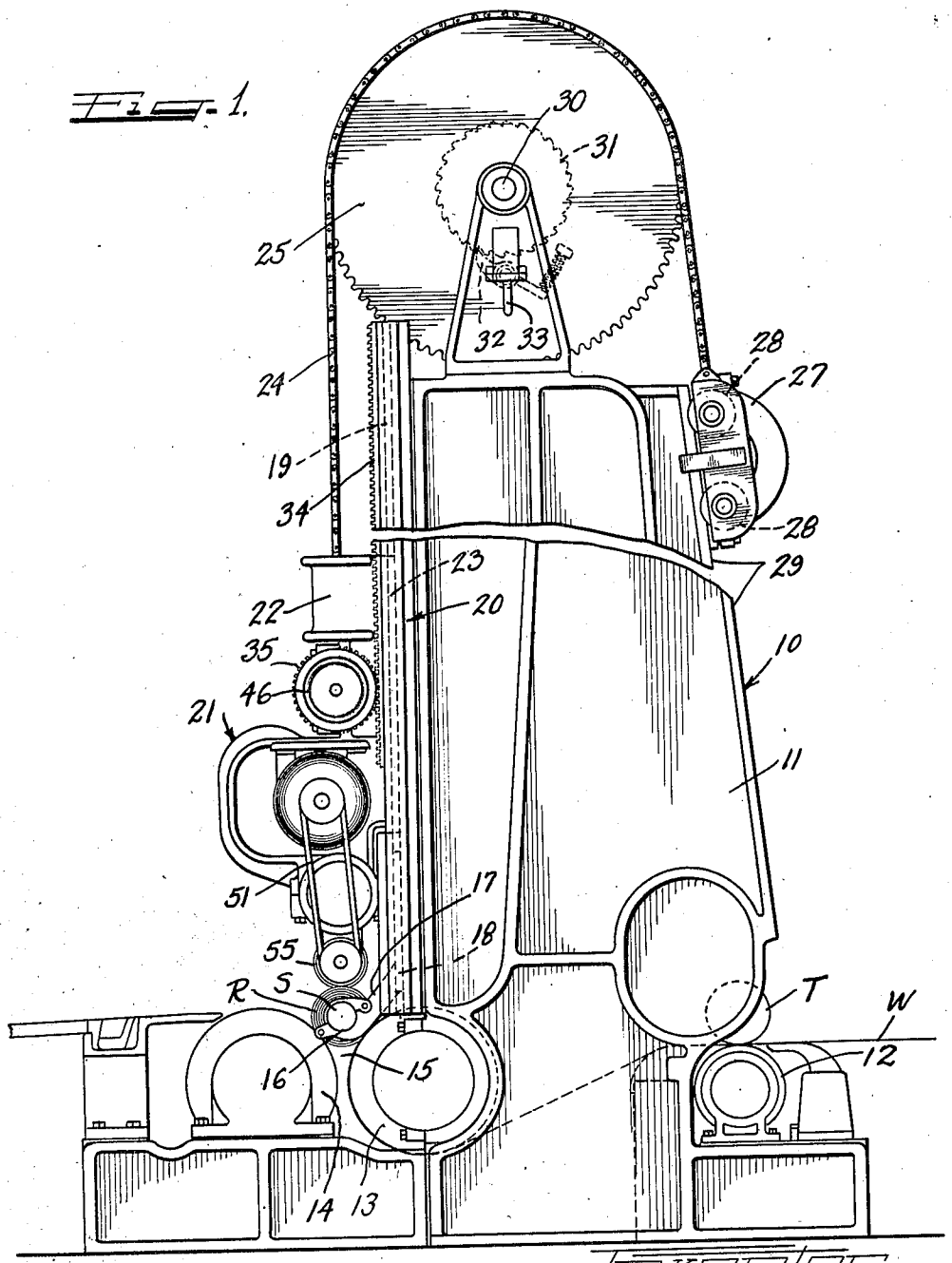
March 2, 1943. L. HORNBOSTEL 2,312,550

METHOD AND APPARATUS FOR SLITTING ROLLS

Filed Nov. 14, 1941 4 Sheets-Sheet 1

Fig. 1.



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METHOD AND APPARATUS FOR SLITTING ROLLS

