Nov. 23, 1943. L. SCUSA 2,334,793

TOILET PAPER ROLL WINDING APPARATUS

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FIG. 1.

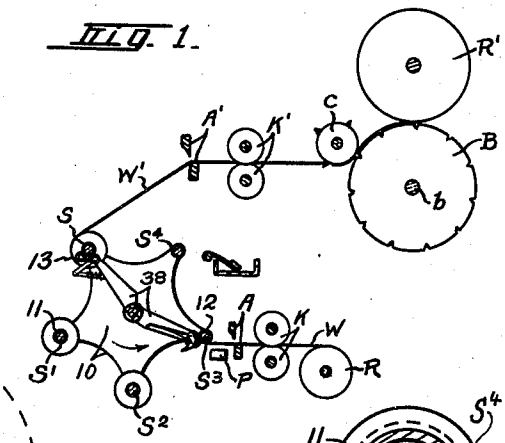
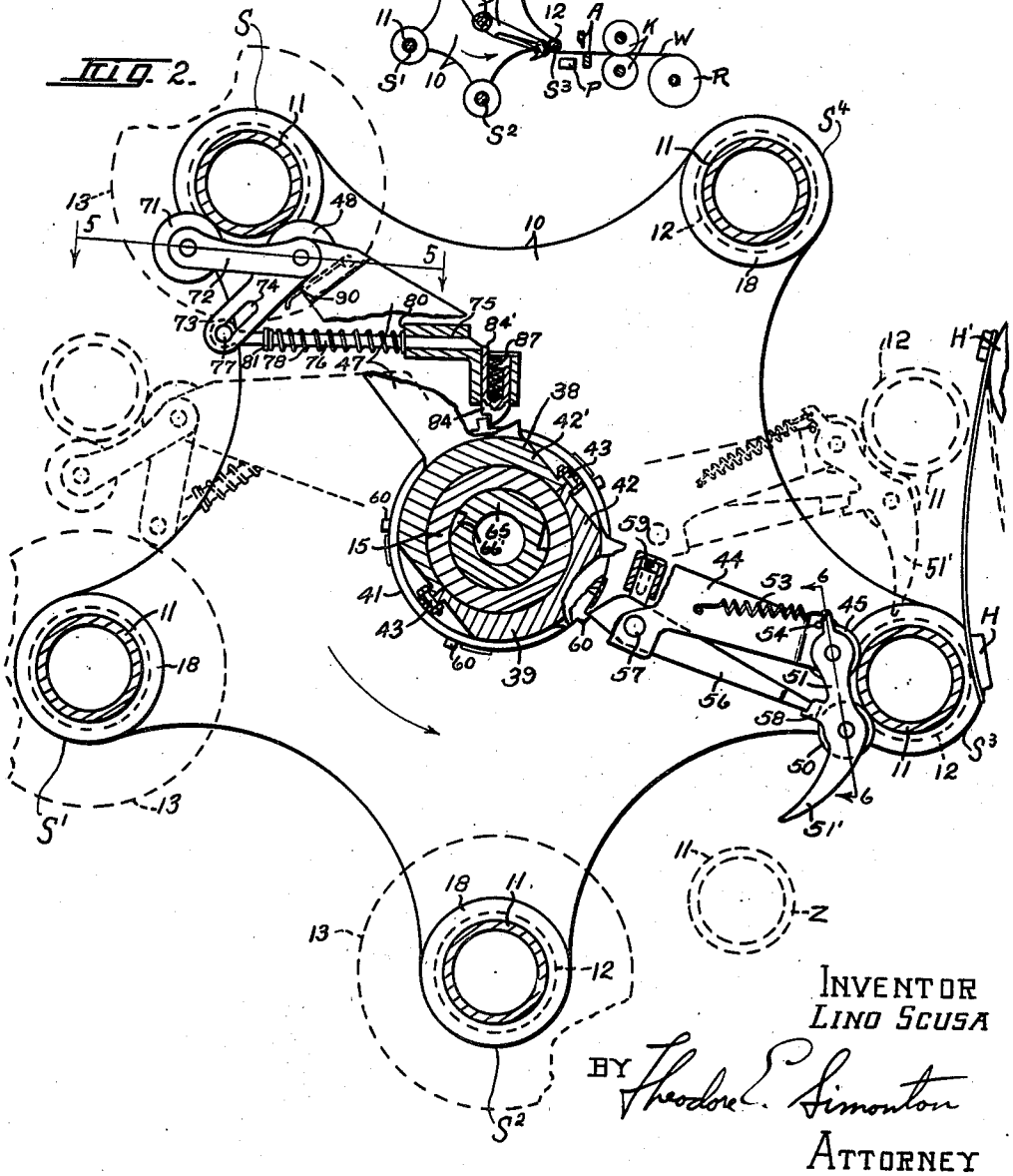


FIG. 2.



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TOILET PAPER ROLL WINDING APPARATUS

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FIG. 3.

