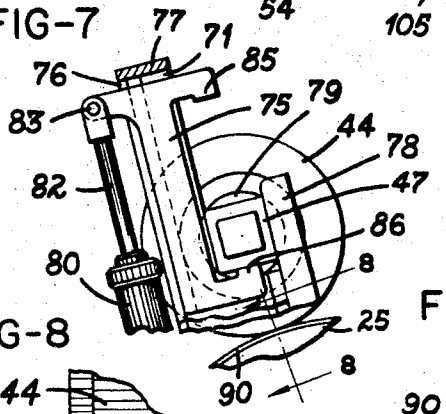


FIG-8

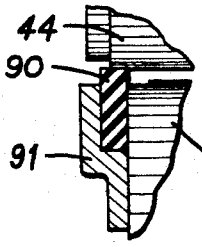


FIG-9

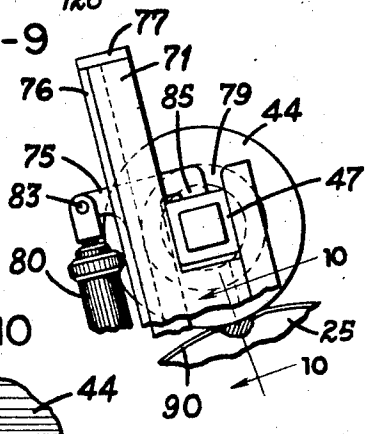
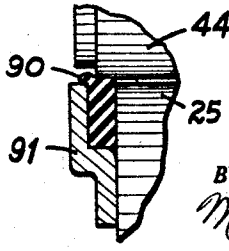


FIG-10



INVENTORS
RAYMOND L. EVANS &
STEPHEN A. STAEGE
BY
Marshall Bachel Franklin & Bugg
ATTORNEYS

March 8, 1955 R. L. EVANS ET AL 2,703,683

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FIG-11

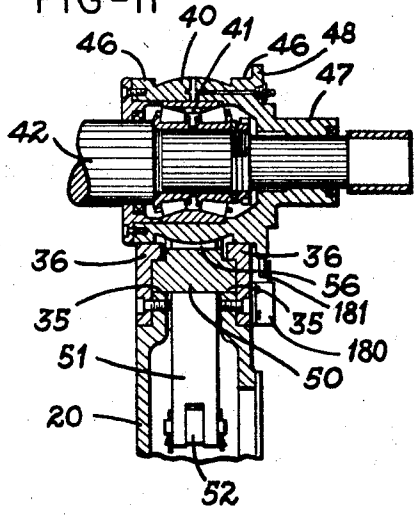


FIG-12

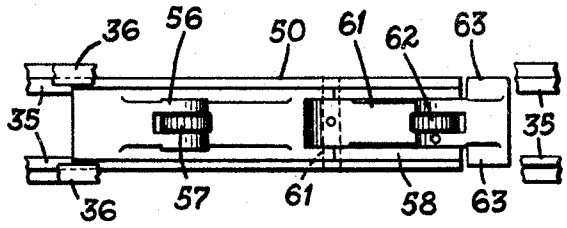


FIG-13

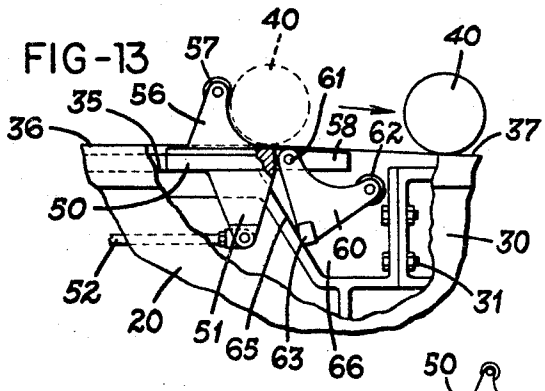
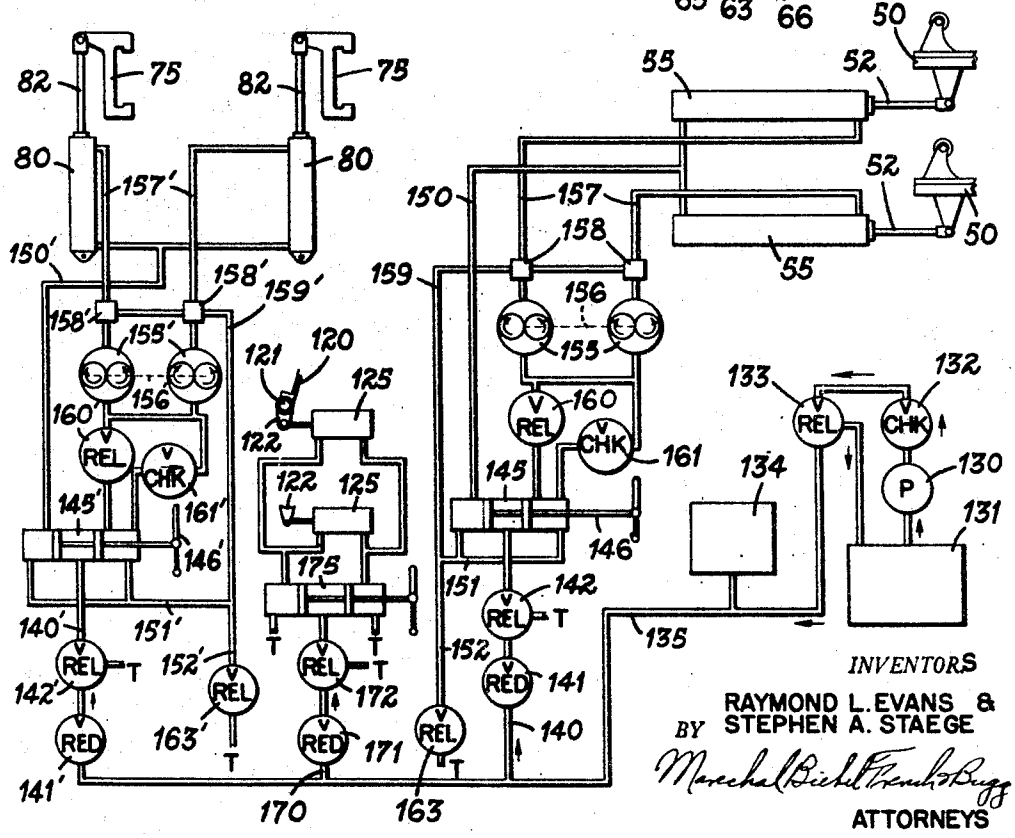


