

April 23, 1963

C. AARON

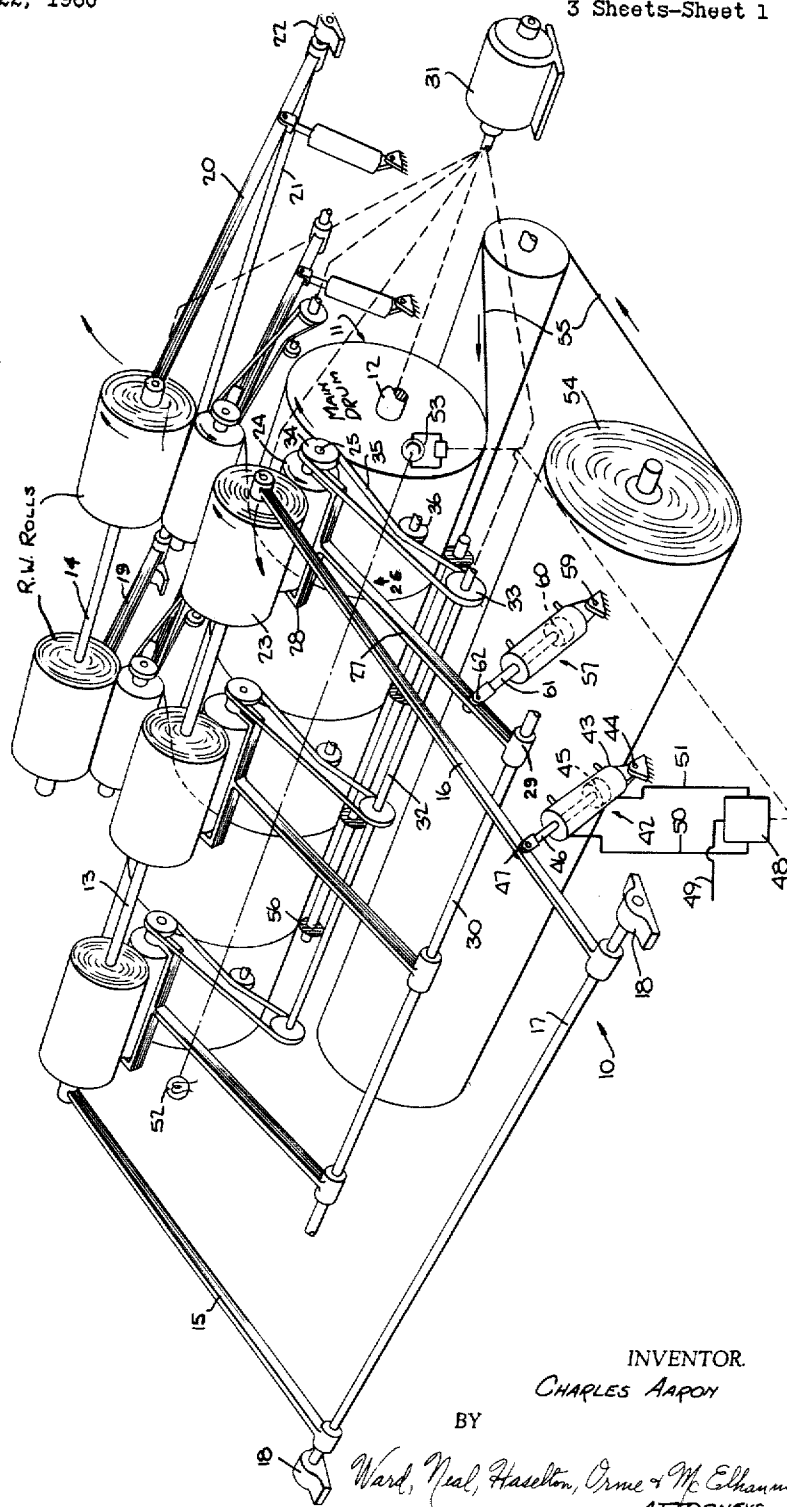
3,086,726

RIDING DRUM APPARATUS FOR REWIND ROLLS

Filed Jan. 22, 1960

3 Sheets-Sheet 1

Fig. 1.