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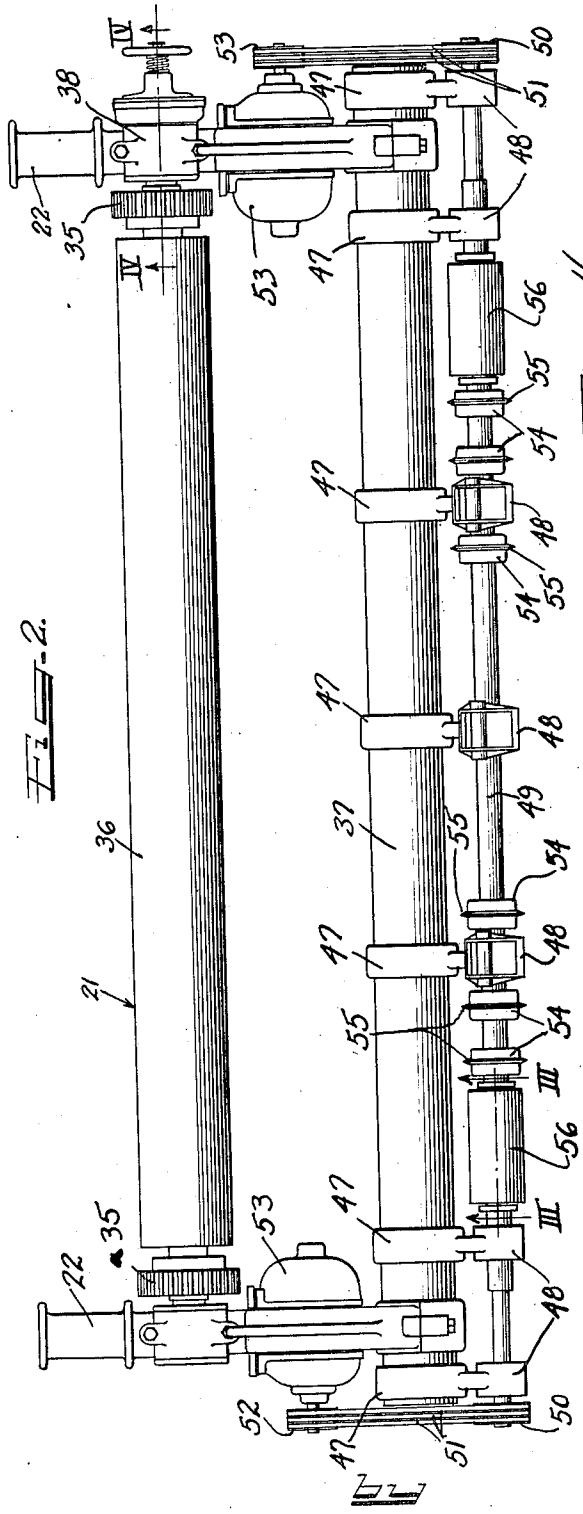


Fig. 2.

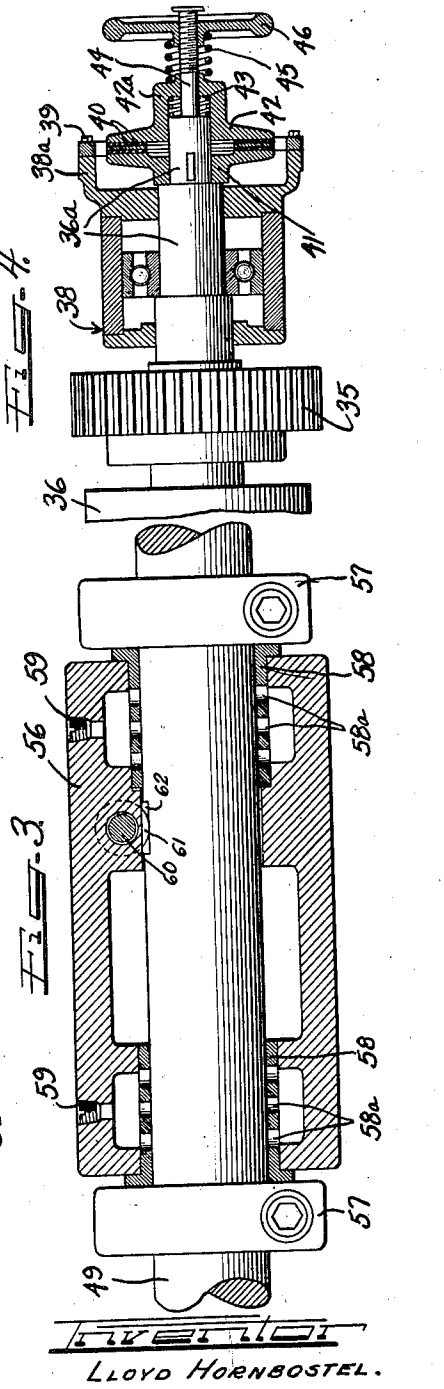


Fig. 4.

Fig. 3.

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METHOD AND APPARATUS FOR SLITTING ROLLS

Filed Nov. 14, 1941 4 Sheets-Sheet 3

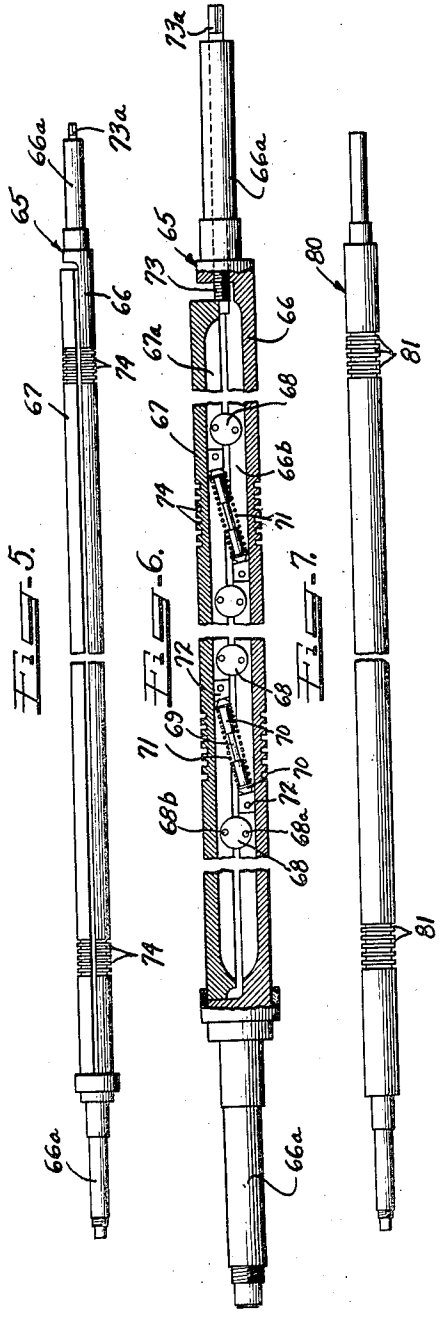


Fig. 5.