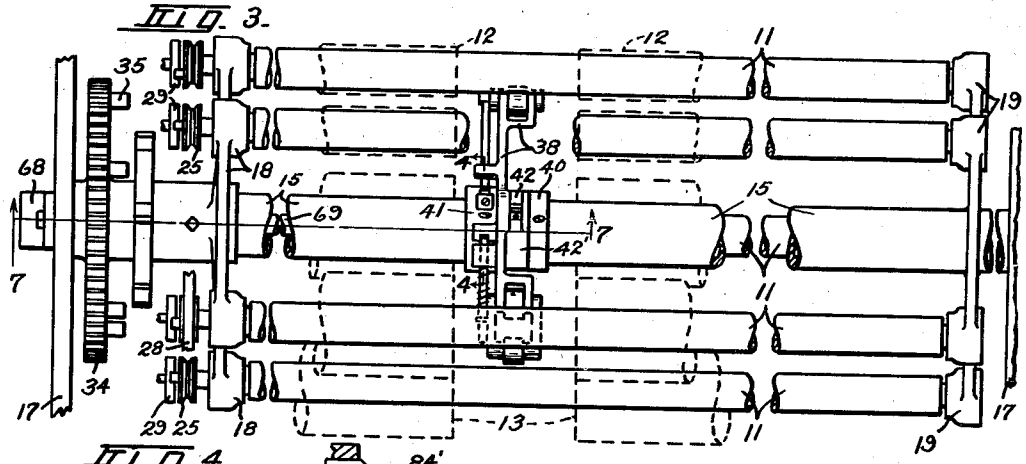


FIG. 4.

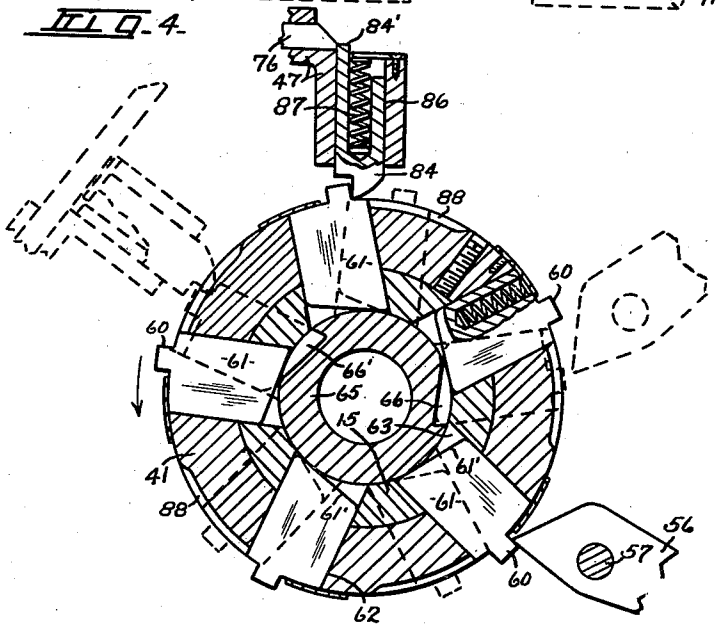


FIG. 5.

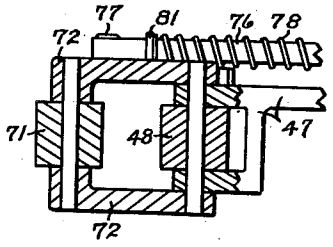
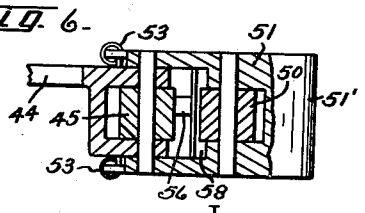


FIG. 6.



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FIG. 7.

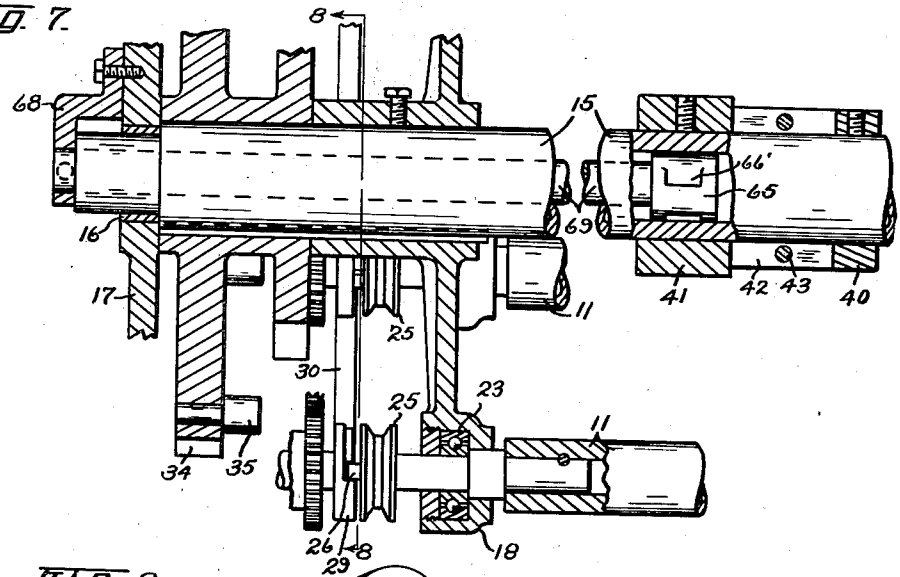
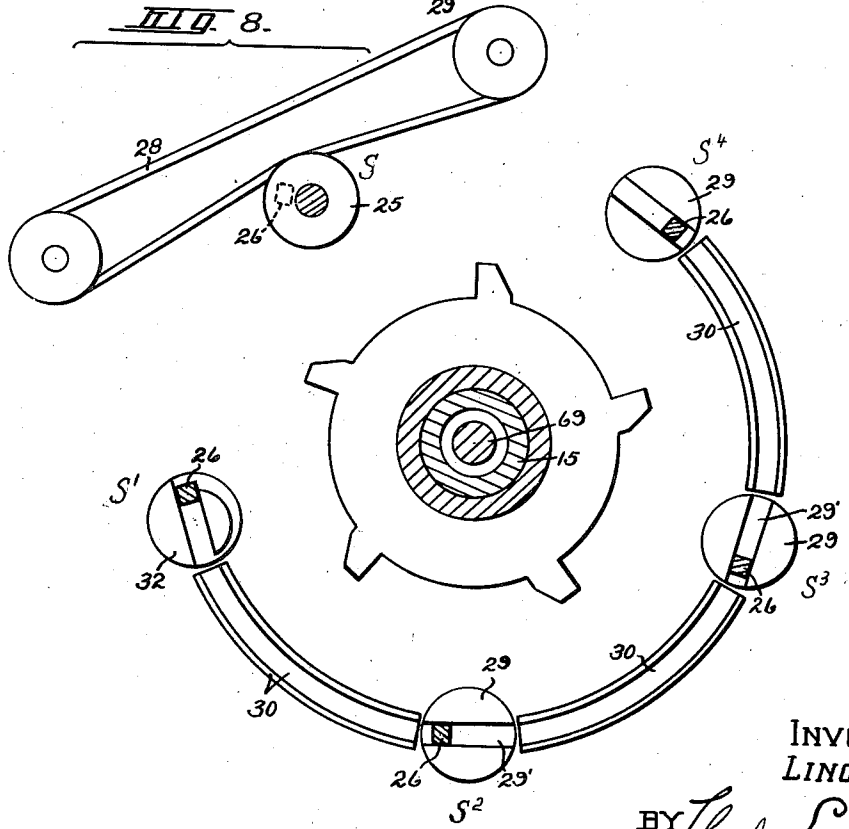