INVENTOR

CHARLES AARON

BY

Ward, Neal, Haselton, Orme & McElhannon
ATTORNEYS

April 23, 1963

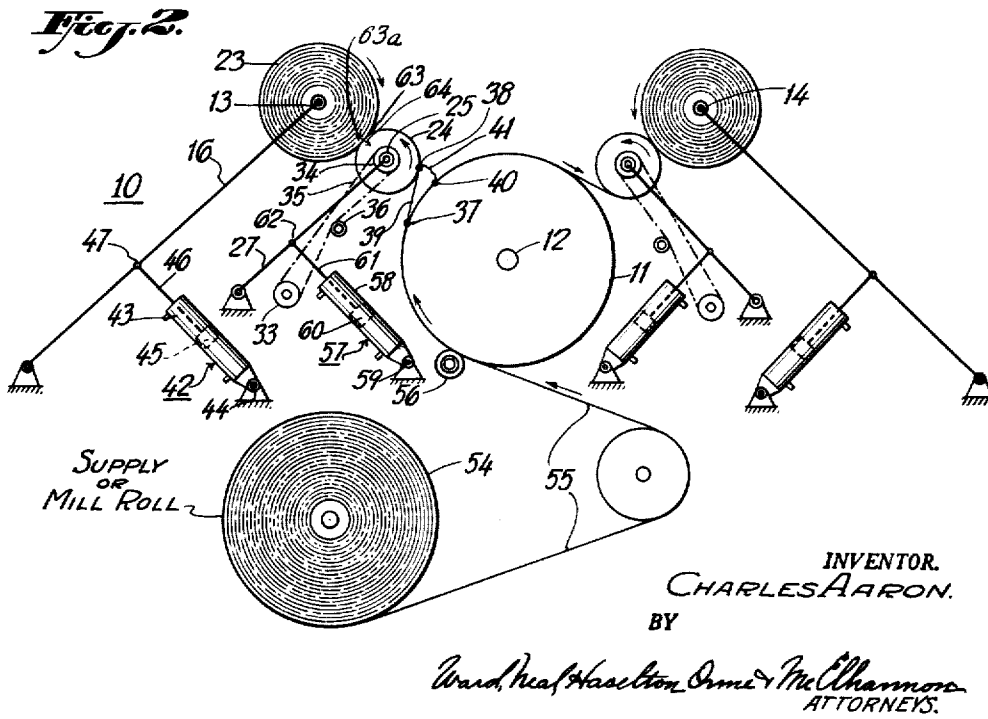
C. AARON

3,086,726

RIDING DRUM APPARATUS FOR REWIND ROLLS

Filed Jan. 22, 1960

3 Sheets-Sheet 2



April 23, 1963

C. AARON

3,086,726

RIDING DRUM APPARATUS FOR REWIND ROLLS

Filed Jan. 22, 1960

3 Sheets-Sheet 3

Fig. 3.

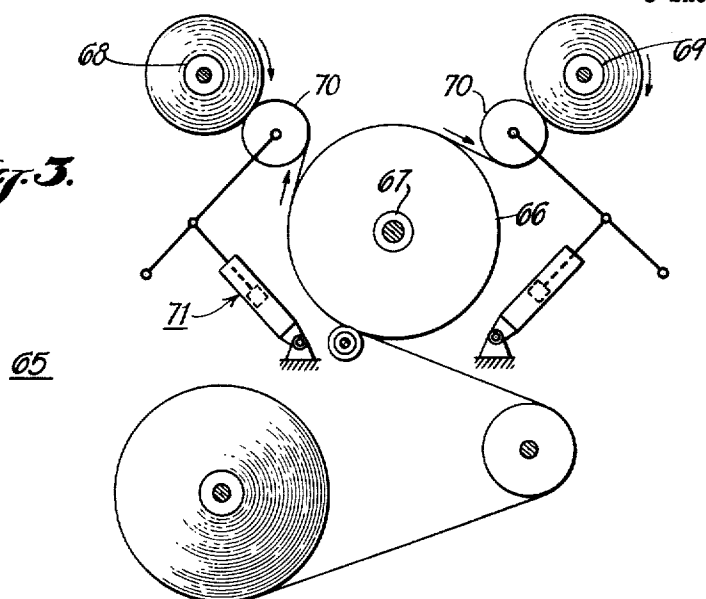
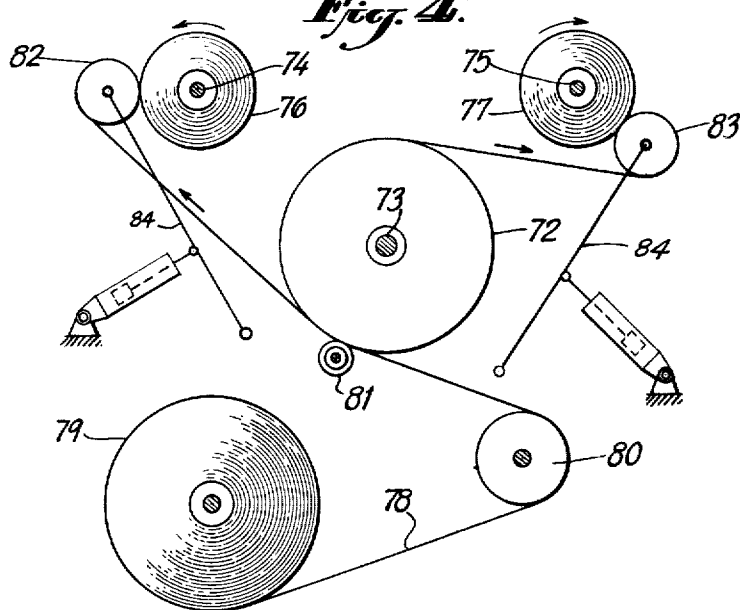


Fig. 4.