Fig. 6.

Fig. 7.

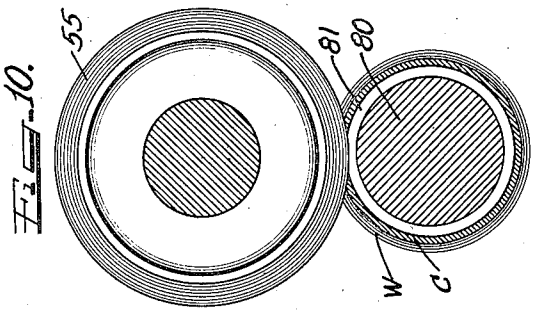


Fig. 10.

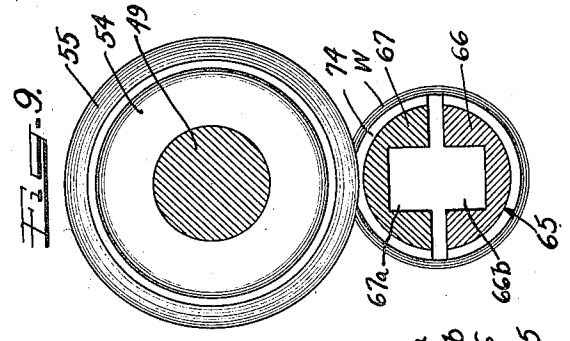


Fig. 9.

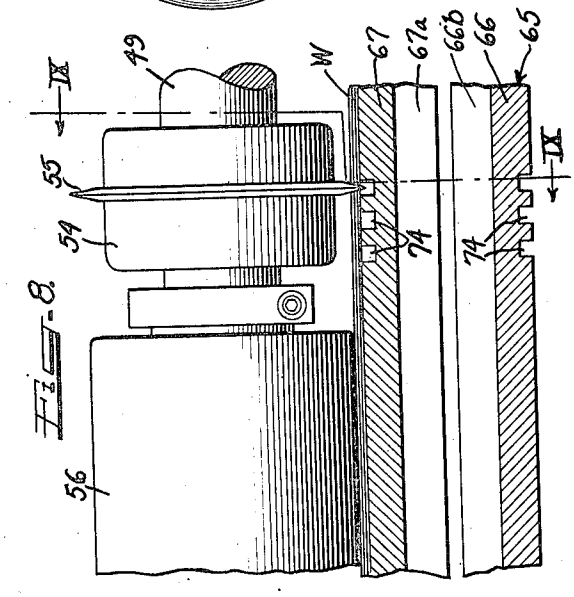


Fig. 8.

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METHOD AND APPARATUS FOR SLITTING ROLLS

Filed Nov. 14, 1941 4 Sheets-Sheet 4

Fig. 11.

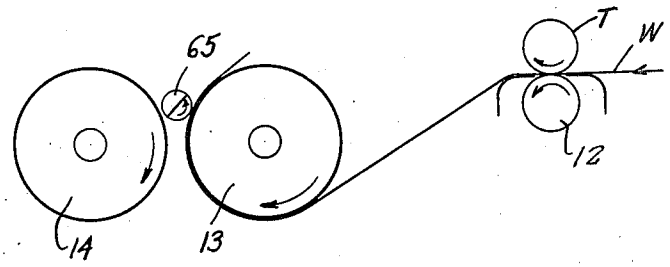


Fig. 12.

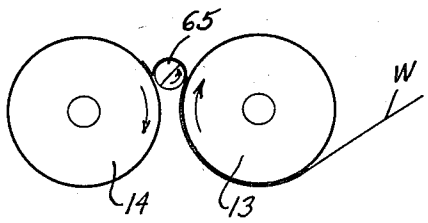


Fig. 13.

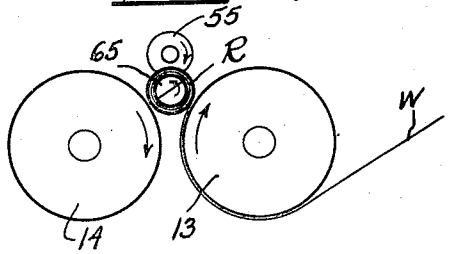


Fig. 14.

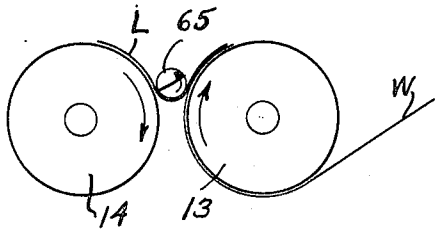


Fig. 15.

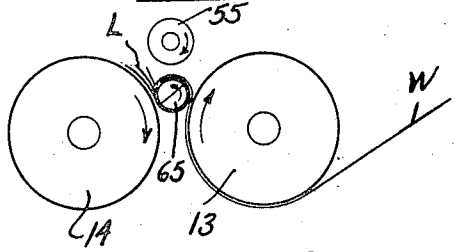


Fig. 16.