FIG-14



INVENTORS

RAYMOND L. EVANS &
STEPHEN A. STAEGE

BY Marechal Bichel Frenkel & Bugg

ATTORNEYS

United States Patent Office 2,703,683 Patented Mar. 8, 1955

2,703,683

PAPER MACHINERY

Raymond L. Evans and Stephen A. Staege, Hamilton, Ohio, assignors to The Black-Clawson Company, Hamilton, Ohio, a corporation of Ohio

Application June 1, 1953, Serial No. 358,798

19 Claims. (Cl. 242—65)

This invention relates to reels for the continuous winding of paper and other web materials.

The invention has special relation to reels of the uniform speed type including a driving drum and primary arms which support the new roll core while the roll is starting thereon and then transfer it to ways or other secondary supports for completion of the winding, and among the general objectives of the invention is the provision of such a reel which is of simple and at the same time highly rugged construction for minimum maintenance and which makes possible highly accurate continuous control of the pressure between the roll and the drum to give correspondingly highly uniform winding.

Among the principal more specific objects of the invention is the provision of a reel of the above general type in which the major part of the winding operation is carried out while the roll is supported on secondary ways, with the pressure between the roll and the drum controlled by fluid pressure cylinders, and in which when the roll is fully wound, it is quickly and automatically released from the pressure cylinders and unloaded from the reel without the use of a crane or other hoisting mechanism, thereby preparing the reel in minimum time for handling the next successive roll.

Another object of the invention is to provide a uniform speed reel in which the primary arms are so constructed and arranged that they will support the new core in any desired relation with the drum and the secondary ways over a wide angular range before the new roll is started, and also to provide such a primary arm construction in which the radial spacing of the new core with respect to the drum may be varied as desired over an appreciable range before the core is actually brought into engagement with the drum.

An additional object of the invention is to provide a uniform speed reel in which the drum is equipped at one or both ends with a yieldable ring of rubber or like resiliently deformable material and of greater diameter than the drum to engage the new core before it is brought into contact with the new drum and thus to accelerate the new core to a peripheral speed comparable with that of the drum before the new roll is started thereon.

It is also an object of the invention to provide a reel of the above type having a hydraulic system for controlling the pressure between the roll and drum during winding in which the hydraulic fluid for the cylinders at opposite ends of the roll is accurately metered to assure effective constant pressure at both ends of the roll, and in which also the pressure at one end of the roll can be adjusted with respect to the other end as required and without affecting the metering system.

Still another object of the invention is to provide a uniform speed reel in which the supporting parts for the roll core and the bearing housings for the core shaft are constructed to minimize sliding engagement of the bearing housing with the supporting parts therefor on the reel frame and thereby to minimize wear of the bearing housings and the resulting possible damage to the bearings.

Other objects and advantages of the invention will be apparent from the following description, the accompanying drawings and the appended claims.

In the drawings—

Fig. 1 is a side elevational view showing a reel constructed in accordance with the invention;

Fig. 2 is a view looking from left to right in Fig. 1 and

showing the back end of the reel, with some parts removed for increased clarity of illustration;

Fig. 3 is an enlarged fragmentary view partly in elevation and partly in vertical section on the line 3—3 of Fig. 5;

Fig. 4 is a fragmentary view looking downwards in Fig. 2 and showing the drive for the primary arms of the reel;

Fig. 5 is an enlarged fragmentary view in side elevation, with parts broken away, showing the construction and operation of the primary arms;

Fig. 6 is a detail section on the line 6—6 of Fig. 5;

Fig. 7 is a fragmentary view showing the position of the new core and the slides on the primary arms just prior to starting of the new roll;

Fig. 8 is an enlarged fragmentary section on the line 8—8 of Fig. 7;

Fig. 9 is a view similar to Fig. 7 showing the position of the parts after the new roll has been started;

Fig. 10 is an enlarged fragmentary section on the line 10—10 of Fig. 9;

Fig. 11 is an enlarged fragmentary section generally on the line 11—11 of Fig. 1;

Fig. 12 is a fragmentary plan view showing one of the carriages for controlling movement of the roll core on the secondary ways;

Fig. 13 is a fragmentary view partly in side elevation and partly broken away to show the operation of the carriages on the secondary ways in unloading the fully wound roll; and

Fig. 14 is an hydraulic diagram.