INVENTOR.

CHARLES AARON.

BY

Ward, Neal, Haselton, Dineen & McChammon
ATTORNEYS.

1

3,086,726

RIDING DRUM APPARATUS FOR REWIND ROLLS
Charles Aaron, West Caldwell, N.J., assignor to Cameron
Machine Company, Dover, N.J., a corporation of New
York

Filed Jan. 22, 1960, Ser. No. 4,074
10 Claims. (Cl. 242—65)

This invention relates to improvements in winding machines which are adapted for continuously winding into rolls a plurality of narrow strips of thin web material, such as paper or plastic, such narrow strips comprising portions of a main supply web which has been subdivided to produce such narrow strips. More particularly, the invention relates to means for controlling the quality of such rolls.

The invention, by way of example, is embodied in a slitting and rewinding machine which employs two shafts for supporting two groups of rewind rolls, such a machine being referred to in the art as of the duplex type. However, certain features of the invention are useful in machines of other types.

In prior apparatus of this type, the slitting and rewinding of certain types of web material, particularly plastic materials, is attended by serious problems which are attributable to variation in thickness or caliper of the web material. Such problems have resulted in distorted and unsaleable rolls.

In such prior machines the supply or mill web passes at least partly around a constant speed roll known as a contact drum or platen drum against which suitable scoring wheels or cutters can operate to subdivide the web into a plurality of small rewind widths, although such subdivision of the web may be done at other locations. These smaller widths then pass to the rewind rolls aforementioned which in such duplex type of machine comprise two groups, one upon each of the two rewind shafts. If one portion of the web is of substantially different thickness or caliper as compared to another portion, the several rewind rolls built up therefrom can be of substantially different diameter. And where it is intended that the rewind rolls shall all be in contact with the main drum, substantial difficulties arise because the roll or rolls of larger diameter can lift the smaller rolls out of peripheral contact with the drum. For example, one rewind roll may develop a diameter of 5½ inches whereas several others on the same rewind shaft may develop a diameter of only 5 inches, the latter losing peripheral contact with the rewind drum.

Such loss of peripheral contact results in loss of control of rewind roll quality including interalia density, tension of the material, and usually results in loss of straight-sidedness of the rewind rolls.

One of the objects of the present invention is to provide improved means for compensating for such variations in diameter of the several rewind rolls.

A further object is to overcome the above difficulties or to reduce same to insignificance.

The invention in its broadest form is constituted by a winding machine having a main drum and two rewind shafts, all of which are mounted for rotation about parallel axes. The rewind shafts are spaced apart to permit staggered rewinding of the rewind rolls, one group of which is wound on one of the shafts and another group on the other, the rewind rolls on each such shaft being spaced from one another. A like plurality of individual or separate riding drums are provided for peripheral engagement with respective of the rewind rolls. The web material passes at least partly around the main drum, each narrow strip or subdivided portion of the web also passing at least partly around its respective riding drum and thence to its respective rewind roll on a rewind shaft.

2

Means are provided for maintaining both the rewind rolls and riding drums in spaced relation from the main drum but for maintaining each riding drum in peripheral engagement with its respective rewind roll.

The invention in a form thereof, which is referred to as the fixed center rewind embodiment, is similar to that described above with the following modifications: The pair of rewind shafts and the main drum are mounted in fixed parallel spaced relationship at such a distance from one another that the rewind rolls when built up to maximum diameter will not engage the periphery of the main drum. There are employed, as before, the plurality of separate riding drums for which individual mounting means are provided for mounting same for rotation about axes which are parallel with the aforementioned main drum and rewind shaft axes. The web also passes at least partially around the main drum and then the subdivided smaller widths or strips are directed to their respective riding drums around which they pass partially and thence to their respective rewind rolls on a rewind shaft. Suitable means are provided for resiliently urging each individual riding drum into peripheral engagement with its respective rewind roll at a selected contact pressure, each such riding drum being positioned to avoid peripheral contact with the main drum.

