July 20, 1937. J. O. McKEAN 2,087,439

PACKAGE WINDING MACHINE

Filed Dec. 5, 1935 4 Sheets-Sheet 1

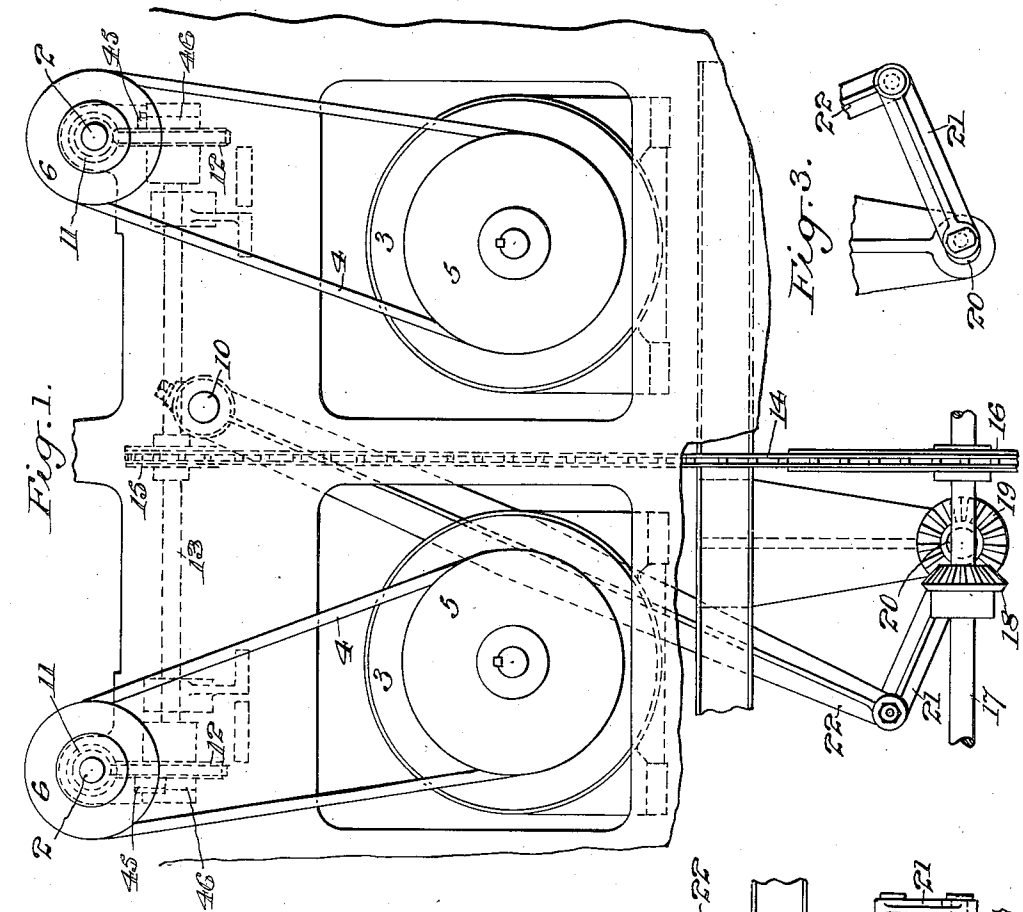


Fig. 1.

Fig. 3.