Referring to the drawings, which illustrate a preferred embodiment of the invention, the base of the reel includes a front side frame 20 and a drive side frame 21 bolted to the floor and provided with one or more suitable cross-braces 22. The journals 23 of the driving drum 25 are supported by bearing assemblies 26 mounted near the back end of the frames 20 and 21 and each including an end cap 27. At the drive side of the reel, the drum journal 23 is connected as by a coupling 28 with the drive shaft 29 from the main drive (not shown).

The frames 20 and 21 extend horizontally for a substantial distance from the driving drum, and an end post 30 is bolted to each thereof at 31. Each post 30 is also shown as bolted to the floor and includes an upwardly extending shoulder 33. The portions of the frames 20 and 21 between the drum and the posts 30 form secondary supports or ways for receiving each successive roll during the major portion of the winding operation. The upper edges of these portions of the frames form tracks 35, and gibs 36 are bolted on both sides of tracks 35 and also extend across to the posts 30. The gibs 36 have their upper surfaces horizontal over a major portion of their length, but the portion 37 of each gib adjacent the posts 30 is inclined downwardly at a small angle, which need not be more than about 1° from the horizontal.

These upper surfaces of gibs 36 form tracks for supporting the bearing housings 40 for the bearings 41 of each core shaft 42 for the cores 44 on which the successive rolls 45 are wound. Referring to Fig. 11, each housing 40 includes cylindrical wheel portions 46 arranged to roll on gibs 36 during winding and movement of the roll along the base with respect to drum 25. These wheel portions of the bearing housing thus minimize friction and also prevent possible wearing of the portions of the housings which surround the bearings. Each bearing housing 40 also includes a square projection 47 at its outer end which fits in one of the primary arms during starting of the roll as described hereinafter. In addition, each housing 40 has a peripheral flange 48 thereon which overlaps the outer gib 36 to guide the roll against possible cocking on the tracks.

The nip pressure of the winding roll 45 and drum 25 while the roll is supported on the secondary ways is controlled by fluid pressure cylinders acting through carriages which slide on the base. Referring especially to Figs. 12 and 13, each carriage includes a crosshead 50 mounted for sliding movement on the tracks 35 between gibs 36, and an arm 51 extends downwardly from each cross head

between tracks 35 and is connected to the piston rod 52 of a double acting hydraulic cylinder 55 pivotally mounted in the frame at 54.

Each crosshead 50 includes an upwardly projecting horn 56 at its rearward end carrying a roller 57 positioned to engage the adjacent bearing housing 40. The forward end of each crosshead 50 includes a fork portion 58, and a second horn 60 is received within this fork and is pivoted thereto at 61. The horn 60 also carries a roller 62 similar to the roller 57, and at its forward end it has a pair of arms 63 which project laterally beyond the ends of fork 58 and ride on the tracks 35 similarly to the crosshead 50.

During winding with the core shaft 44 supported on the secondary ways, pressure between the drum 25 and the winding roll 45 is regulated by controlling the discharge of pressure fluid from the piston rod ends of the cylinders 55, with the increasing diameter of the roll causing bearing housing 40 to move continuously away from the drum against the horns 60. When the roll 45 is fully wound and severed from the web, pressure is applied to the piston ends of cylinders 55 to cause crossheads to push the full roll away from the drum by means of horns 56.

During the first part of this travel, the bearing housings 40 remain between horns 56 and 60, but Fig. 13 shows how the tracks 35 are relieved at 65 to form a pocket 66 below gibs 36. When the crossheads 50 have been pushed to the positions shown in Fig. 13, the horns 60 pivot downwardly into pockets 66, and since the relieved portion 65 of the tracks lies just below the beginning of the inclined portion 37 of gibs 36, the bearing housings are then free to roll under the force of gravity down surfaces 37 until stopped by the shoulders 33 on the end posts.

It will accordingly be seen that this carriage and track construction provides for automatically unloading the full roll from the carriages, and the roll resting on the end posts can be removed as desired while the next roll is winding. Also, while shoulders 33 are convenient as providing a temporary restraining means for the core until it can be removed, they can be omitted if desired to permit the full roll to travel directly onto a suitable dolly or other conveyor, or the track portions 37 can be extended sufficiently to convey the full roll to the floor or to an unwind stand or other station for further treatment.

The primary arms which support each new core during starting of the roll thereon are identified generally as 70. Each includes a quadrant 71 mounted on the bearing caps 27 of the drum by bearings 72 and held in place by a cover plate 73. The upper part of each primary arm is bifurcated over the major portion thereof to support a C-shaped slide 75 held therein by gibs 76 and a cap 77. Each primary arm also includes a jaw plate 78 which is bolted thereto in spaced relation with the slide-supporting part of the arm to form therewith a yoke 79 proportioned to receive the square projection 47 on the adjacent bearing housing 40 for the core shaft.