The invention in a further form thereof, which is referred to as the variable rewind center embodiment, is similar to that described in the preceding paragraph with the following modifications: the rewind shafts instead of being so fixedly mounted are initially much closer to the main drum and are capable of moving away from such drum in response to the progressive build-up of the rewind rolls thereon. This embodiment is advantageously used in rewinding materials which are subject to the formation of "draw wrinkles" which are corrugations extending lengthwise of the web and which occur as a result of strains in the web brought about by undesirable amounts of "draw" or length of web between the riding and main drums. Such draw wrinkles can overlap or fold over one another and produce severe problems in rewinding. Hence it is desirable in rewinding this type of material for such length of web or draw between the main drum and each riding drum to be as short as possible commensurate with the requirement to avoid peripheral contact of such drums. Thus means are provided for mounting each riding drum in such a way that such draw is at the lowest possible value commensurate with such requirement. As each rewind roll builds up in diameter, the aforementioned draw therefor should remain about the same low value in length and the "gap" (shortest distance between the periphery of the main drum and that of each riding drum) similarly should be as short as possible and still avoid peripheral contact of such drums. A minimum draw and gap also is desirable for purposes of preventing or at least reducing to negligible proportions the wandering propensities of each of the smaller widths of the web which are being rewound. Accordingly, means are provided for effecting a change in position of the axis of each rewind shaft as its rewind rolls build up in diameter. Any suitable means for this purpose can be employed, for example, as follows: means for temporarily holding each rewind shaft in a fixed position while its several rewind rolls each build up by a selected small amount; the aforementioned means for resiliently urging the riding drums against their respective rewind rolls whereby, during such temporary holding, each riding drum will shift in position as its rewind rolls builds up by a small amount; means for sensing the largest movement of the riding drums on a rewind shaft responsive to such rewind roll build-up; and means responsive to such largest movement for causing the rewind shaft to retreat from the main drum by a selected incre-

3

ment, all the riding drums following their respective rolls on such shaft as a result of the action of the aforementioned means for urging the riding drums resiliently against such rolls. This cycle repeats itself until the rewind rolls have built up to their maximum desired size.

Alternatively, the rewind shafts can rotate on fixed axes and the main drum can be mounted to retreat therefrom while the rewind rolls build up in diameter.

The above and further objects and novel features of the present invention will more fully appear from the description set forth below when read together with the accompanying drawings, the latter being for purposes of illustration only and not for defining the limits of the invention, reference for this latter purpose being had to the appended claims.

FIG. 1 is a perspective schematic view of the form of the invention referred to as the variable rewind center embodiment, certain elements being omitted to improve clarity;

FIG. 2 is a schematic end elevation of certain of the parts shown in FIG. 1;

FIG. 3 is an end view of the form of the invention referred to as the fixed center rewind embodiment; and

FIG. 4 is an end elevation of a modification of the form of the invention of FIG. 3.

Referring to the drawings in greater detail, there will now be described the embodiment of the invention shown in FIG. 1.

This embodiment is generally designated by the numeral 10 and embraces a main drum 11 having a central shaft 12, a front rewind shaft or mandrel 13 and a rear rewind shaft or mandrel 14. As aforementioned, a group of rewind rolls is wound about each of such two rewind shafts. The latter, together with the main drum shaft 12, are mounted for rotation with the axes thereof parallel in the manner shown in FIGS. 1 and 2. Means (not shown) are provided for rotatably mounting the main drum shaft 12 with its axis stationary, but the means for mounting the shafts 13 and 14 permit them to vary in position and hence the derivation of the aforementioned expression defining this form of the invention as "variable center rewind." The shaft 13 is supported at its opposite extremities by rewind shaft arms 15 and 16, the lower extremities of which are secured to a common pivot shaft 17 which is mounted for pivotal movement in mountings schematically indicated at 18. Thus the shaft 13 can shift angularly toward and away from the main drum 11.

The several rewind rolls are rewound upon suitable separate cores (not shown) which are mounted upon the rewind shafts 13 and 14, such separate cores being separately removable from the rewind shafts in a well known manner.

The rewind shaft 14 is analogously supported at its opposite extremities upon arms 19 and 20 which in turn are secured to a common pivot shaft 21, the latter being mounted for angular movement in mounting means 22.

Although the mounting means for the rewind shafts 13 and 14, in this form of the invention, permit angular shifting of such shafts in arcuate paths about the axes of their respective pivot shafts (17, 21), it is possible to provide mounting means for such rewind shafts, which, while holding same parallel to the drum 11, permit same to move in paths other than arcuate paths, for example, in straightline paths toward and away from the main drum 11.

For the purpose of overcoming the aforementioned disadvantages due to differences in diameters of the rewind rolls caused by variation in thickness or caliper of the web, there is provided for each rewind roll a separate riding drum having separate mounting means. Also, means are employed for acting on such mounting means for maintaining each riding drum in peripheral contact with its rewind roll while avoiding peripheral contact with the main drum 11.