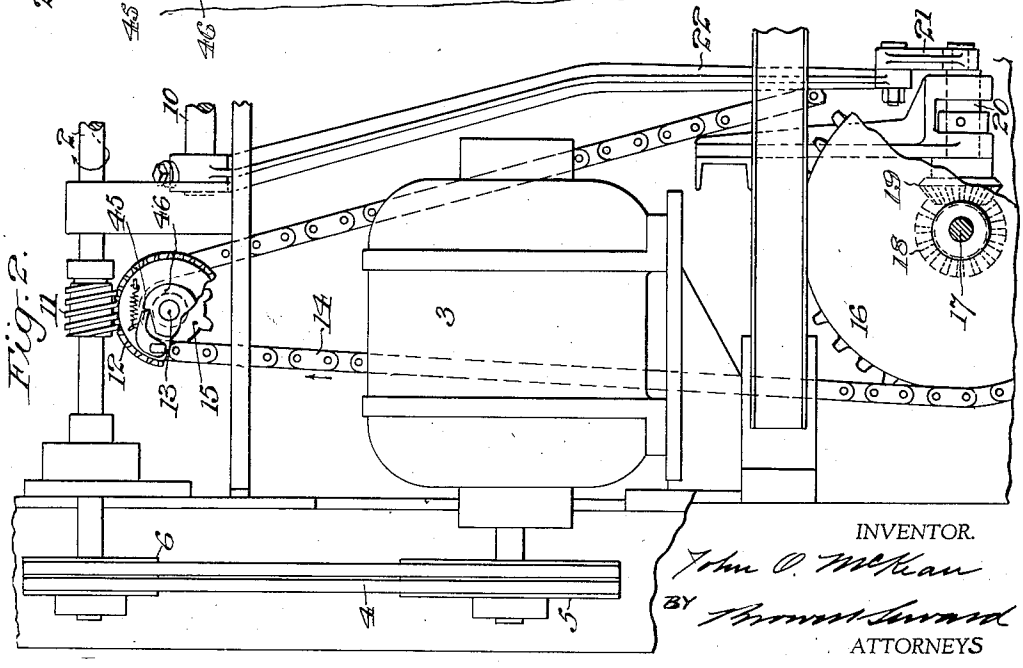


Fig. 2.

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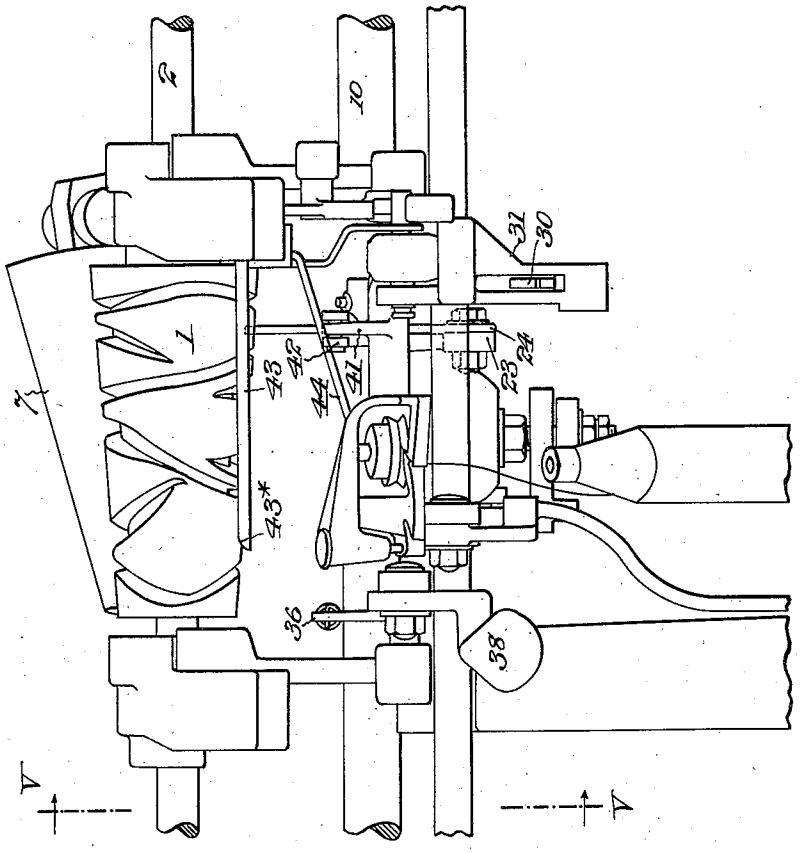


Fig. 4.

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PACKAGE WINDING MACHINE

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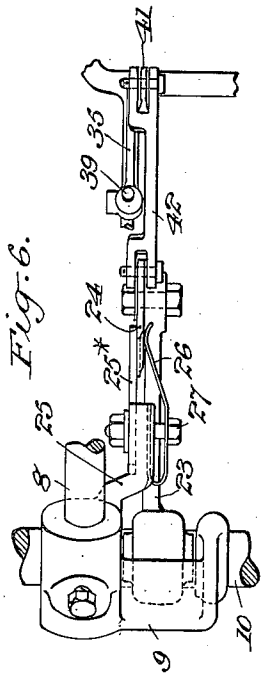


Fig. 6.