FIG. 8.



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Patented Nov. 23, 1943 2,334,793

UNITED STATES PATENT OFFICE

2,334,793

TOILET PAPER ROLL WINDING APPARATUS

Lino Scusa, Phoenix, N. Y.

Application June 26, 1940, Serial No. 342,512

18 Claims. (Cl. 242—64)

This invention relates to improvements in machines for winding rolls of toilet paper or the like wherein paper unwound from a jumbo roll is first perforated at intervals to form sheets, then slit longitudinally to form strips of predetermined width corresponding to the length of the rolls to be wound, after which these strips are wound on cores carried by winding mandrels.

In conventionally constructed machines of the above mentioned type, it will be understood that the mandrels are of greater length than that of the jumbo roll to wind the web drawn from the jumbo roll thereon. The jumbo rolls now used are usually eighty-one inches long and the web unwound therefrom is slit so as to provide eighteen strips each four and one-half inches wide from which toilet paper rolls are wound. It therefore follows that each mandrel is at least eighty-one inches long between bearing supports therefor, with the result the mandrels quite readily flex laterally at their centers. The rotation of the mandrels and, therefore, the speed of operation of the machines used heretofore is limited due to the fact that if the mandrels are rotated above a certain speed, substantially twelve hundred R. P. M., the mandrels whip or vibrate laterally to such an extent that the paper strips often tear where weakened at the perforations.

The main object of this invention is to produce a toilet paper roll winding machine which may be successfully operated at a much higher rate of speed than has heretofore been possible with conventionally constructed machines of this type.

A further object of the invention is to produce a machine having an increased capacity whereby a larger number of toilet paper rolls may be successfully wound at one and the same time.

A more specific object of the invention resides in providing an auxiliary support for the winding mandrels releasably engageable therewith substantially midway between the conventional bearing supports for said mandrels whereby the mandrels will be maintained against lateral vibratory movement during winding of paper rolls thereon.

Paper winding machines of the type disclosed herein and as shown in my Patent No. 1,421,730, dated July 4, 1922, are often provided with a reel which carries a plurality of winding mandrels. The reel is indexed to successively bring the mandrels into the paper winding position and a mechanism is provided for winding cores on the mandrels in advance of the winding of the paper thereon.

Another object of the invention is to provide an auxiliary support releasably engageable with a mandrel during the formation of cores thereon in advance of the winding of paper on the cores, whereby said mandrel is maintained against lateral springing movement which may be caused by the pressure of heating elements on the cores.

Other objects and advantages pertaining to the details of the structure of my improved device and to the form and relation of the parts thereof will more fully appear from the following description taken in conjunction with the accompanying drawings, in which:

Figure 1 is a diagrammatic view of a machine embodying the various features of this invention, illustrating the manner in which paper rolls and the cores therefor may be simultaneously formed on the winding mandrels.

Figure 2 is a transverse sectional view of a winding mandrel reel illustrating auxiliary bearing supports for the mandrels in accordance with my invention.

Figure 3 is a plan view of the reel illustrated in Figure 2 with the auxiliary support for the winding mandrels associated therewith, portions of the reel and mandrels being broken away and in section.

Figure 4 is an enlarged detail transverse sectional view taken substantially on line 4—4, Figure 3, illustrating the manner of releasably locking the bearing supporting elements in cooperative relation with the winding mandrels positioned at the stations for winding the paper rolls and the cores therefor.

Figure 5 is a detail horizontal sectional view taken on line 5—5, Figure 2.

Figure 6 is a detail vertical sectional view taken on the line 6—6, Figure 2.

Figure 7 is an enlarged detail vertical longitudinal sectional view taken substantially on line 7—7, Figure 3.

Figure 8 is a detail vertical sectional view taken substantially in the plane of the line 8—8, Figure 7, illustrating the drive means for rotating the winding mandrels.

In the toilet paper roll winding apparatus illustrated in Figure 1 of the drawings, 10 indicates a reel mounted for rotation about a fixed horizontal axis and having a plurality of, in this instance five, winding mandrels 11 rotatably journaled therein with their axes parallel to and equidistant from the axis of rotation of the reel. One of the mandrels is shown positioned at the toilet paper winding station S, a second mandrel is shown positioned at a label applying station S^1, a third mandrel is shown positioned at the roll

ejection station S^2, a fourth mandrel is shown positioned at the core winding station S^3, while the fifth mandrel is shown positioned at an adhesive applying station S^4.