4

A typical riding drum and its mounting means will now be described (FIGS. 1 and 2), it being understood that the others are similar. For the rewind roll 23 there is provided a riding drum 24 which is mounted by means of a shaft 25 for rotational movement on an axis which is parallel to the axes of the aforementioned shafts, namely, 12, 13, 14, 17 and 21. Such mounting means comprises, in the form shown, a yoke type of mounting 26 having a main arm 27 which supports a bifurcated element or yoke 28 at its upper extremity, the aforementioned shaft 25 being rotatably mounted upon the arms of such yoke. The lower extremity of the arm 27, by means of a collar 29, is mounted for angular movement about and relative to a supporting shaft 30.

The riding drum 24 is "center driven," that is, means are provided for driving the riding drum by applying torque to its central supporting shaft 25.

The application of center rewind torque to the rewind rolls, such as 23, via the rewind shafts 13 and 14 is optional. In a preferred form of the invention center rewind torque is applied to all of the riding drums, such as 24.

As shown in FIGS. 1 and 2, such center rewind torque is applied to the riding drum 24 by means of an electric motor 31 which is operatively connected to the shaft 25 (and all other analogous riding drum shafts) by any suitable means, for example, via a shaft 32 mounted for rotation about a fixed axis which communicates torque to the shaft 25 via a pulley 33 secured to the shaft 32 and a pulley 34 secured to the shaft 25, such pulleys being interconnected by means of a belt 35. Tension of the belt can be controlled by any desired means, for example, by means of a pulley 36 suitably mounted for exerting pressure intermediate the pulleys 33 and 34.

The main drum 11, as schematically shown, has applied thereto at all times a center rewind torque as by motor 31.

The variable center rewind form of the invention in FIGS. 1 and 2 is designed in such a way that the rewind shafts 13 and 14 can respectively retreat from the main drum 11 as the rewind rolls thereon build up, it being understood all the while the riding drums, such as 24, are in peripheral engagement with their respective rewind rolls, but at all times are spaced from the main drum 11 and are never in peripheral contact therewith.

The means for accomplishing this will be described hereinafter following the disclosure of the reason why the riding drums 24, in the form shown in FIGS. 1 and 2, are interposed between their respective rewind shafts and the main drum.

In FIG. 2 the length of the tangent followed by the web in passing from the main drum 11 to the riding drum 24 is defined between the points 37 and 38, such length of web being designated 39 and comprising the aforementioned "draw." Also, there is a finite spacing between the periphery of the main drum 11 and the riding drum 24 defined between the points 38 and 40, this distance being referred to as the aforementioned "gap" and designated 41.

In the slitting and rewinding of certain types of material, the aforementioned problems involving draw wrinkles occur. In order to eliminate such problems in these particular types of material it is necessary to reduce the aforementioned gap and draw to their minimum values. For example, the gap 41 should be sufficiently large to prevent peripheral contact yet sufficiently small to insure that the draw 39 is at its minimum value.

The draw wrinkle problems are accentuated in such materials as polyethylene, vinyl film, and certain coated papers including, for example, kaolin coatings.

Thus in the form of FIGS. 1 and 2 where it is desired to minimize the draw and gap to eliminate draw wrinkle effect, the riding drums are interposed between the main drum and their respective rewind rolls.

5

However, in other forms of the invention where it is not necessary to contend with the draw wrinkle problem it is not necessary to minimize such draw and the gap, and hence the riding drums need not be so interposed between the main drum and the rewind rolls. This is true of the variable rewind center type of the apparatus, such as that of FIGS. 1 and 2, wherein the rewind shafts 13 and 14 can move as the rewind rolls build up, and is also true of the fixed center type of the apparatus wherein the axes of the main drum and the rewind shafts are parallel but relatively immovable.

A schematic representation of the riding drums mounted at positions which are not so interposed is shown in FIG. 4 and the latter can be either of the variable or fixed center rewind type as aforementioned.

A system will now be described with respect to the form 10 of FIGS. 1 and 2 which is designed for causing the aforementioned retreat of the rewind shafts 13 and 14 as the rewind rolls progressively increase in diameter and at the same time to maintain peripheral contact between such rolls and their respective riding drums while the latter are held spaced from the main drum 11.

Consider, for example, the system as applied to the front rewind shaft 13, it being understood that a similar system is employed for the rear rewind shaft 14.

Means, including an hydraulic cylinder device 42, are employed for temporarily holding the rewind shaft arms 15 and 16 in a fixed position while the several rewind rolls on the shaft 13 increase in diameter by some selected minimum increment. Thereupon valve means are actuated for injecting an increment of fluid into one end of the hydraulic cylinder device 42 and for removing a comparable increment from the other end thereby to cause an incremental retreat of such rewind shaft until a next increment of diameter has been wound on the rewind rolls, whereupon the cycle repeats itself.