Each slide 75 is reciprocated in its supporting quadrant 71 by means of a double acting fluid pressure cylinder 80 pivoted at 81 to the quadrant and having its piston rod 82 pivoted to the slide 75 at 83. Each slide 75 includes upper and lower fingers 85 and 86, and in the upper limit positions of the slides, their lower fingers 86 engage the parts 47 of bearing housings 40 and are proportioned to support the core 44 in radially spaced relation with the surface of the drum. When the slides 75 are shifted to their inner limit positions with respect to the drum, their upper fingers 85 can engage the opposite surfaces of the parts 47 to press the core against the surface of the drum as shown in Fig. 9.

Special means are provided on the drum for accelerating each new core to substantially the same peripheral speed as the drum prior to starting of the new core thereon. Referring to Figs. 2, 8 and 9, a resiliently yieldable or deformable ring 90, such as a ring of soft rubber or an inflatable tire, is mounted on both ends of drum 25 as by means of flanges or ferrules 91 bolted to the head of the drum. The ring 90 has an outer diameter slightly greater than that of the drum, for example one inch greater, and thus when the new core is lowered toward the drum by the action of the cylinders 80 as described, its surface will engage the ring 90 before it touches the drum. The first contact between the ring 90 and the new core will therefore start the core rotating, and as the core continues to move downwardly towards the drum, it will deflect ring 90 out of the way, as shown in Fig. 10, while reaching effectively the same peripheral speed as the drum as it finally engages the drum for starting of the new roll thereon.

The primary arms 70 are rotatable between limit positions shown in Fig. 5. Each quadrant 71 carries a gear segment 95 meshing with a pinion 96 on a shaft 97 extending across the back of the base and connected as by a coupling 99 with a gear reduction 100 driven by a motor 101. A projecting shaft 102 from the gear reduction is provided with a brake 103 of the solenoid-operated, spring-set type, and the solenoid unit 104 of this brake is operated by limit switches 105 and 106 on the base. The switch 105 stops movement of the primary arms in counterclockwise direction as viewed in Fig. 5 and is actuated by an arm 107 on a quadrant 71, and the switch 106 stops movement of the primary arms in clockwise direction and is operated by a bolt 108 on the quadrant.

Fig. 1 shows the web 110 to be wound as approaching the drum under a guide roll 111 in bearing units 112 carried for vertical adjustment by brackets 113 on the base. Figs. 1 and 5 show the doctor unit for cleaning the drum when desired. This includes an angle bar 120 which carries the doctor plate and is mounted on a rock shaft 121 journaled on the base, and lever arms 122 extend from shaft 121 and are connected to the piston rods of double acting hydraulic cylinders 125 mounted on each side frame.

Fig. 14 shows a hydraulic system for operating this reel which offers special advantages of both simplicity and accurate control over the winding conditions. The pressure pump 130 supplies oil from a reservoir tank 131 through a check valve 132 and relief valve 133 to an accumulator tank 134 of the air pressure type. The valve 133 may be set for a desired pressure, such for example as 150 pounds, and when the accumulator tank is charged up to that pressure, the pump discharge will normally pass over the relief valve back to the tank. Alternatively, the pump 130 may be controlled by a pressure switch responsive to the pressure in accumulator tank 134.

A pressure header 135 leads from tank 134 to the several pairs of cylinders 55, 80 and 125. The connecting line 140 for cylinders 55 is provided with a reducing valve 141 which is adjusted for any desired pressure lower than the pressure in the header, for example 130 pounds, and next in the line is a relief valve 142 which may be set for some pressure higher than the reducing valve 141 but lower than the pump relief valve 133, for example 140 pounds. From the valve 142, the oil flows to center chamber of the manually operated 4-way valve 145 having a control handle 146.

A line 150 leads from left hand end of valve 145 in Fig. 14 to the piston ends of the cylinders 55, and another line 151 connects this same end of valve 145 and also the opposite or right hand end of the valve with a drain line 152 to the tank. The right hand end of valve 145 is also connected with the piston rod ends of cylinders 55, and a special system provided for metering the oil flow to and from these ends of cylinders 55 to assure that the carriages 50 move in unison and thus maintain the core shaft 42 and roll 45 in properly parallel relation with drum 25 for uniform winding of the roll.

This metering system includes a pair of gear pumps 155 having their shafts coupled together at 156 and each connected by a separate line 157 with the piston rod end of one of cylinders 55. Each line 157 also includes a normally closed manually operable relief valve 158, such as a poppet valve, having a common connection 159 to the drain line 152. The gear pumps 155 are provided with parallel common connections with the right hand end of valve 145, one such connection including a relief valve 160 and the other including a one-way check valve 161 arranged to permit oil flow only from valve 145 to the gear pumps.

With this system, when the valve 145 is in its middle position as shown in Fig. 14, the opposite ends of cylinders 55 will be connected together through the gear pumps 155, the two ends of valve 145 and the line 151. This part of the system is maintained normally full of oil by a relief valve 163 in drain line 152 below the connection between lines 151 and 152. When the valve 145 is shifted to either of its end positions, it will connect the pressure line 140 to the corresponding ends of the cylinders 55, while

simultaneously connecting the other ends of the cylinders to drain line **152**.