The cores 12 for the toilet paper rolls are formed from cardboard or other suitable material wound in a roll R which is rotatably mounted on the machine at the rear of the reel 10. The web W drawn from the roll R is passed between a plurality of rotary slitting knives K to form strips having a width substantially equal to the length of the paper rolls to be formed. These strips pass from the slitting knives K between strip severing knife elements A and thence to the mandrel 11 positioned at the core forming station S^3. Each mandrel 11 is provided with suitable gripping elements (not shown). These elements on the mandrel at station S^3 grip the core material and cause the same to rotate with said mandrel. The strips of core material are severed transversely by the knife elements A during the winding of the cores into suitable lengths. Glue or other suitable adhesive is applied to the core material from a pot P by any suitable means and heating elements H carried by a shaft H' (Figure 2) press adjacent portions of the core into contact with each other to cause the same to adhere to each other. After the cores are wound on the mandrel at station S^3, heating elements H are moved away from the cores by rotation of shaft H' and the reel 10 is indexed one-fifth of a revolution to bring the mandrel having the cores thereon to station S^4. At station S^4 suitable adhesive material, such as glue, is applied to the exterior surface of the cores carried by the mandrel. By the next indexing of the reel 10, the mandrel at station S^4 is moved to station S where the paper is wound on the cores carried by said mandrel.

The paper wound on the cores 12 is drawn from a jumbo roll R' which, in this instance, is indicated as being mounted above a grooved drum or cylinder B which in turn is mounted on a drive shaft b to be rotated thereby. The jumbo roll R' is in surface contact with the cylinder B so that rotation of the cylinder will produce corresponding rotation of the jumbo roll and thereby unwind the web from said roll. This web, as W', is drawn between perforator rollers C and the cylinder B where the web is perforated transversely to form sheets of predetermined length. The web then passes from the perforator roller C between a pair of rotary slitting knives K' which cut the web into strips of the same width as the length of the paper rolls to be formed. These strips are then passed between strip severing knife elements A' into engagement with the adhesive coated cores 12 to be picked up by the cores and wound thereon. Knife elements A' cut the strips transversely, after which the reel 10 may be again indexed to bring the rolls as 13 formed at station S to station S^1 where labels may be applied in any suitable manner to the rolls. When the reel 10 is again indexed, the rolls 13 carried by the mandrel positioned at station S^1 are moved to station S^2 where the rolls are ejected from the mandrel by any suitable means and in any suitable manner.

The reel 10 comprises a hollow or tubular shaft 15 which is journaled in suitable bearings 16 provided in the frame 17 of the machine, as indicated in Figures 3 and 7. The reel 10 carries a plurality of, in this instance five, mandrels 11, which are journaled in suitable bearing members 23 provided in the heads 18 and 19, secured to shaft 15 to rotate therewith. Each mandrel has a pulley 25 secured thereto. Each of these pulleys is provided with a drive lug 26 arranged at one side of the axis of rotation of the pulley. Each pulley 25 is adapted to engage the lower run of a belt 28 when the mandrel connected therewith is at the winding station S for producing rapid rotation of said mandrel.

The mandrels are rotated slowly at the discharge station S^2 by a drive head 29 engaging the lug 26 connected with the mandrel at station S^2. Similarly, the mandrels are rotated at stations S^3 and S^4 by drive heads 29, as indicated in Figure 8. The lugs 26 are brought into alignment with a guide track 30 at station S' by means of a suitable positioning head 32 and clutch mechanism associated therewith. The track 30 extends from the member 32 to station S^4, as indicated in Figure 8 so that the drive lugs will register with slots 29' provided in the drive heads 29. The drive heads 29 and the member 32 may be rotated in any suitable manner which is not believed to be necessary to further explain in connection with this application.

The reel 10 is indexed by a suitable segmental gear (not shown) meshing with a driven gear 34 connected with the reel shaft 15, as shown in Figures 3 and 7. The reel may be releasably locked in the indexed positions by any suitable means engaging the studs 35 connected with the gear 34.

The novel features of this invention reside in an auxiliary bearing support 38 carried by the reel 10 and which is adapted to supportably engage the mandrels 11 positioned at the paper roll winding station S and the core winding station S^3. The auxiliary bearing support 38, as shown in the drawings, comprises a hub 39 which is mounted on the reel shaft 15 substantially midway of the ends of said shaft for oscillation about the shaft between a collar 40 and a cam follower housing 41 secured to said shaft. The hub 39 is composed of two hub sections 42 and 42' secured to each other by bolts 43. The hub section 42 has an arm 44 extending therefrom which carries a roller 45 at the outer end thereof adapted to bear against a mandrel 11 positioned at the core winding station S^3, as indicated in Figure 2. The hub section 42' is provided with an arm 47 extending outwardly therefrom and which rotatably supports a roller 48 at its outer end adapted to contact with a mandrel 11 positioned at the roll winding station S. The rollers 45 and 48 are so mounted on the arms 44 and 47 that they contact with the respective mandrels so indexed when the axis of rotation of each roller is in a line extending radially from the reel shaft 15 through the axis of the mandrel contacted by that roller.