Thus the hydraulic cylinder device 42 comprises a cylinder 43, one extremity of which is mounted for pivotal movement about a shaft 44 having a fixed axis, and a piston 45 is provided therein, a piston rod 46 of which is pivotally secured at 47 to the arm 16. An analogous hydraulic cylinder device (not shown) may be similarly connected to the other arm 15 and coordinated with the one here described. A control valve 48 is provided for the hydraulic cylinder device 42 which receives hydraulic fluid under pressure from a suitable source (not shown) via a conduit 49 and which is connected to the opposite extremities of the cylinder 43 via the conduits 50 and 51.

The control valve 48 is under the influence of any suitable means which are sensitive to the increase in the diameter of the rewind rolls by such aforementioned selected increment. In the form shown, a photoelectric device is employed which embraces an incandescent lamp 52 which directs a beam therefrom onto a photoelectric cell 53 along a path which can be interrupted by any arm 27 of the riding drum supporting means above described. The elements 52 and 53 are so positioned that the roll which achieves the largest incremental increase, that is, the biggest roll of the group is able to actuate the photoelectric device thereby to cause a retreat of the pertinent rewind shaft by a selected angular increment.

Thus from a supply or mill roll 54 a web 55 is drawn which is directed (FIG. 2) to the several rewind rolls via the main drum 11 and the respective riding drums 24, it being understood that the web 55, either before or after subdivision, passes partially around the main drum 11 and thence each subdivided portion or subweb passes partially about its respective riding drum 24 and to its rewind roll.

The rewind shaft 13 (and also 14) remain stationary during the period required for a rewind roll to build up enough to move an arm 27 sufficiently to interrupt the beam from the lamp 52 to the photoelectric cell 53 whereupon, by suitable operative interconnection, the photo-

6

electric cell 53 actuates the control valve 48 to cause the angular movement of the arms 15 and 16 by a selected angular increment and hence the retreat of the rewind shaft 13 by a corresponding angular increment and a selected distance.

If desired, there may be employed, as shown in FIG. 2, suitable score cutters, one of which is shown at 56, which are urged against the main drum or platen drum 11 for the purpose of scoring the web 55 thereby to subdivide same into the plurality of smaller widths, this being accomplished in a well known manner.

The aforementioned draw wrinkle effect produced on the web is due to the length of web between two drums which is longer than necessary in view of the type of web material, and which wrinkles may cause the aforementioned wandering and/or a folding over or overlapping of the rewinding portions of the web.

The draw wrinkles are the result of longitudinal strain of the web and such strain or deformation is a function of web length in those web materials which are prone thereto. Thus as the length of the draw increases, the extent of the strain increases and the greater the draw wrinkles.

In order to insure that the riding drums 24 are in peripheral contact at all times with their respective rewind rolls, each riding drum is urged resiliently toward its rewind roll by any suitable means which, in the form shown, comprise a pneumatic cylinder device 57 (one for each riding drum) including a cylinder 58 which is pivotally secured at 59, and a piston 60 having a rod 61 which is pivotally secured to the arm 27 at 62. Air under pressure enters the lower portion of the cylinder 58 and thereby urges the piston 60 upwardly. This force acts through rod 61 and arm 27 to arcuately urge the riding drums 24 against their respective rewind rolls. Upon the other end of cylinder 58 is positioned an exhaust port.

As the rewind shafts 13, 14 retreat progressively by successive increments in the manner described above, each of the pneumatic cylinder devices 57 causes its respective riding drum to retreat therewith. But while each rewind shaft, such as 13, is temporarily fixedly held for a short interval during the progressive build-up of the diameter of its rolls by such selected small increment, the pneumatic cylinder devices 57 resiliently must yield in a direction opposite to such retreat thereby to accommodate an accompanying slight angular movement of each supporting arm 27 in such opposite direction.

However, the point of contact 63 between the riding drum 24 and its rewind roll 23 moves along the arrow 63a while the rewind roll builds up. Thus the motion of the riding drum 24 is in effect an oscillating one, namely, a few degrees clockwise (FIG. 2) while the rewind roll diameter progressively builds up until the light beam is interrupted by arm 27 whereupon the rewind shaft retreats a few degrees in a counterclockwise direction, and arm 27 follows. Thus the riding drum 24 is continuously oscillating through a small angular increment during the build-up of the rewind rolls in this particular variable center rewind form of the invention.

Referring to FIG. 3, the fixed center rewind form of the invention, generally designated 65, will now be described, this form being identical to that described in connection with FIGS. 1 and 2 with the exception that the axes of the shafts of the main drum and the rewind shafts are held stationary.

In FIG. 3 a main drum 66 is provided which is analogous to main drum 11 and is mounted for rotation about a shaft 67, the axis of which is fixed.

Front and rear rewind shafts 68 and 69 are provided (analogous to shafts 13 and 14) which are substantially spaced from the main drum 66 and which are rotatably mounted in suitable means which hold the axes thereof parallel to the shaft 67 but also fixed, there being no relative movement between the three shafts 67, 68 and 69.