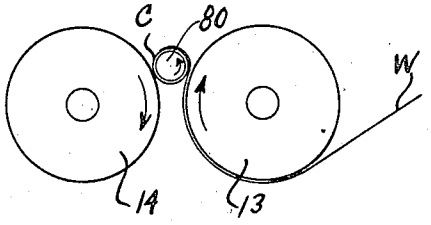
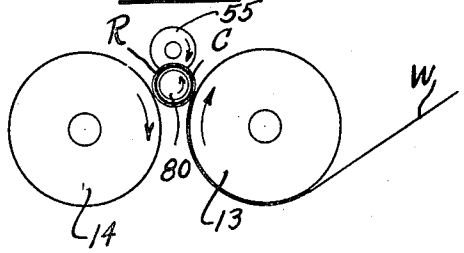


Fig. 17.



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Patented Mar. 2, 1943

2,312,550

UNITED STATES PATENT OFFICE

2,312,550

METHOD AND APPARATUS FOR SLITTING ROLLS

Lloyd Hornbostel, Beloit, Wis., assignor to Beloit Iron Works, Beloit, Wis., a corporation of Wisconsin

Application November 14, 1941, Serial No. 419,171

16 Claims. (Cl. 164—65)

This invention relates to the slitting of web material as it is being wound into rolls for producing a plurality of rolls from a single web.

More particularly this invention relates to the slitting of paper rolls as they are being wound to form a plurality of completely independent paper rolls from a single web of paper without damaging the edges of the paper even at the cores of the rolls.

While the invention will be hereinafter specifically described in connection with the production of counter rolls of paper such as are used by butchers, and merchants in general, for wrapping purposes, it should be understood that the invention is not limited to such use but is applicable to the slitting of webs in general as the same are being wound.

Heretofore it has been quite difficult to produce counter rolls on paper making machine winder apparatus because on a high speed paper machine every set of counter rolls being formed will be completely rolled in about one minute. These counter rolls are usually about nine inches in diameter and the winding of the rolls at this rapid rate of speed requires very effective slitters capable of preventing the counter rolls of paper from collapsing or running together. It has been customary to position the slitters at some distance away from the winder drums which roll up the paper. This slitter mounting, however, requires careful tucking of the slit sheets of paper around the new winder shaft each time a new set of counter rolls is started. If the tucking is not carefully performed the individual sheets will run together and make it impossible for the adjacent counter rolls to be separated.

Counter rolls are generally wound on a paper core which is carried by a solid winder shaft or are wound directly on a collapsible winder shaft without any cores. When cores were used it has heretofore been necessary to cut the same to the desired length ahead of time thereby necessitating the mounting of the short cores individually on the winder shaft.

When the rolls are formed without paper cores on a collapsible winder shaft, it is very difficult to wrap all of the individual slit sheets around a single collapsible shaft. This tucking operation is time-consuming and, as a result, the winder cannot keep up with the paper machine.

Thus in both types of prior counter roll winding procedures it has been necessary for the paper mill to install an additional winder to keep up with the paper machine.

The present invention now eliminates the necessity for an additional winder and makes it possible to produce counter rolls from the wide web of paper delivered by the paper machine at a sufficiently high rate of speed and with very little lost time between winding operations so that only a single winder is necessary per paper machine.

According to this invention the web of paper from the machine reel or from any other source is wound either directly around a single collapsible winder shaft or a single core on a winder shaft. After the sheet of paper has been wound for several turns around the shaft or core, positively driven rider slitters are brought down in contact with the roll being formed to slit this roll into a plurality of counter rolls of the desired length. The collapsible winder shaft or the solid shaft receiving the paper cores thereon is grooved around the periphery thereof at the proper points so that the driven slitter disks can enter the grooves and effect a cutting of the first few turns of paper, as well as cutting of the core if the same is used, into individual widths. As a result, independent counter rolls are produced from a single sheet of paper and each time a new set of counter rolls is started the single sheet of paper need only be wrapped around a single core or shaft.

The driven rider slitters are preferably operated at higher speed than the paper so as to effectively cut down through the paper roll being formed without in any way damaging the edges of the paper. The slitters ride up on the rolls being formed and continue to slit the paper as soon as it is wound. Thus the slitters are positioned between the individual counter rolls and the paper cannot run together between the rolls.

The feature of grooving the winder shaft so that the slitters can cut through the first few turns of paper and the core makes possible a complete separation of the counter rolls.

It is, then, an important object of this invention to slit webs into individual ribbons as they are being rolled.

Another object of the invention is to ride positively driven slitter disks on top of rolls of paper and to drive the disks at speeds greater than the speed of the paper.

A further object of the invention is to provide mechanism enabling the complete separation of a roll of paper into a plurality of rolls as it is being wound.

Another object of the invention is to provide grooved roll supports adapted to receive the cutting edges of slitter disks to permit the cutting

of the first few turns of paper as well as the cutting of any core on which the paper is being wound.

A specific object of this invention is to provide a high speed slitter assembly for a paper machine winder capable of handling the output of the paper machine to produce individual counter rolls of paper from the web made by the machine.

A further object of the invention is to equip a paper winder with a slitter assembly capable of completely separating a plurality of rolls from a single roll being wound by the winder.

A still further object of the invention is to eliminate the necessity for individual cores on a winding machine whenever a plurality of rolls are being wound.

Other and further objects of the invention will be apparent to those skilled in the art from the following detailed description of the annexed sheets of drawings which, by way of preferred example, illustrate an embodiment of the invention.

On the drawings:

Figure 1 is a broken side elevational view of a paper winding machine equipped with a slitter mechanism according to this invention.

Figure 2 is a front elevational view of the slitter mechanism adapted for mounting on the machine of Figure 1.

Figure 3 is a cross-sectional view taken along the line III—III of Figure 2 illustrating a rider drum construction of the slitter assembly.