The arm 44 also carries a second bearing roller 50 which is connected with the outer end of said arm by a yoke 51 to swing about the axis of the roller 45, as shown in Figures 2 and 6. The roller 50 is normally urged outwardly into engagement with the mandrel 11 at station S^3 behind said mandrel by a spring 53 connected to the yoke 51 and arm 44, as shown in Figure 2. A stop pin 54 provided on the arm 44 limits the outward swinging movement of the lower end of said yoke and the roller 50. The roller 50 is releasably locked in its outermost position by means of a rock arm or latch 56 pivoted at 57 to the arm 44 in slightly outward spaced relation to the hub section 42. The latch

56 has the outer end thereof normally positioned in latching engagement with a keeper 58 provided on the yoke 51. The other or inner end of the latch 56 is positioned adjacent the housing member 41 for rocking thereof in one direction by a latch releasing spring 59 to release the latch and for rocking thereof in the opposite direction to rock the latch into latching position by each one of a series of lugs 60 rendered successively effective by indexing of the reel. One lug 60 is provided on each of a plurality of, in this instance five, plungers or cam followers 61 slidable radially of shaft 15 and carried in corresponding substantially radially disposed apertures 62 provided in the housing member 41. These cam followers 61 are arranged in substantially uniformly spaced relation around shaft 15, as illustrated in Figure 4, and have the inner ends thereof projecting through corresponding radially disposed openings 63 provided in the reel shaft 15 in alignment with corresponding apertures 62. The inner ends of the cam followers 61 are beveled, as at 61', and are adapted to normally ride on the peripheral surface of a cylindrical cam member 65 mounted within the shaft 15 adjacent the housing member 41. Each follower 61 is spring urged inward, and its outward movement is positively limited by suitable arresting means, as shown in Figure 4. At the outward limit of motion of each follower, the lug 60 on the outer end of that follower is protruded from the periphery of the member 41, as shown.

The cam member 65 is provided with a pair of circumferentially spaced cam recesses 66 and 66' forming low points on the cam in the path of travel of the cam followers 61 about said cam 65. The cam member 65 is maintained stationary against rotation with the reel 10 by means of a holding arm or bracket 68 secured to the machine 17 and to the outer end of a rod 69 which extends axially into the hollow shaft 15 and is secured to the cam 65, as illustrated in Figure 7.

Associated with the arm 47 is a second roller 71 which is connected with said arm by a yoke 72 to swing about the axis of the roller 48. The yoke 72 is provided with a pendent arm 73 having a slot 74 extending longitudinally thereof.

Slidably mounted in aperture 75 provided in the arm 47 is a holding rod 76 which has one end pivotally connected with the arm 73 by a pin 77 slidably received in the slot 74. A spring 78 may, as shown in Figure 2, be mounted upon the rod 76 between a shoulder 80 on the arm 47 and a collar 81 provided on the rod 76 for yieldingly urging the roller 71 to its outermost position for engagement with the mandrel 11 at the roll winding station S in front of that mandrel. The rod 76 is releasably maintained in its outermost position by a stop plunger or latch member 84 slidably mounted in an aperture 85 provided in the arm 47 in right angular relation to the aperture 75.

The plunger 84 is yieldingly urged by a spring 87 into engagement with the peripheral surface of the housing member 41 and into the path of movement of the holding lugs 60. The plunger 84 is provided with an upwardly extending stop member 84' which normally projects into the path of movement of the inner end of the rod 76 for holding said rod against inward movement. The housing member 41 is provided with a recess 88 in the peripheral surface thereof at the rear of each cam follower 61 adapted to receive the inner end of plunger 84. Each recess 88 opens at its leading end into one of the cam follower guide slots 62, and the plunger 84 is seated, in each indexed position of the series of mandrels 11, on the outer end of one of the cam followers 61 behind the lug 60 on that follower so that when that follower (during the next indexing operation) enters recess 66', the plunger 84 is moved inward by spring 87 to the annular path of travel of the bottoms of the recesses 88 and will remain so pressed inward while said plunger is engaged in the adjacent or following recess 88 during said next indexing operation. Movement of said plunger into its said inwardly pressed position brings the stop member 84' out of the path of movement of the rod 76 and thereby permits said rod to move inwardly through the aperture 75. Roller 71 is thus released and is free to be swung inwardly to a position inside the path of movement of the mandrels 11 and thus release the support 38 from the mandrel positioned at the roll forming station S. A spring 90 connected with the arm 47, as shown in Figure 2, may be utilized to function in conjunction with the spring 76 for urging the yoke 72 to its outermost position with the roller 71 maintained in engagement with an adjacent mandrel.

In operation, there is a pair of rolls R and a pair of jumbo rolls R' used and the rolls of each pair are separated from each other to permit the support 38 to operate between the two series of cores and paper rolls wound therefrom. When the reel 10 is indexed, the auxiliary support 38 moves in unison with the reel and mandrels 11 during the initial movement of the reel or until the cam followers 61 associated with the latch or holding members 56 and 84 move into registration with and enter respectively the cam recesses 66 and 66'; that is, during the movement of the arms 44 and 47 from the position indicated in full lines to that indicated in broken lines in Figure 2. As the cam followers enter the cam recesses 66 and 66', the lug 60 engaged behind the latch 56 moves inward out of contact with said latch and permits the adjacent end thereof to be rocked over said lug by spring 59, with the result that the outer end of the latch 56 is moved out of engagement with the stop 58, thereby releasing the yoke 51. Simultaneously with the releasing of the yoke 51, the rod 76 and yoke 72 are released by the latch member 84 being moved inwardly by the action of the spring 87 upon inward movement of the cam follower 61 associated with said latch. When the rod 76 is released, the roller 71 is free to be swung inwardly against the action of the spring 78 and release the auxiliary support 38 from the mandrel 11 leaving station S. The preponderance of weight of the auxiliary support is at the side having the arm 44 so that when yokes 51 and 72 with their rollers 50 and 71 are released, arm 44 swings downwardly and arm 47 swings upwardly or turn in unison about shaft 15 in a direction opposite to the direction of indexing rotation of the reel or mandrel carrier 10. As the released arm 44 approaches that mandrel 11 which is about to move into the core winding station S^3, which mandrel will then be in substantially the position illustrated at Z, Figure 2, a tail piece 51' formed at the lower end of the yoke 51 engages the mandrel and swings the lower end of yoke 51 inwardly against the action of the spring 53 so that roller 50 travels over the mandrel to the lower side thereof. As the axis of roller 45 on said descending arm nears the radial line through the axis of shaft 15 and