7

This can be achieved in the form of the invention shown in FIG. 1 by locking the rewind shaft supporting arms 15, 16 and 19, 20 in fixed position.

A plurality of riding drums 70 are provided which are analogous to the aforementioned riding drums 24, there being one group of such riding drums for the rewind rolls wound on the shaft 68 and another group of riding drums for the rolls wound on the shaft 69.

The riding drums 79 can be mounted in a manner identical to that described in connection with FIGS. 1 and 2, there being employed a pneumatic cylinder device 71 for each of the riding drums 70 and which is constructed and arranged for resiliently urging each of such drums 70 into peripheral contact with its respective rewind roll.

The position of the rewind shafts 68 and 69 is selected in such a way that when the rewind rolls are fully wound thereupon and thereby have attained their maximum diameters, the riding drums 70 will be adequately spaced from the main drum 66 whereby at no time during the rewinding of the rolls on the shafts 68 and 69 is the main drum 66 in peripheral contact with such riding drums.

Thus, the variable center form of the invention of FIG. 1 can be easily converted into the fixed center rewind form of FIG. 3 merely by: (a) locking the rewind shafts in a position analogous to shafts 68 and 69 well spaced from the drum 64 so that at maximum rewind roll diameter the riding drums will be spaced from the main drum, and (b) disconnecting the photoelectric device 52, 53 and its interconnected hydraulic cylinder devices 42.

The form of the invention shown in FIG. 4 is identical to that shown in either FIGS. 1 or 3 with the exception that the riding drums are not interposed between the main drum and the rewind rolls.

In this form a main drum 72 having a central shaft 73 is employed, the rewind shafts being designated 74 and 75 upon which the rewind rolls 76 and 77 progressively build up. A web 78 is directed from a mill or supply roll 79 to the main drum 72 via any selected number of intermediate rolls, such as a driven roll 80. If desired, the web can be subdivided by scoring same against the main drum 72 by means of a plurality of scoring wheels 81, and after such web has passed partially around the main drum it is directed to the rewind shafts 74, 75 via riding drums 82 and 83, respectively, which are mounted each by individual supporting means 84 which, for example, are similar to those described in FIG. 1 for the riding drum 24.

Subdivided portions of the web 78 pass partially around their respective riding drums 82 and 83 and thence to their respective rewind rolls in the manner shown.

The form of the invention of FIG. 4 can be either variable or fixed center rewind, that is, the rewind shafts 74 and 75 can be mounted for movement in the manner shown and described in connection with FIG. 1, or they can be fixed in the manner shown and described in connection with FIG. 3.

With that form of the invention of FIG. 4 there is preferably employed a web material which is not subject to the draw wrinkle effect above described.

The apparatus embodying the present invention is particularly well adapted for use with the invention shown and described in U.S. Patent 2,872,126, granted February 3, 1959.

What is claimed is:

1. In a winding machine, a driven roll shaft adapted for the winding thereon of a plurality of rolls of subwebs formed from subdividing a web of sheet material; a driven main drum; a like plurality of driven riding drums mounted for peripheral engagement with respective of such rolls; means for mounting said shaft and drums for rotation with the axes of rotation of said drums parallel with the axes of rotation of said shaft and with said riding drums positioned between said main drum and roll shaft, said drums and shaft thus being positioned for permitting a like plurality of subwebs to pass at least partly around said

8

main drum, thence each subweb over its respective riding drum and thence to its respective roll on said shaft; and means for maintaining said riding drums in peripheral engagement with their respective rolls while maintaining a gap between said main drum and each of said riding drums during build-up of said rolls.

2. In apparatus of the class described, a main drum; a rewind mandrel upon which a plurality of rewind rolls can be wound from a divided web passing at least partly around said drum; a like plurality of riding drums one for each such rewind roll; means for mounting said riding drum for peripheral contact with the respectively corresponding rewind rolls but spaced from said main drum; means for mounting said mandrel for movement relative to said main drum to accommodate build-up of said rewind rolls; means for moving said mounting means; means for continuously and resiliently urging each of said riding drums into the aforementioned peripheral contact with its respective rewind roll; and means responsive to movement of a riding drum by a selected distance from a norm position for actuating such moving means to move said mandrel a preselected increment away from such main drum.

3. In apparatus of the class described, a main drum; a rewind mandrel positioned near said main drum and upon which a plurality of rewind rolls can be wound from a divided web which passes at least partly around said main drum; means for mounting said main drum and mandrel for movement relative to one another with their axes parallel; a like plurality of riding drums, one for each rewind roll on said mandrel; a like plurality of separate mounting means for said riding drums for disposing each of such riding drums between said mandrel and main drum with the axes of the riding drums parallel to the axes of said main drum and mandrel; a like plurality of means operatively connected to said mounting means for urging resiliently each of said riding drums toward said mandrel thereby to effect peripheral contact between each riding drum and its respective rewind roll; and means for controlling the relative positions of said mandrel, main drum and the aforementioned plurality of mounting means to maintain a space between the periphery of said main drum and each of said riding drums during build-up of such rewind rolls.