Figure 4 is a cross-sectional view, with parts in elevation, taken along the line IV—IV of Figure 2 illustrating a clutch device for controlling the resistance to raising and lowering of the slitter assembly.

Figure 5 is a broken side elevational view of a collapsible winder shaft grooved in accordance with this invention.

Figure 6 is an enlarged broken view of the winder shaft shown in Figure 5 with parts shown in vertical cross section to illustrate interior mechanism of the shaft.

Figure 7 is a broken side elevational view of a solid grooved winder shaft according to this invention.

Figure 8 is an enlarged fragmentary side elevational view, with a part in vertical cross section, illustrating the manner in which a slitter can enter a groove to cut the first few turns of paper on a collapsible winder shaft such as shown in Figures 5 and 6.

Figure 9 is a cross-sectional view, with parts in elevation, taken along the line IX—IX of Figure 8.

Figure 10 is a view similar to Figure 9 but illustrating the cutting of paper on a paper core which is mounted on a solid grooved winder shaft such as is shown in Figure 7.

Figure 11 is a diagrammatic view illustrating the threading of the paper web on a winder machine for direct wrapping around a collapsible winder shaft.

Figure 12 is a view similar to Figure 11 illustrating the manner in which the leading end of the sheet is tucked around the collapsible winder shaft.

Figure 13 is a view similar to Figures 11 and 12 illustrating the slitting of the paper being wound on the collapsible winder shaft.

Figure 14 is a view similar to Figures 10 to 13 illustrating the covering of the collapsible winder sheet with a heavy sheet of paper to protect a lighter sheet which is to be wound thereon.

Figure 15 is a view similar to Figure 14 illustrating the manner in which the heavy protecting sheet is tucked around the collapsible winder shaft with the leading edge of the sheet to be wound.

Figure 16 is a diagrammatic view illustrating the manner in which the leading edge of a sheet is pasted on a paper core carried by a solid winder shaft.

Figure 17 is a view illustrating the slitting of the sheet and paper core as the sheet is being wound on the core.

As shown on the drawings:

In Figure 1 the reference character **10** designates generally a winder machine adapted for receiving a web of paper W directly from the reel of a paper making machine. The machine **10** includes a frame structure **11** rotatably supporting a drum **12** adapted to receive the web W from the reel thereover. Trimmers such as T are provided for cutting off the deckle edges of the web W. The web W is directed from the top of the roll **12** beneath the first winder under drum **13**. A second winder under drum **14** is rotatably mounted in closely spaced horizontal relation from the drum **13**. The two drums **13** and **14** provide a nip **15** therebetween for receiving therein a winder shaft S on which a roll R is wound from the web W. The shaft S is carried at its ends in bearing caps **16** provided on the free ends of arms such as **17** which are slidably mounted on carriages such as **18** in vertical grooves **19** provided by standards such as **20** of the frame structure. The arms **17** can thus ride vertically in the grooves **19** toward and away from the under drums **13** and **14** and will ride upwardly as the roll R builds up in diameter.

The rider slitter assembly **21** includes subframes **22** at the ends thereof having groove engaging carriages **23** adapted to ride in the grooves **19** of the frame standards **20** above the arm-carrying carriages **18**.

The slitter assembly thus is mounted in the main frame **11** of the winder machine to ride up and down above the roll R being wound by the winder machine.

Sprocket chains such as **24** are attached at one end thereof to the sub-frames **22** and are trained around sprocket wheels such as **25** rotatably mounted on top of the frame structure **11**. The other ends of the chains **24** are secured to counterweights such as **27**. Each counterweight **27** is mounted on rollers **28** which ride on ways **29** of the frame **11**.

The sprockets **25** can be secured on a single shaft **30** which also carries a ratchet **31** acted on by a spring-pressed pawl **32** and adapted to be manually disengaged by a trip handle **33**. Thus the slitter roll assembly can be manually raised in the grooves **19** away from the roll R and the counterweights **27** will facilitate this manual raising of the assembly. The pawl **32** when allowed to engage the ratchet **31** will hold the assembly in its raised position until it is tripped by the operating handle **33**.

The frame standards **20** carry rack bars such as **34** thereon. These rack bars **34** are in toothed engagement with pinions **35** which are rotatably carried between the sub-frames **22** on a cross-brace roll **36**. This cross-brace member **36** cooperates with a lower tubular member **37** to provide a rigid assembly tying together the two sub-frames **22**.

For the purpose of imparting resistance to the rise and fall of the slitter assembly 21 the roll 36 of the assembly carrying the pinions 35 has a reduced end 36a as best shown in Figure 4 rotatably mounted in a fixed bearing housing 38 carried by a frame 22. The housing 38 has a cup-shaped head 38a carrying a spider plate 39 which is equipped with friction disks 40 in the mouth of the cup. A clutch element 41 is keyed on the reduced end 36a and is adapted to engage the friction disks on the inner face of the spider plate. A second clutch element 42 is freely mounted on the shaft portion 36a and is adapted to engage the friction disk 40 on the outer face of the spider plate 39. The clutch element 42 has a hollow hub portion 42a in which is mounted a light spring 43 for urging the clutch element 42 away from the friction disk 40.

A threaded rod portion 44 extends from the end of the shaft portion 36a through the hub 42a and receives therearound a heavier coil spring 45. A hand wheel 46 is threaded on the rod 44 against the spring 45 to urge the clutch element 42 against this friction disk 40.