The metering pumps **155** operate to maintain uniform pressure conditions at the piston rod ends of both cylinders **55** and thereby assure proper movement in unison of the crossheads **50**. Thus when the roll is building up on the secondary ways and pushing away from the drum against the horns **60**, the oil from the piston rod ends of the cylinders will be forced to travel through the metering pumps **155** in order to reach the opposite ends of the cylinders, and with the two pumps coupled as described, the oil flow from both of the cylinders will be metered at precisely the same rate, with the pressure at these ends of the cylinders being maintained in accordance with the setting of the relief valve **160**. If, however, uneven pressure conditions should develop such that one end of the roll tends to move faster than the other end, such condition can be readily corrected by momentarily opening the proper valve **158** to permit discharge of the small amount of oil necessary to restore the desired uniform conditions, and this adjustment will in no way affect the operation of the gear pumps as described. The check valve **161** operates only during the return of the crossheads **50** to the position to receive a new roll from the primary arms, but during this operation also, the gear pumps **155** meter the flow to the two cylinders to maintain the crossheads in unison.

The hydraulic system for the cyinders **80** is effectively identical with that for the secondary cylinders **55**, and in order to simplify the description, these parts have been numbered **140'**, **141'**, and so forth in Fig. 14. The doctor cylinders **125** are also supplied with hydraulic fluid from the crosshead **135** through a supply line **170** through a reducing valve **171** and relief valve **172** to a manually operated four-way valve **175**. The valve **175**, however, has its opposite ends connected directly to the opposite ends of the cylinders **125**, and the metering units provided for the other cylinders are not necessary for the doctor cylinders **125**, in view of the fact that the rock shaft **121** acts as a torsion shaft to couple the two cylinders together for conjoint action.

In the operation of this reel, the major portion of the winding takes place while the roll is supported on the gibs **36**. Pressure during winding between the drum and the roll is maintained as desired by the setting of the relief valve **160**, with this valve opening when the desired pressure is exceeded to permit a metered flow of oil from the piston rod ends of the cylinders **55** through the valve **145** to the other ends of the cylinders. The valve **145** is accordingly maintained in its centered position shown in Fig. 14 until the roll is completely wound.

While a roll is winding on the gibs **36**, the new core **44** and core shaft are loaded on the primary arms, but the slides **75** are maintained in their upper limit positions shown in Fig. 7 to hold the core out of contact with both the drum and the accelerating ring **90**. The slides **75** are moved into this position by shifting valve **145'** to its left hand position as viewed in Fig. 14. When the roll **45** is substantially fully wound, slides **75** are operated to drop the new core into contact with ring **90** for acceleration. This may be done by shifting valve **145'** to its centered position to permit the slides and core to descend by gravity until the core rests on ring or rings **90**. Then as the core accelerates to the peripheral speed of the drum, valve **145'** is moved to its right hand position to apply pressure to the piston rod ends of cylinders **80**.

After the web has been broken and started on the new core, the new roll builds up fairly rapidly, and the pressure between it and the drum is controlled by the setting of the relief valve **160'**, the valve **145'** being then returned to its neutral position. In the meantime, the valve **145** is shifted to its left hand position as viewed in Fig. 14 to apply full line pressure to the piston ends of cylinders **55**. This pushes crossheads **50** towards the far end of the reel frame until the carriages automatically unload the full roll when they reach the track portions **65** as already described in connection with Fig. 13. During this movement of the roll, it is maintained in accurately parallel relation with the drum by operation of the gear pumps **155** metering the discharge from cylinders **55**.

As soon as the full roll has been unloaded, valve **145** is shifted to its other end position to return the carriages to positions adjacent the drum to receive the new roll from the primary arms. The new roll may be started in any desired angular position of the primary arms between their limit positions shown in Fig. 5, since the core shaft is readily maintained within the yokes **79** but out of contact with the drum as already described, and after the carriages have returned to the position shown in Fig. 5 and the new roll has increased to the desired extent, the primary arms are swung over as shown in dotted lines in Fig. 5 to insert the ends of the core shaft in the yoke formed by the horns **56** and **60**. It will be noted that this yoke is of greater width than the portion of the core shaft received therein to facilitate this operation, and it will also be apparent that the carriages may require shifting in accordance with the diameter of the roll at the time of transfer in order to align the yoke properly with the core shaft.

The pressure between the new roll and the drum is maintained during this operation by the operation of the cylinders **75** as described, but thereafter the carriages are moved towards the drum until the outer horns **60** apply the desired pressure to the core. The cylinders **90** are then reversed to move the slides **75** to the outer ends of the primary arms, but the core shaft remains in the primary arms until the diameter of the roll has increased sufficiently to move the bearing housing portions **47** beyond the jaw plates **78** and thus free of the primary arms. In order to assure return movement of the primary arms as soon as the core shaft is free of the jaw plate **78**, a limit switch **180** controlling motor **101** may be mounted as shown in Figs. 1 and 11 on the side of one of the gibs **36** so that the roller **181** on its operating arm will be actuated by the flange **48** on the adjacent bearing housing **40** to start motor **101** for retraction of the primary arms as soon as the core shaft has moved to its proper release position beyond jaw plate **78**.