the axis of the mandrel at said position Z, the latch 56 is engaged by the lug 60 on one of the cam followers 61 and is rocked thereby into latching position as the axis of said roller 45 moves into said radial line, thereby locking roller 50 in its projected position behind said mandrel with both rollers 45 and 50 engaged with said mandrel in mandrel supporting position. As the rollers 45 and 50 are thus brought into holding engagement with the mandrel positioned at Z, the rollers 48 and 71 move into holding engagement with the mandrel 11 approaching the paper winding station S. It will be understood that the yoke 72 and roller 71 are moved to their outermost position by the spring 78 after the roller 71 passes beyond the mandrel 11 moving from station S to station S^1 during the aforesaid upward or reverse movement of arm 47. The latch 84 is moved outwardly against the action of spring 86 as said latch moves out of the groove 88 in which it was engaged during a part of the indexing operation and thereby brings the stop member 84' into the path of movement of rod 76 to lock roll 71 in its projected position to engage in front of the mandrel 11 approaching station S.

As the rollers 71 and 48 in their latched relation are brought by the upward or reverse movement of arm 47 into engagement with the mandrel 11 approaching the paper winding station S, said rollers cause the arms 44 and 47 to rotate in unison with the reel until the end of the indexing movement of the reel. The rollers 45 and 50, and 48 and 71 will thus be maintained in holding relation with their respective mandrels until the reel is again indexed, whereupon the auxiliary supporting mechanism will again be shifted from engagement with the mandrels leaving the stations S and S^3 and be brought into holding relation with the mandrels approaching said stations. In each stationary indexed position of the reel the lug 60 of one cam follower 61 is engaged behind the inner arm of latch 56 to hold the latch in latching position, and the latch plunger 84 is held projected outward by another one of the cam followers 61 with lug 60 of the latter follower in advance of said plunger. The latch plunger 84 is adapted, as shown, for outward camming of the plunger by lugs 60 on the cam followers and by the rear end walls of the recesses 88 during reverse movement of arm 47.

It will be understood that prior to the indexing of the reel, the heating elements H will be moved out of engagement with the core members formed on the mandrel at station S^3 by rocking of the shaft H' in the usual manner.

Furthermore, it is apparent that, with the mandrels 11 at the winding stations S and S^3 supported at their centers by my novel bearing support, the mandrels may be materially increased in length without a decrease in the speed of operation of the machine being necessary. In other words, by the use of the auxiliary mandrel bearing support, I am enabled to not only increase the speed of operation of the apparatus about fifty percent but am also enabled to increase the lengths of the mandrels so that instead of eighteen toilet paper rolls and the cores therefor being wound, twenty-four such rolls and cores may be wound simultaneously on the mandrels.

Although I have shown and particularly described the preferred embodiment of my invention, I do not wish to be limited to the exact construction shown as various changes both in the form and relation of the parts thereof may readily be made without departing from the spirit of the invention as set forth in the appended claims.

I claim:

1. In a paper roll winding apparatus of the class described having a winding station, in combination, a reel, a plurality of winding mandrels rotatably journaled in said reel with said mandrels extending longitudinally of the reel for movement in unison in a common circular path by rotation of the reel, indexing means for intermittently rotating the reel to successively bring the mandrels to said winding station, bearing elements engageable with circumferentially spaced portions of the mandrel presented at said station, supporting means for said bearing elements mounted on said reel for oscillatory rotation about the reel axis with respect to said reel, at least one of said bearing elements having bodily movement with respect to the supporting means to releasably engage the mandrel presented at said station, and latching means including a cam and a holding member carried by the reel and by said supporting means and rendered effective by rotation of the reel for releasably holding said bodily movable bearing element against bodily movement from mandrel engaging position while the mandrel engaged thereby is presented at said station.

2. In a paper roll winding apparatus of the class described having a winding station, in combination, a reel, a plurality of winding mandrels rotatably journaled in said reel with said mandrels extending longitudinally of the reel for movement in unison in a common circular path by rotation of the reel, said reel being adapted to be intermittently rotated to successively bring the mandrels to said winding station, bearing elements engageable with circumferentially spaced portions of a mandrel presented at said winding station, a carrier frame for said bearing elements rotatably mounted on said reel for oscillation with respect to said reel about the reel axis, at least one of said bearing elements being mounted on the frame for movement with respect thereto into and inside of said circular path respectively toward and from an operative mandrel engaging position, a holding member movably mounted on the frame for releasably locking said movable bearing element in said operative position, and cam means rendered effective by rotation of the reel and oscillation of the frame for actuating the holding member to release said movable bearing member when a mandrel engaged thereby is moved from said station and to lock said bearing member in engaging position with the next mandrel presented at said station.