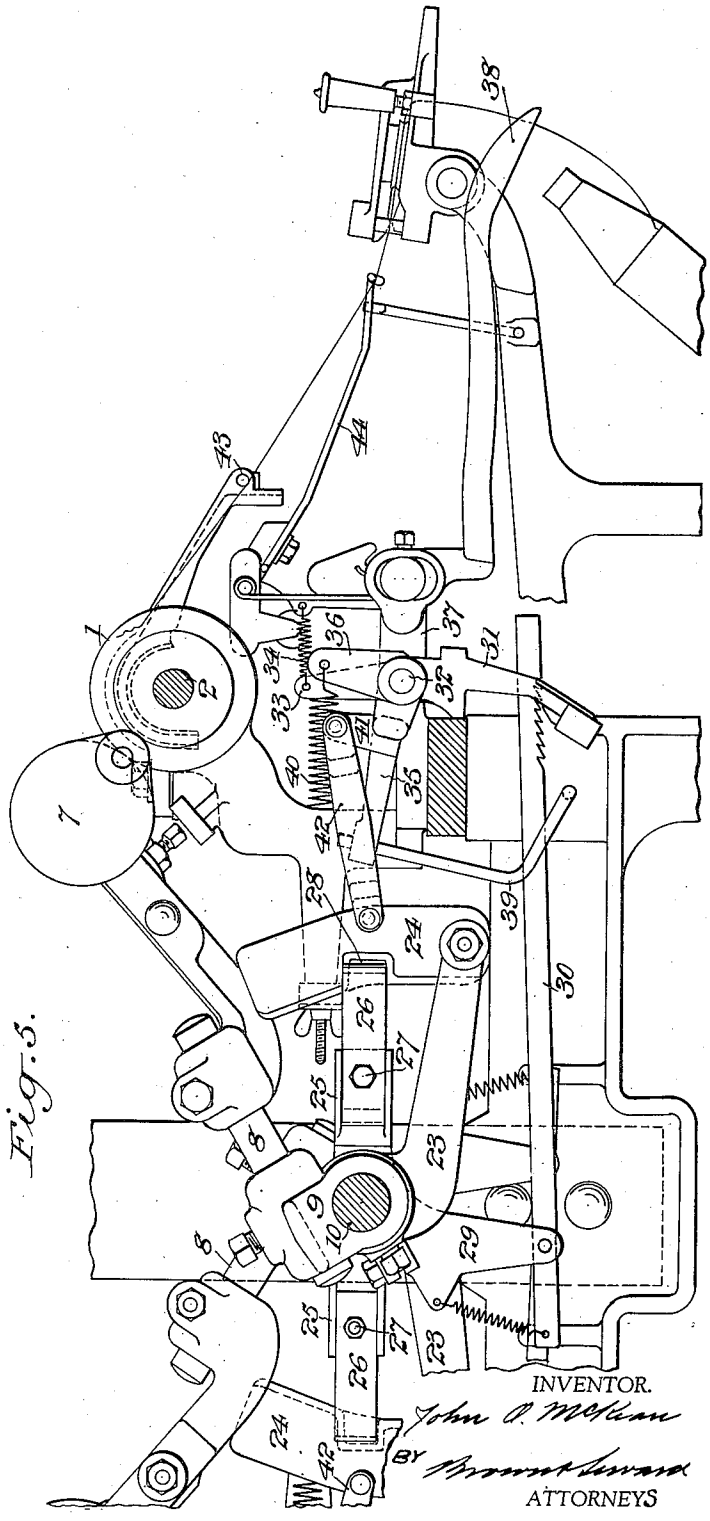


Fig. 5.

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July 20, 1937. J. O. McKEAN 2,087,439

PACKAGE WINDING MACHINE

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Fig. 8.