4. In apparatus of the class described, a main drum; a rewind mandrel positioned near said main drum and upon which a plurality of rewind rolls can be wound from a divided web which passes at least partly around said main drum; means for mounting said main drum and mandrel for movement relative to one another with their axes parallel; a like plurality of riding drums, one for each rewind roll on said mandrel; a like plurality of means for urging resiliently each of said riding drums toward said mandrel thereby to effect peripheral contact between each riding drum and its respective rewind roll; and means for controlling the relative positions of said mandrel, main drum, and riding drums to maintain at all times during operation a space between the periphery of said main drum and riding drums; during build-up of such rewind rolls.

5. In a winding machine, a main drum, a rewind shaft for the winding thereon of a plurality of rewind rolls of sheet material, a like plurality of riding drums, means for mounting said drums and rewind shaft for rotation about their respective axes, said mounting means including a plurality of separate devices equal in number to the plurality of riding drums and each device including a shaft and a pivotally mounted support therefor for individually supporting respective of said riding drums for movement relative to said rewind shaft thereby to ride upon such material wound on said rewind shaft and to move away therefrom as such material builds up thereon, and means for holding said riding drums in spaced relation from said main drum while urging such riding drums into contact with respective of said rewind rolls.

6. A winding machine according to claim 5 wherein the axes of said main drum and said rewind shaft are parallel and in fixed spaced relation to one another.

7. In a winding machine, a roll shaft adapted for the winding thereon of webs of material in the form of a plurality of rolls, a main drum, a plurality of riding drums corresponding in number to the said plurality of rolls, means for mounting said shaft and main drum for rotation with the axes thereof parallel and with said riding drums positioned between said shaft and main drum, means for individually pivotally mounting said riding drums for movement toward and away from said shaft and means for maintaining a gap between said main and riding drums while maintaining peripheral engagement between said riding drums and respectively corresponding rolls wound on said shaft.

8. In a winding machine, a pair of rewind shafts for the winding thereon of a plurality of rolls of web material, a main drum, a like plurality of riding drums, means for mounting said drums and rewind shafts for rotation about their respective axes, and in proximity to one another, the axes of said drums being parallel to the axes of said rewind shafts, and said mounting means including a plurality of separate devices equal in number to said plurality of riding drums, each of said devices including a shaft and a pivotally mounted support therefor for individually supporting respective of said riding drums for movement relative to respective of said rewind shafts and main drum, and means for maintaining said riding drums in peripheral engagement with their respective rewind rolls.

9. In a winding machine, a rewind shaft for the winding thereon of a plurality of rolls of web material, a main drum, a like plurality of riding drums, means for mounting said drums and rewind shaft for rotation with the axes of said drums parallel to the axis of said rewind shaft whereby such web material can pass at least partly around said main drum, thence over its respective riding drum and then to its respective roll on said rewind shaft, said

mounting means including a plurality of separate devices equal in number to said plurality of riding drums and each of said devices including a shaft and a pivotally mounted support therefor for individually supporting respective of said riding drums for movement relative to said rewind shaft and main drum and means for maintaining said riding drums in peripheral engagement with their respective rolls on said rewind shaft during operation while maintaining said main drum and riding drums peripherally in spaced relation.

10. In a winding machine, a roll shaft adapted for the winding thereon of a plurality of rolls of sheet material; a driven main drum; a like plurality of driven riding drums; means for mounting said riding drums for peripheral engagement with respective of such rolls and including a plurality of separate devices equal in number to said plurality of driven riding drums with each said device including a shaft and a pivotally mounted support therefor for individually supporting respective of said riding drums for movement relative to said roll shaft and main drum; means for mounting said roll shaft and riding drums for rotation about their respective axes with the axes of said main drum and roll shaft parallel and with the axes of said riding drums parallel to said main drum and roll shaft, said drums and roll shaft thus being positioned for permitting a like plurality of subwebs to pass at least partly around said main drum, thence each over a respective riding drum and thence to a respective roll on said roll shaft; and means for maintaining said riding drums in peripheral engagement with their respective rolls.

References Cited in the file of this patent

UNITED STATES PATENTS

545,449	Brokaw	Sept. 3, 1895
2,777,644	Nicholson	Jan. 15, 1957
2,790,497	Heygel et al.	Apr. 30, 1957

FOREIGN PATENTS

309,564	Germany	Nov. 29, 1918
---------	---------	---------------