3. In a paper roll winding apparatus of the class described having core winding and paper winding stations, in combination, a reel, and a plurality of winding mandrels rotatably journaled in said reel with said mandrels extending longitudinally of the reel for movement in unison in a common circular path by rotation of the reel, said reel being adapted to be intermittently rotated to successively bring the mandrels to said winding stations, two groups of bearing elements adapted for engagement of the elements of one group at one of said stations and the elements of the other group at the other one of said stations with circumferentially spaced portions of the mandrels at said stations, a carrier frame for said groups of bearing elements rotatably mounted on said reel for oscillation with respect to the reel, at least one of the bearing elements of each group being mounted on the frame for outward

and inward movement with respect to said circular path respectively to and from an operative position in said path in holding engagement with a mandrel, means including two holding members respectively movably carried by the frame for releasably locking the movable bearing element of different ones of said two groups of elements in the operative position, and cam means rendered effective by rotation of the reel and oscillation of the frame for actuating the holding members to release the bearing elements held thereby upon movement of the held mandrels from said stations.

4. In a paper roll winding apparatus of the class described having a winding station, in combination, a reel member, a plurality of winding mandrels rotatably supported at their ends by said reel member, said reel member being adapted to be intermittently rotated to successively bring the mandrels to said station, an auxiliary supporting means for the mandrels including a frame member rotatably mounted on the reel member, bearing means on said frame member adapted to operatively engage a mandrel at the central portion thereof, means for actuating the frame member to bring the bearing means into successive operative engagement with the mandrels as said mandrels move to said winding station including spaced holding elements connected with one of said members to move therewith, one element for each mandrel, means on the other one of said members coacting with the holding elements for locking said members to each other, means for actuating the holding elements to unlock said members from each other, and means for rotating the frame member.

5. In a paper roll winding apparatus of the class described having a winding station, in combination, a reel member, a plurality of winding mandrels rotatably supported at their ends by said reel member, said reel member being adapted to be intermittently rotated in one direction to successively bring the mandrels to said station, an auxiliary supporting means for the mandrels including a frame member rotatably mounted on the reel member, bearing means on said frame member adapted to operatively engage a mandrel at the central portion thereof, means for actuating the frame member to bring the bearing means into successive operative engagement with the mandrels as said mandrels move to said winding station including spaced holding elements connected with said reel member to move therewith, one element for each mandrel, means on the frame member coacting with the holding elements for locking said members to each other, means having a cam action on the holding elements during said intermittent rotary movements of the reel member for unlocking the frame and reel members from each other, and means for rotating the frame member in the opposite direction with respect to the direction of rotation of said reel member.

6. In a paper roll winding apparatus of the class described having a winding station, in combination, a plurality of winding mandrels, supporting means for said mandrels including a reel member having bearing members engaging the ends of the mandrels for rotatably supporting the same, said reel member being adapted to be intermittently rotated to successively bring the mandrels to said winding station, auxiliary holding means for the mandrels including a rock frame member mounted on the supporting means for movement with respect thereto, bearing means on said frame member adapted to operatively engage said mandrels one at a time intermediate the ends thereof, and means for actuating the frame member to bring the latter bearing means into successive operative engagement with the mandrels as said mandrels move to said winding station.

7. In a paper roll winding apparatus of the class described having a winding station, in combination, a plurality of winding mandrels, supporting means for said mandrels including a reel member rotatably supporting the mandrels at their ends, said reel member being adapted to be intermittently rotated to successively bring the mandrels to said winding station, auxiliary holding means for the mandrels including a rock frame member mounted on the reel for movement with respect thereto, means releasably locking the reel and frame member to each other, bearing means on said frame member adapted to operatively engage said mandrels one at a time substantially medially of the ends thereof, means rendered effective by said intermittent movement of the reel for actuating the locking means to release the frame member, and means for rocking the released frame in a reverse direction to that of the rotary movement of the reel to bring the bearing means into successive operative engagement with the mandrels as said mandrels move to said winding station.

8. In a roll winding apparatus of the character described having a plurality of winding mandrels and a mandrel indexing reel in which each of the mandrels is journaled at the ends thereof, in combination, auxiliary means for supporting each of the mandrels in succession intermediate its ends at a winding station during the winding operation comprising a pair of bearing elements, a support mounted on the reel for movement with respect thereto, means operatively connecting the bearing elements to the support in lateral spaced relation to each other for engagement with circumferentially spaced portions of a mandrel intermediate the ends of the mandrel, means for producing relative movement of the support and reel during rotation of the reel, said connecting means including relatively movable holding members connected with at least one of the auxiliary bearing elements, and means connected with the holding members and actuated during movement of the reel for causing said latter bearing element to move out of the path of an adjacent mandrel whereby both of said bearing elements may move into and out of engagement with successive mandrels during relative movement of the support and reel.

9. In a roll winding apparatus of the character described, in combination, a plurality of winding mandrels, an indexing reel in which said mandrels are journaled at their ends, an auxiliary support for supporting the mandrels one at a time and intermediate their ends at a winding station comprising a pair of roller bearing members, a carrier mechanism for the bearing members including a rock frame journaled substantially coaxially with the reel, means connecting the bearing members with the frame in spaced relation to each other and with the axes of rotation thereof extending substantially parallel with the axes of rotation of the mandrels, said connecting means including relatively movable supporting members of such a character that at least one of the bearing members may move with respect to the frame from an operative to an inoperative position, means including holding elements con-

nected with the frame and reel releasably locking the movable bearing member in the operative position, and means for producing relative rotary movement of the reel and frame when the bearing member is released by the holding elements to bring the bearing members into successive operative engagement with the mandrels.