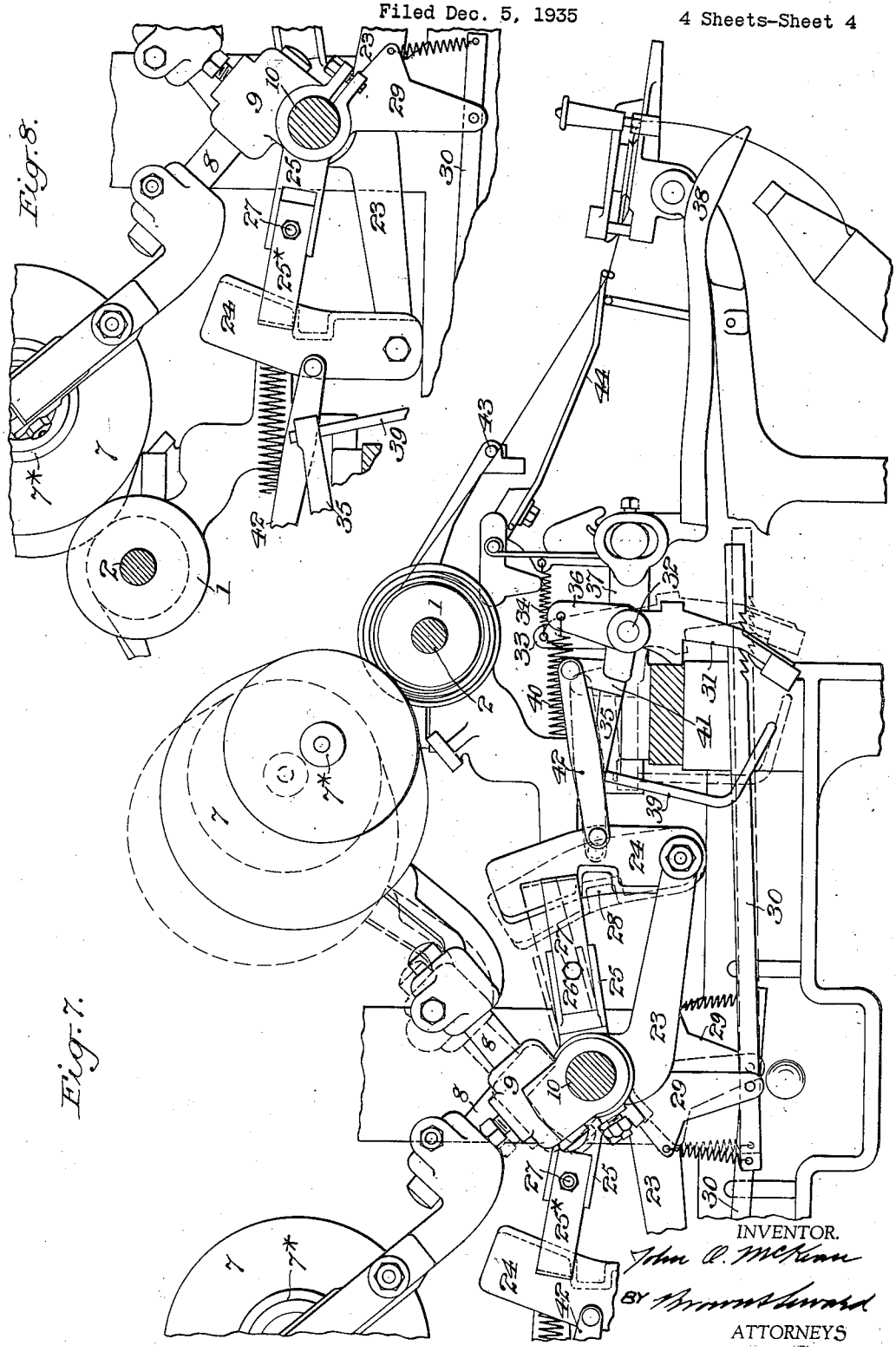


Fig. 7.

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Patented July 20, 1937 2,087,439

UNITED STATES PATENT OFFICE

2,087,439

PACKAGE WINDING MACHINE

John O. McKean, Westfield, Mass., assignor to Foster Machine Company, Westfield, Mass., a corporation of Massachusetts

Application December 5, 1935, Serial No. 52,982

22 Claims. (Cl. 242—18)

My invention comprises, in a package winding machine, a yarn traversing cam roll and a package frictionally driven thereby, mechanism being provided for automatically periodically separating to a greater or lesser extent and contacting the package and its cam roll to alternately slow down and speed up the rotation of the package for the purpose of preventing so-called "ribbon wind"; the said mechanism being rendered ineffective during a predetermined period in the winding of the package so that the yarn may be wound smoothly and evenly on the package. This is particularly advantageous at the start of the winding of the package on an empty core.

My invention further comprises means for adjustably controlling the frictional pressure of the package on the cam roll so that any tendency toward unevenness or the formation of slight ridges on the package is eliminated and any tendency of the package to run unevenly or jump as it slows down and speeds up is prevented.

My invention still further comprises novel means for ensuring the full traverse of the yarn on the traverse cam roll.

My invention more specifically comprises mechanism frictionally connected to the rocking package support for automatically periodically moving the package partially or completely out of and into contact with its cam roll and where oppositely disposed cam rolls and their packages are provided for moving the packages alternately into and out of contact with their respective cam rolls.

A practical embodiment of my invention is represented in the accompanying drawings which illustrate a package winding machine of the type which is provided with two rows of yarn traversing cam rolls and their packages, said rows being located upon opposite sides of the machine.

Fig. 1 represents a detail end view of the package winding machine.

Fig. 2 represents a detail side view of the same.

Fig. 3 represents a detail end view of the eccentric control for the rock shaft lever arm.

Fig. 4 represents a detail side view on a larger scale of one of the winding units.

Fig. 5 represents a detail cross section taken in the plane of the line V—V of Fig. 4, looking in the direction of the arrows, the parts being in the positions they assume when about to start the package winding operation.