Thus adjustment of the hand wheel 46 will control friction between the disks 40 and the clutch elements. For example if the hand wheel 46 is threaded inwardly the clutch element 42 will be moved inwardly toward the spider plate 39. This spider plate, in turn, is backed by the clutch element 41 and the friction disks will be squeezed between the clutch elements 41 and 42. Now since the spider plate 39 is non-rotatable while the clutch element 41 is keyed to the rotatable shaft 36, it is obvious that rotation of the shaft 36 will be resisted. Since the pinions 35 on the shaft 36 engage the rack bars 34, the assembly 21 can be moved only with more force than that necessary to overcome its own weight differential with relation to the counterbalance 27. Conversely a threading of the hand wheel outwardly will release the frictional resistance to rise and falling movements of the assembly 21.

The fixed shaft 37 of the assembly 21 has a plurality of straps 47 mounted therearound at spaced intervals. Each strap 47 supports a bearing housing 48 beneath the shaft 37. A slitter drive shaft 49 extends through the bearing housings 48 and is rotatably carried thereby beneath the shaft 37. The shaft 49 has belt pulleys 50 keyed to the ends thereof. Belts 51 are trained around the pulleys 50 and around pulleys 52 driven by electric motors 53 which are carried by the frames 22 between the roll 36 and shaft 37. These motors 53 are energized preferably by direct current to drive the shaft 49 at any desired speed.

Slitter disk mounting members or hubs 54 are fixedly secured on the shaft 49 at the desired spaced intervals along the length thereof. Each mounting 54 carries a slitter disk or knife 55 projecting peripherally therefrom.

Rider drums 56 are mounted on the shaft 49 at spaced intervals to ride on the counter rolls being wound. As best shown in Figure 3, each rider drum 56 is disposed between a pair of straps 57 which are tightened on the shaft 49 and thrust against bearing sleeves 58 extending into the ends of the drum. These bearing sleeves are rotatable on the shaft 49 and the drum 56 is free to rotate relative to the shaft. The sleeves are apertured in the drum end as at 58a and can be lubricated through plugged lubricant ducts 59 in the drum 56.

If desired, the drum 56 can be driven by the shaft 49 by means of a drawbolt 60 mounted in the drum and carrying a collar 61 adapted to be slid into a groove or flat spot 62 on the shaft 49. When the collar is seated on the flat part of the shaft it will form a driving connection between the drum 56 and the shaft. Thus the drums 56 are rotated by the counter rolls being wound and in turn drive the shaft 49 to rotate the cutters 55. However in the usual installation the shaft 49 is driven to rotate the cutter disks 55 at higher speeds than the speed of the paper being wound and the drums 56 are free on the shaft since they move at the same speed as the paper. The drums serve to raise the assembly 21 as the roll being wound increases in diameter.

It will be noted that the cutter knives 55 are of larger diameter than the drums 56 so as to project therefrom and enter the paper as well as the core if any is used.

As best shown in Figures 5 and 6, an expander shaft 65 composed of a body member 66 having spindle ends 66a adapted to be rotatably mounted in the bearing caps of the winder machine such as 16 (Figure 1) and a cored out or hollow intermediate portion 66b cooperates with an expander intermediate portion 67 which is also cored out or hollow as at 67a to provide a cylindrical shaft adapted to receive the paper directly thereon. The expander member 67 and the body member 66 are connected through disks 68 mounted in the hollow cores thereof and each pinned to the body member 66 and the expander member 67 as at 68a and 68b respectively.

Rods 69 have plunger heads 70 slidably mounted on the ends thereof which are urged by a spring 71 against blocks or lugs 72 mounted in the chambers 66b and 67a respectively. These spring urged heads tend to move the member 67 axially of the body member 66 to cause the disks 68 to rotate and draw the expander member against the body member thereby collapsing the shaft.

One of the spindles 66a of the body member receives in threaded relation therethrough a rod 73 having the inner end thereof acting against one end of the expander member 67 to resist the spring pressure 71 and axially slide the expander 67 relative to the body member 66 for reverse rotation of the disks 68 to move the expander 67 away from the body member thereby expanding the shaft. The rod 73 has a headed end 73a adapted to be engaged by a wrench to effect the expansion of the shaft.

In operation the shaft in an expanded position receives paper therearound and after the rolls of paper have been wound on the shaft the rod member 73 is rotated to move it outwardly from the chamber 66b thereby permitting the springs 71 to expand and collapse the shaft. As a result the collapsed shaft can be readily removed from the wound roll of paper.

In accordance with this invention the body member 66 and the expander 67 are circumferentialy grooved as at 74 at desired spaced intervals along the length thereof. Groups of adjacent grooves are preferably provided at selected intervals for minute adjustment enabling the cutter knives to enter any one groove of a group so that the paper will be cut to the desired width.

As shown in Figures 8 and 9 the first few turns of the web W around the expander shaft 65 can be readily cut by the slitter knife or disk 55 since the same will enter one of the grooves 74 while the rider drum 56 rides on the last turn

of the paper web. The knife 55 projects sufficiently beyond the rider drum so that even when the rider drum is riding on quite a number of turns of paper, the knife will still enter a groove.

In Figure 7 the reference character 80 designates generally a solid winder shaft which, according to this invention, is provided with groups of grooves 81 at selected intervals along the length thereof. As illustrated in Figure 10 a slitter disk 55 can enter a groove 81 of the solid shaft 80 to cut not only the first few turns of paper W but also a paper core C which is mounted on the shaft to form the center of the roll being wound. The grooving of the shaft enables the use of a single long core C for the production of a number of counter rolls since this core may be cut by the slitter disk 55 at the selected intervals of length to produce independent cored counter rolls.