Following this completion of the transfer of the new roll to the carriages, the primary arms are returned to their rest position above the drum shown in full lines in Fig. 5. Then while the roll continues to build up on the ways under the control of the carriages, a new core is loaded into the primary arms in preparation for the next roll change. This loading is facilitated by the construction of the primary arms as shown especially in Fig. 5, since with the arms inclined rearwardly and with the upper fingers **85** extending outwardly only to a position short of the radial projection of the jaw plate **78**, the yoke **79** is effectively open at its upper end to permit the new core shaft to be dropped into place. Then after the winding roll has been completely wound, a further new roll is started as already described.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of ways on said frame for supporting each said core during winding thereon, carriages on said ways each including inner and outer horns defining a yoke for receiving the ends of each said core therebetween, means on said frame connected with said carriages to control the movements thereof with respect to said drum, means pivoting each said outer horn to the associated said carriage, and means responsive to movement of said carriages to a predetermined position on said ways spaced from said drum to cause downward pivoting of said outer horns on said carriages with resulting opening of said yokes for free movement of said roll on said ways away from said drum.

2. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of generally horizontally extending ways on said frame for supporting each said core during winding thereon, carriages on said ways each including inner and outer horns defining a yoke for receiving the ends of each said core therebetween, double acting fluid pressure cylinders on said frame connected with said carriages, control means for said cylinders operable in one position to provide yieldable resistance to movement of said carriages away from said drum and in another position to push said carriages and roll away from said drum through said inner horns, each said outer horn having a pivotal

connection with the associated said carriage, said ways including portions supporting said outer horns in said yoke forming relation with said inner horns, and said horn supporting portions of said ways being relieved at a position spaced from said drum to cause said outer horns to pivot downwardly when said carriages reach said position with resulting opening of said yokes for free movement of said roll on said ways away from said drum.

3. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of ways on said frame for supporting each said core during winding thereon, tracks on said ways each including a horizontal portion of substantial length adjacent said drum and a downwardly inclined outer portion spaced from said drum, carriages movable on said ways and each including inner and outer horns defining a yoke for receiving the ends of each said core therein, means on said frame connected with said carriages to control the movements thereof with respect to said drum, means pivoting each said outer horn to the associated said carriage, and means responsive to movement of said carriages to said inclined portions of said tracks to cause downward pivoting of said outer horns on said carriages with resulting opening of said yokes for free movement of said roll down said inclined track portions.

4. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of ways on said frame for supporting each said core during winding thereon, tracks on said ways each including a horizontal portion of substantial length adjacent said drum and a downwardly inclined outer portion spaced from said drum, carriages movable on said ways and each including inner and outer horns defining a yoke for receiving the ends of each said core therein, double acting fluid pressure cylinders secured to said frame below said tracks, said cylinders having piston rods extending below said tracks and connected with said carriages, control means for said cylinders operable in one position to provide yieldable resistance to movement of said carriages away from said drum and in another position to push said carriages and roll away from said drum through said inner horns, means pivoting each said outer horn to the associated said carriage, and means responsive to movement of said carriages to said inclined portions of said tracks to cause downward pivoting of said outer horns on said carriages with resulting opening of said yokes for free movement of said roll down said inclined track portions.

5. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of a resiliently deformable ring secured to one end of said drum and of greater normal outer diameter than said drum to project radially therebeyond, primary arms for supporting each successive said core during starting of a roll thereon, means on said arms for bringing said core into driven engagement with said ring to accelerate said core to a peripheral speed comparable with that of said drum while supporting said core out of contact with said drum, and means for thereafter forcing said core against said ring with sufficient pressure to deflect said ring with resulting driven engagement of said core with said drum.

6. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of a resiliently deformable ring of rubbery material secured to one end of said drum and of greater normal outer diameter than said drum to project radially therebeyond, primary arms including means for supporting each successive said core in spaced out-of-contact relation with said ring, means on said arms for shifting said core into driven engagement with said ring to accelerate said core to a peripheral speed comparable with that of said drum, and means for controlling the operation of said shifting means to move said core first into driven engagement witth said ring while out of contact with said drum during acceleration of said core and thereafter to force said core against said ring with sufficient pressure to deform said ring with resulting driven engagement of said core with said drum.

7. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of a resiliently deformable ring secured to one end of said drum and of greater normal outer diameter than said drum to project radially therebeyond, primary arms including slides for supporting each successive said core, double-acting fluid pressure means on said arms for shifting said slides on said arms to move said core with respect to said drum, and means for controlling the operation of said pressure means to support said core first in out-of-contact relation with said ring, then in driven engagement with said ring and out of contact with said drum to accelerate said core, and thereafter to force said core against said ring with sufficient pressure to deflect said ring with resulting driven engagement of said core with said drum.

8. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of primary arms adapted to receive one of said cores and mounted on said frame for swinging movement with respect to said drum to carry said core around the surface of said drum, secondary supports on said frame for receiving said core from said primary arms and supporting said core during winding thereon, yokes on said arms for retaining each said core therewithin during movement of said core towards and away from said drum, a double-acting fluid pressure cylinder mounted on each said arm, means for connecting the piston rod of each said cylinder to the adjacent end of each said core, said connecting means including means for causing in and out movement of said core with respect to said drum in response to the application of pressure to one or the other end of said cylinders, control means for selectively applying pressure to either end of said cylinders, and means for swinging said arms to said secondary supports to transfer the started roll thereto for further winding.

9. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of primary arms adapted to receive one of said cores and mounted on said frame for swinging movement with respect to said drum to carry said core around the surface of said drum, secondary supports on said frame for receiving said core from said primary arms and supporting said core during winding thereon, yokes on said arms for retaining each said core therewithin during movement of said core towards and away from said drum, generally C-shaped slides on said arms for supporting said core within said yokes, means under the control of the operator for shifting said slides between an outer limit position wherein said slides support said core out of contact with said drum and an inner limit position wherein said slides urge said core into driven engagement with said drum for starting of the roll thereon, and means for swinging said arms to said secondary supports to transfer the started roll thereto for further winding.

10. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of primary arms adapted to receive one of said cores and mounted on said frame for swinging movement with respect to said drum to carry said core around the surface of said drum, secondary supports on said frame for receiving said core from said primary arms and supporting said core during winding thereon, yokes on said arms for retaining each said core therewithin, generally C-shaped slides on said arms for supporting said core within said yokes, double-acting fluid pressure cylinders on said arms for shifting said slides on said arms to move said core towards and away from said drum, means for selectively supplying pressure to opposite ends of said cylinders to shift said slides between an outer limit position wherein said slides support said core out of contact with said drum and an inner limit position wherein said slides urge said core into driven engagement with said drum for starting of the roll thereon, means for effecting controlled and metered transfer of pressure from one end of said cylinders to the other to regulate the pressure of said core on said drum, and means for swinging said arms to said secondary supports to transfer the started roll thereto for further winding.

11. In a reel including a rotary drum on a frame for driving successive rolls winding on a core shaft, the combination of ways on said frame for supporting each said shaft during winding thereon, means on said ways forming a pair of tracks adapted to support each end of said shaft, said tracks in each said pair being spaced axially of said drum to provide a slot therebetween, bearing means and a bearing housing for each end of said shaft, each said bearing housing including a pair of cylindrical wheel portions spaced axially between the bearing enclosing porton thereof and proportioned to roll on said tracks while maintaining said bearing enclosing portion out of contact with said tracks, and means on said frame

cooperating with said bearing housings to control the pressure between said drum and the roll winding on said shaft.

12. In a reel including a rotary drum on a frame for driving successive rolls winding on a core shaft, the combination of ways on said frame for supporting each said shaft during winding thereon, means on said ways forming a pair of tracks adapted to support each end of said shaft, said tracks in each said pair being spaced axially of said drum to provide a slot therebetween, bearing means and a bearing housing for each end of said shaft, each said bearing housing including a pair of axially spaced cylindrical wheel portions between the bearing enclosing portion thereof and proportioned to roll on said tracks while maintaining said bearing enclosing portion out of contact with said tracks, fluid pressure cylinders mounted on said frame adjacent each end of said drum, and means extending through said slots and engaging said bearing housings to form connections between said cylinders and said bearing housings for cooperation with said cylinders to control the pressure between said drum and the roll winding on said shaft.

13. In a reel including a rotary drum on a frame for driving successive rolls winding on a core shaft, the combination of ways on said frame for supporting each said shaft during winding thereon, means on said ways forming a pair of tracks adapted to support each end of said shaft, said tracks in each said pair being spaced axially of said drum to provide a slot therebetween, bearing means and a bearing housing for each end of said shaft, each said bearing housing including a pair of axially spaced cylindrical wheel portions between the bearing enclosing portion thereof and proportioned to roll on said tracks while maintaining said bearing enclosing portion out of contact with said tracks, carriages slidable on said ways between said tracks and including means extending upwardly through said slots to form a yoke for receiving the adjacent said bearing housing, and fluid pressure cylinders connected to said frame and to said carriages for cooperation therewith to control the pressure between said drum and the roll winding on said shaft.

14. In a reel including a rotary drum on a frame for driving successive rolls winding on a core shaft, the combination of ways on said frame for supporting each said shaft during winding thereon, means on said ways forming a pair of tracks adapted to support each end of said shaft, said tracks in each said pair being spaced axially of said drum to provide a slot therebetween, bearing means and a bearing housing for each end of said shaft, each said bearing housing including a pair of axially spaced cylindrical wheel portions between the bearing enclosing portion thereof and proportioned to roll on said tracks while maintaining said bearing enclosing portion out of contact with said tracks, carriages slidable on said ways between said tracks and each including inner and outer horns projecting upwardly through said slots to define a yoke for receiving the adjacent said bearing housing therebetween, means pivoting each said outer horn to the associated said carriage, said tracks each including a downwardly inclined outer end portion, double-acting fluid pressure cylinders connected to said carriages and said frame below said tracks, control means for selectively applying pressure to either end of said cylinders to draw said carriages toward said drum or to push said carriages away from said drum with resulting control of the pressure between said drum and the winding roll, and means responsive to movement of said carriages to said inclined portions of said tracks to cause downward pivoting of said outer horns on said carriages with resulting opening of said yokes for free rolling of said bearing housings down said inclined track portions.

15. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of ways on said frame for supporting each said core during winding thereon, a pair of double acting hydraulic cylinders having connections with said frame and the ends of each said core for controlling the pressure between the drum and the roll winding on said core, said cylinders being arranged to resist movement of said roll from said drum in response to the application of pressure fluid to one end thereof and to push said roll away from said drum in response to application of pressure fluid to the other end thereof, a pair of positive displacement fluid pumps each connected in the supply line to said one end of one of said cylinders respectively, and means coupling said pumps to cause movement thereof in unison in response to the flow of pressure fluid in either direction therethrough to meter said fluid flow to and from said end of each said cylinder with resulting maintenance of uniformly conjoint movement of the ends of said core.

16. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of ways on said frame for supporting each said core during winding thereon, a pair of double acting hydraulic cylinders having connections with said frame and the ends of each said core for controlling the pressure between the drum and the roll winding on said core, said cylinders being arranged to resist movement of said roll from said drum in response to the application of pressure fluid to one end thereof and to push said roll away from said drum in response to application of pressure fluid to the other end thereof, a pair of positive displacement fluid pumps each connected in the supply line to said one end of one of said cylinders respectively, means coupling said pumps to cause movement thereof in unison in response to the flow of pressure fluid in either direction therethrough to meter said fluid flow to and from said end of each said cylinder with resulting maintenance of uniformly conjoint movement of the ends of said core, and means under the control of the operator for selectively relieving pressure in either said supply line without affecting the pressure in the other said supply line.

17. In a reel including a rotary drum on a frame for driving successive rolls winding on cores, the combination of ways on said frame for supporting each said core during winding thereon, a pair of double acting hydraulic cylinders having connections with said frame and the ends of each said core for controlling the pressure between the drum and the roll winding on said core, said cylinders being arranged to resist movement of said roll from said drum in response to the application of pressure fluid to one end thereof and to push said roll away from said drum in response to application of pressure fluid to the other end thereof, a main supply line of pressure fluid, a four-way valve connected with said main supply line, a pair of separate branch supply lines from one end of said valve to said one end of each of said cylinders, a branch passage connecting the other line of said valve to the other ends of said cylinders, an open connecting passage between said ends of said valve to provide for flow of pressure fluid between the ends of said cylinders, a pair of positive displacement fluid pumps each connected in one of said pair of branch supply lines, and means coupling said pumps to cause movement thereof in unison in response to the flow of pressure fluid in either direction therethrough to meter said fluid flow to and from said one end of each said cylinder with resulting maintenance of uniformly conjoint movement of the ends of said core.

18. In a reel including a rotary drum on a frame for driving successive rolls winding on a core shaft, the combination of ways on said frame each having a pair of tracks thereon for supporting the opposite ends of said shaft during winding thereon, said tracks in each said pair being spaced axially of said drum to provide a slot therebetween, bearing means and a bearing housing for each end of said shaft, each said housing including cylindrical wheel portions proportioned to roll on said tracks, carriages slidable on said ways between said tracks and each including inner and outer horns projecting upwardly through said slots to define a yoke for receiving the adjacent said bearing housing therebetween, means pivoting said outer horns to said carriages, a pair of double acting hydraulic cylinders connected with said frame and said carriages to move said carriages towards and away from said drum upon application of pressure to one or the other end thereof, a main supply line of pressure fluid, a four-way valve connected with said main supply line, a pair of separate branch supply lines from one end of said valve to said one end of each of said cylinders, a branch passage connecting the other end of said valve to the other ends of said cylinders, an open connecting passage between said ends of said valve to provide for flow of pressure fluid between the ends of said cylinders, a pair of positive displacement fluid pumps each connected in one of said pair of branch supply lines, means coupling said pumps for movement in unison in response to the flow of pressure fluid in either direction therethrough to

meter said fluid flow to and from said one end of each said cylinder with resulting maintenance of uniformly conjoint movement of the ends of said core, and means responsive to movement of said carriages to a predetermined position on said ways spaced from said drum to cause downward pivoting of said outer horns and opening of said yokes for free movement of said roll on said tracks.

19. In a reel including a rotary drum on a frame for driving successive rolls winding on a core, the combination of primary arms adapted to receive each said core and mounted on said frame for swinging movement with respect to said drum to carry said core around the surface of said drum, secondary supports on said frame for receiving said core from said primary arms and supporting said core during winding thereon, yokes on said arms for retaining each said core therewithin during movement of said core towards and away from said drum, generally C-shaped slides on said arms for supporting said core within said yokes, means under the control of the operator for shifting said slides between an outer limit position wherein said slides support said core out of contact with said drum and an inner limit position wherein said slides urge said core into driven engagement with said drum for starting of the roll thereon, carriages on said secondary supports for receiving the started roll from said arms for further winding, fluid pressure means for controlling the movements of said carriages to regulate the pressure between said roll and said drum during winding, drive means for swinging said arms around said drum to transfer the started roll to said carriages, and means on said secondary supports responsive to movement of said roll with said carriages to a release position beyond said yokes for actuating said drive means to swing said arms away from said carriages leaving said roll on said carriages.

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