10. In a roll winding apparatus of the character described, in combination, a plurality of winding mandrels, an indexing reel in which said mandrels are journaled at their ends, an auxiliary support for supporting the mandrels one at a time and intermediate their ends comprising a pair of roller bearing members, a carrier mechanism for the bearing members including a rock frame journaled substantially coaxially with the reel, means rotatably connecting a first one of said bearing members to the frame for engagement with the mandrels one at a time intermediate the mandrel ends and substantially on a line connecting the axis of the engaged mandrel with the axis of the reel, means including a yoke mounted on the frame for movement with respect thereto connecting the second bearing member to the frame for operative engagement with a mandrel in circumferentially spaced relation to that of the first bearing member, means connected with the yoke and frame yieldingly urging the second bearing member outwardly with respect to the reel axis to the operative position, means controlled by the rotation of the reel for releasably locking the second bearing member in the operative position, and means for producing relative rotary movement of the reel and frame when the bearing member is released by the locking means to bring the bearing members into successive operative engagement with the mandrels.

11. In a roll winding apparatus of the character described, in combination, a plurality of winding mandrels, an indexing reel in which said mandrels are journaled at their ends, an auxiliary support for supporting two of the mandrels simultaneously intermediate their ends comprising two pairs of roller bearing members, a carrier mechanism for said bearing members including a rock frame journaled substantially coaxially with the reel, means rotatably connecting one member of each pair of said bearing members with the frame for concurrent engagement of said connected members with two different ones of said mandrels substantially on lines extending between the axes of the two engaged mandrels and the reel, two separate means each movably connected with the frame and each supporting one of the other bearing members for operative engagement with the mandrel engaged by the first mentioned member of the corresponding pair in circumferentially spaced relation to the first mentioned bearing member of the corresponding pair, and means yieldingly urging the second mentioned bearing members of said pairs to their operative positions.

12. A winding apparatus, as defined in claim 11, having means releasably locking the second mentioned bearing members of said pairs in their operative positions whereby the frame is caused to rotate with the reel, and means for actuating the locking means at a predetermined position of the reel for releasing said second mentioned bearing members.

13. A winding apparatus, as defined in claim 11, having means releasably locking the second mentioned bearing members of said pairs in their operative positions whereby the frame is caused to rotate with the reel, means for actuating the locking means at a predetermined position of the reel for releasing said second mentioned bearing members, and means for effecting rotation of the frame in a direction opposite to that of the reel subsequent to the release of said second mentioned bearing members to bring each pair of bearing members into successive operative engagement with the mandrels.

14. A roll winding apparatus of the character described comprising, in combination, a winding mandrel; supporting mechanism including bearing elements engageable with the ends of the mandrel for rotatably supporting said mandrel; an auxiliary support for the mandrel including a pair of contact members arranged substantially midway between the bearing elements in lateral spaced relation to each other for engaging circumferentially spaced portions of the mandrel; and holding means carried by the supporting mechanism maintaining the contact members in such cooperative relation with the mandrel that said mandrel is maintained against lateral vibratory movement thereby during the rotation thereof.

15. A roll winding apparatus of the character described comprising, in combination, a winding mandrel; supporting mechanism including bearing elements engageable with the ends of the mandrel for rotatably supporting said mandrel; an auxiliary support for the mandrel including a pair of contact members substantially shorter than the mandrels and arranged substantially midway between the bearing elements in lateral spaced relation to each other for engaging circumferentially spaced portions of the mandrel; and carrier means operatively connecting the contact members with the supporting mechanism, said carrier means including holding members arranged to provide a substantially rigid connection between the supporting mechanism and said contact members for maintaining the said latter members in operative engagement with said mandrel with a positive action, whereby said mandrel is maintained against lateral vibratory movement during the rotation thereof.

16. An apparatus for winding toilet paper rolls or the like, said apparatus comprising a core winding station and a paper roll winding station, a reel, a plurality of winding mandrels rotatably journaled at their ends in said reel, said reel being adapted to be intermittently rotated to successively bring the mandrels from one of said stations to the other, an auxiliary support for the mandrels including a pair of contact members substantially shorter than the mandrels and arranged in a plane extending normal to the mandrels substantially centrally thereof; and carrier means operatively connecting the contact elements with the reel, said carrier means including holding members arranged to provide substantially rigid connections between the reel and said contact members for simultaneously maintaining said members in operative engagement with the mandrels at said core winding station and paper roll winding station respectively, whereby said mandrels are maintained against lateral vibratory movement during the rotation thereof.

17. In a paper roll winding apparatus of the character described having a winding station, in combination, a reel, a plurality of winding mandrels rotatably journaled at their ends in said reel, said reel being adapted to be intermittently rotated to successively bring the mandrels to said winding station, auxiliary bearing elements mounted on the reel to rotate about the axis of

said reel to move into and out of holding engagement with successive ones of the mandrels for releasably supporting the mandrel presented at said station; means controlled by the movement of the reel for releasing the bearing elements from engagement with the mandrel moving out of the winding station, and separate means set into operation when said bearing elements are released for producing rotation of the bearing elements with respect to the reel to bring them into holding engagement with the mandrel moving into said winding station.

18. In a paper roll winding apparatus of the class described having a winding station, in combination, a reel, a plurality of winding mandrels journaled in said reel for individual rotation thereof in the reel and arranged in a circular path about the axis of the reel, indexing means for intermittently rotating the reel in one direction to present said mandrels one at a time at said winding station, a pair of auxiliary bearing elements releasably engageable with circumferentially spaced portions of a mandrel presented at said station, supporting means carried by the reel for supporting said bearing elements for movement of at least one thereof relatively to said circular path from a position in which said elements together releasably engage and support at circumferentially spaced points the mandrel presented at said station into a disengaged position in which the mandrel is unsupported by the bearing elements, and means releasable by indexing rotation of the reel for positively preventing the aforesaid bearing element movement relatively to said circular path while any one of said mandrels is presented at said station.

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