In Figures 11 to 13 there is illustrated the method of forming counter rolls on a collapsible winder shaft 65 from a paper web W of sufficient strength to obviate the necessity for a core and not requiring protection from the collapsible shaft to prevent tearing thereof as when the shaft is withdrawn. In Figure 11 the web W has the deckle edges thereof trimmed as it passes over a roll 12 by the trimmer disks such as T. The web is then wound under the first winder drum 13 above the shaft 65. As shown in Figure 12 the leading end of the web is then tucked between the winder shaft and the winder drum 14.

As shown in Figure 13 the winding operation effects the wrapping of a number of turns of the web around the shaft 65 and the slitter disks such as 55 are then brought down on top of the roll R being wound to cut through the first few turns of paper. As explained above the slitter disks 55 are adapted to enter grooves in the winder shaft 65 so as to completely cut all of the paper on the shaft even down through the first few turns. The winding operation continues until a roll R of the desired diameter is wound and during the continuation of the winding the slitter disks 55 of course ride upwardly with the roll R and continue to cut the incoming web. The disks are preferably driven in the same direction of rotation as the roll being wound but at a higher speed than the speed of the roll.

In Figures 14 and 15 there is illustrated the method of winding a web W on a collapsible countershaft when the web is rather light in weight and should be protected from the winder shaft. In Figure 14 the web W is trained under the first winder drum 13. The winder shaft 65 is set between the winder drums 13 and 14 on a liner sheet L intermediate the ends of this sheet. A web W then passes on the winder drum 13 under the length of the liner sheet L which is disposed over the winder drum 30.

As shown in Figure 15 the leading end of the web W and the portion of the liner sheet L on top of the web W in Figure 14 is tucked between the winder shaft 65 and the under drum 14 so that the shaft 65 has a complete covering of liner L therearound and so that the leading end of the web W is tucked in position between the shaft and the winder drum 14 for the start of the winding operation. After a plurality of turns of the web W have been wrapped around the liner sheet L the slitter disks such as 55 can be brought down on top of the roll being wound to cut the same into counter roll lengths. After the counter rolls have been formed the same can be removed from the winder machine, the shaft 65 collapsed, and withdrawn from all of the rolls simultaneously to leave finished counter rolls each having a core of the liner L.

In Figures 16 and 17 there is illustrated the method of forming counter rolls on a core C carried by the solid winder shaft 60. As shown in Figure 16 the web W is trained under the winder drum 13 and up over the core C which is disposed on the solid winder shaft 80. The leading edge of the sheet is pasted to the core C.

As shown in Figure 17 several turns of paper are wound around the core C and and the slitter disks such as 55 are then brought down on top of the partially wound roll to cut through the turns of paper thereon and to also cut through the core C as better illustrated in Figure 10.

From the above descriptions it will be clearly understood that this invention provides winding and slitting mechanism for the production of independent rolls of paper from a single web without in any way damaging the web.

It will, of course, be understood that various details of construction may be varied through a wide range without departing from the principles of this invention and it is, therefore, not the purpose to limit the patent granted hereon otherwise than necessitated by the scope of the appended claims.

I claim as my invention:

1. Web winding and slitting mechanism comprising a pair of winder drums defining a winding nip, a peripherally grooved winder shaft, means mounting said shaft for vertical movement in the winding nip, a slitter assembly mounted for vertical movement above said shaft mounting means, slitter disks rotatably mounted on said assembly, means for driving said disks, drums on said assembly adjacent said disks adapted to ride on the web material being wound for being driven by the web material independently of the disks, and said slitter disks having a larger diameter than said rider drums to project into the grooves of the winder shaft for completely slitting the web into separate ribbons.

2. A web winder and slitter machine which comprises a pair of under winder drums, winder shaft support mechanism movable toward and away from said winder drums, a grooved winder shaft for said mounting means, a slitter assembly movable toward and away from said winder drums above said mounting means, slitter disks on said assembly, motors on said assembly for driving said disks, and freely rotatable rider drums on said assembly adapted to ride on and be driven by the rolls being wound by the under drums to raise the slitter assembly away from the drums as the roll builds up in diameter, and said rider drums having a smaller diameter than said slitter disks whereby the slitter disks can enter the grooves of the winder shaft to completely slit all turns of the web on the winder shaft for producing independent rolls therefrom.

3. A paper winder and slitter machine comprising a pair of winder drums, a peripherally grooved winder shaft adapted to be mounted in the nip between said drums for receiving a web of paper therearound, a slitter assembly movably mounted above said winder shaft having a plurality of slitter disks thereon for cutting the paper being wound into independent rolls, said slitter disks adapted to enter said grooves of the winder shaft to completely cut the first few turns of paper, and means for positively driving said slitter disks.

4. A web winding and slitting machine which

comprises a main frame, a pair of winder drums rotatably carried by said frame, means on said frame providing vertical tracks above said winder drums, a winder shaft mounting means movable on said tracks, a peripherally grooved winder shaft carried by said mounting means, a slitter assembly movably mounted on said tracks above said winder shaft, a counterbalance device for said slitter assembly, motors on said slitter assembly, rotary slitters on said slitter assembly driven by said motors, elongated rider drums independent of said rotary slitters adapted to ride on the rolls of paper being wound around said shaft for moving the assembly upward as the diameters of the rolls increase and said rider drums being of lesser diameter than said slitters to permit the slitters to enter the grooves of the winder shaft for completely severing all turns of the web on the shaft for producing independent rolls of paper from the web.

5. A web winding and slitting device comprising a winder drum, a winder shaft supporting means mounted for movement toward and away from said drum, a peripherally grooved winder shaft carried by said mounting means, a slitter shaft mounted for movement toward and away from the winder mechanism, slitter disks on said shaft, and means independent of the winder drum for driving said slitter shaft to rotate the rotary slitters at speeds greater than the speed of the material being wound for cutting the material as it is being wound into independent ribbons for the production of independent rolls.

6. A counter roll making machine adapted to simultaneously produce a plurality of independent counter rolls from a single web of paper which comprises a peripherally grooved winder shaft, means for rotating said shaft to wind a sheet of paper therearound, and a slitter assembly including positively driven rotary slitters independent of the means for rotating the shaft mounted for movement toward and away from the roll being wound to slit the same into independent counter rolls by moving the rotary slitters through the first few turns of paper into the grooves of the winder shaft and then permitting the disks to continue to cut the incoming web of paper into separate ribbons.

7. A collapsible winder shaft comprising a body member having a hollow central portion, a hollow expander member, disks in the hollow chamber provided by the body member and the expander connecting the expander to the body member, spring means urging said expander in one axial direction to rotate the disks for collapsing the shaft, manually controlled means for abutting said expander to resist the spring pressure and rotate the disks in the reverse direction to expand the shaft, and said body member and said expander having peripheral grooves at spaced intervals along the length thereof.

8. An expansible winder shaft comprising a main body member having spindle ends adapted to be rotatably mounted in a winder machine, a complementary shaft portion mounted in the intermediate portion of the shaft for axial movement to increase the diameter of the shaft as it is moved in one direction and to reduce the diameter of the shaft as it is moved in the other direction, and said expander and body portion of the shaft having aligned peripheral grooves at spaced intervals along the lengths thereof.

9. The method of simultaneously producing independent rolls of web material from a single web which comprises winding the web on a peripherally grooved collapsible shaft until a plurality of turns of web have been wound on the shaft, moving a plurality of rotary slitters through the turns of paper on the shaft into the shaft grooves, continuing the winding, slitting operation and moving the slitters outwardly from the shaft as the rolls increase in diameter, collapsing the shaft, and withdrawing the collapsed shaft from the rolls.

10. The method of producing counter rolls of paper from a single web of paper which comprises winding a plurality of turns of the web around a peripherally grooved shaft, moving a plurality of rotary cutters against the turns of paper, rotating said cutters through the turns of paper until the cutters enter the grooves of the shaft, continuing the winding of the slit ribbons of paper on the shaft and simultaneously moving the rotary slitters outwardly from the shaft as the rolls increase in diameter.

11. The method of making coreless counter rolls which comprises winding a web of paper around a peripherally grooved collapsible shaft for a plurality of turns, moving a plurality of rotating slitter knives against the paper to cut through said plurality of turns until the knives enter the grooves of the shaft, and riding the rotating slitter knives on the rolls being wound without interfering with rotation of the rolls to continue the slitting of the incoming sheet of paper into independent ribbons.

12. The process of making counter rolls which comprises covering a collapsible peripherally grooved winder shaft with a liner sheet, winding a plurality of turns of paper around the liner sheet covered shaft, moving a plurality of rotary slitters through said turns of paper until the slitters enter the grooves of the shaft, continuing the winding of the paper to build up rolls of the desired diameter and riding the rotary slitters on said rolls for slitting the incoming web as the rolls increase in diameter.

13. The method of making cored counter rolls which comprises inserting a peripherally grooved winder shaft into a paper core, rotating the shaft and core to wrap a plurality of turns of paper therearound, and moving a plurality of rotary slitters through said plurality of turns of paper and through said core into the grooves of the shaft for severing the paper and core into independent widths.

14. A web winder and slitter machine which comprises a main frame, a winder drum rotatably mounted in said main frame, winder shaft supporting means movably mounted on said frame above the winder drum, a slitter assembly movably mounted on the main frame above said winder shaft supporting means, rotary slitters on said slitter assembly, means independent of said winder drum for driving said rotary slitters, elongated rider drums on said slitter assembly adjacent the rotary slitters and adapted to freely rotate on the roll being wound for raising the slitter assembly as the roll increases in diameter, and detachable means for drivingly connecting said rider drums and said rotary slitters to drive the slitters from the roll being wound when the first mentioned means for driving the rotary slitters is not used.

15. In a web winder machine having means for winding a web of paper into a roll, the improvement which comprises a slitter assembly on said machine including a shaft, means for driving the shaft, slitters fixed on said shaft adapted to cut the roll being wound into a plu-

rality of rolls, rider drums freely rotatable on said shaft to raise the shaft and slitters as the rolls being wound increase in diameter, and means for keying the rider drums to said shaft for driving the shaft and slitters when the first mentioned driving means is not used.

16. A paper winder and slitter machine comprising a main frame, a winder drum rotatably mounted in said main frame, a winder shaft supporting means mounted for vertical movement on said frame above the winder drum, a slitter assembly mounted for vertical movement on said main frame above said winder shaft supporting means, a vertical rack carried by the main frame of the machine, a rotatable gear carried by the slitter assembly in meshed engagement with said rack, means carried by the slitter assembly imparting resistance to rotation of said gear for impeding the rise and fall of the slitter assembly relative to the main frame, a slitter shaft rotatably carried by said assembly, rotary slitters fixed on said shaft, and rider drums carried by said shaft adapted to ride on the roll of paper being wound to raise the assembly as the roll increases in diameter.

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