Fig. 6 represents a detail plan view of the friction connection between the rock shaft and the rocking support for the package.

Fig. 7 represents a detail cross section in the same plane as Fig. 5, the package being shown in full lines slightly raised from its yarn traversing cam roll and in dotted lines fully thrown off from the cam roll.

Fig. 8 represents a detail cross section in the same plane as Fig. 5 with a package of the opposite row shown in contact with its yarn traversing cam roll.

The oppositely disposed yarn traversing cam rolls are denoted by 1, the shafts 2 of which cam rolls are driven from their respective electric motors 3 through belt and pulley connections 4 and 5, 6.

The packages 7 are wound on cores 7*, which cores in the present instance are shown as cones, the said packages being frictionally driven by their respective cam rolls 1. These packages are carried by the arms 8 of rocking package supports 9 loosely mounted on a common rock shaft 10. For ensuring a smooth even wind of the packages the cam rolls and their package cores are made of different diameters which are not of equal ratios nor of fractionally equal ratios.

Mechanism is provided for automatically periodically moving the oppositely disposed packages alternately out of and into contact with their cam rolls so that as the packages along one side of the machine are moved out of contact with their cam rolls the packages along the opposite sides of the machine are moved into contact with their cam rolls.

This mechanism comprises the following elements: Each cam shaft 2 has a worm and gear connection 11 and 12 with a rotary shaft 13, which shaft in turn has a chain and sprocket driving connection 14 and 15, 16 with a rotary shaft 17. This shaft 17 has a bevel gear connection 18, 19 with a stud shaft 20, which shaft in turn has an eccentric connection with one end of a link 21, the other end of which link is pivoted to the lower end of a depending lever arm 22, the upper end of which arm is fast on the rock shaft 10.

The driving connection between the cam shaft 2 and the shaft 20 is such that the speed of rotation of the shaft 20 is much slower than that of the cam shaft 2, thereby imparting a comparatively slow rocking movement to the shaft 10. This rocking movement is just sufficient to bring the package and its cam roll out of and into frictional contact automatically and periodically during the winding of the package, after it has

been wound regularly up to a predetermined amount.

The friction connection between the rock shaft 10 and the rocking support 9 is as follows:

Another lever arm 23 is fast on the rock shaft 10, to the outer end of which lever arm an uprising friction blade 24 is pivoted, which blade forms one member of the said friction connection. A lever arm 25 projects from the rocking package support 9, said arm having an extension 25* which overlaps and frictionally contacts with one face of the friction blade 24. A flat bar spring 26 is secured to the lever arm 25, which spring overlaps and frictionally contacts with the opposite face of the blade 24. An adjusting screw 27 serves to adjust the pressure of the free end of the spring 26 against the friction blade 24. This spring 26 forms the other coacting member of the friction connection. This friction blade 24 has a cut-away or thinned portion 28 which is located under the pressure end of the spring 26 when the package starts its winding operation, as in Fig. 1, and the friction pressure of the spring is thus so slight on the blade that it renders the package moving mechanism ineffective to move the package periodically away from and into contact with its cam roll until the arm 25 and its spring 26 in the upward movement of the package support, due to the increase in size of the package, brings the pressure part of the spring onto the normal thickness of the blade. This will render the said mechanism effective to automatically periodically move the package through the friction connection of spring and blade, out of and into contact with its cam roll. This movement, it will be seen, alternately slows down and speeds up the rotation of the package, thereby eliminating "ribbon wind" thereon.

A stop motion is provided of well known or approved form, such, for instance, as one of the type shown in United States Letters Patent 1,958,060, May 8, 1934. Only such parts of the stop motion as have a bearing on my present invention will be specifically described herein.

The rocking support 9 has a depending arm 29 which is pivoted to a rack bar 30, the teeth of which are arranged to be brought into and out of engagement with a tooth on the depending arm 31 of a rock lever pivoted at 32, which rock lever is also provided with an uprising arm 33 to which a spring 34 is attached for holding the arm 31 at the limit of its inward movement.

The hand lever which is also pivoted at 32 is provided with three arms 35, 36, 37, the arm 37 being provided with the usual handle 38 and the arm 35 being provided with the usual hook pin 39. A spring 40 engages the lever arm 36 for holding the handle 38 in its raised position. A lug 41 on the arm 35 is connected to one end of a link 42, the other end of which link is connected to the friction blade 24.

To ensure the full traverse of the yarn on its cam roll 1 a horizontally disposed bar 43 is spaced from the cam roll and located between it and the drop wire 44, under which bar the yarn is caused to pass on its way to the cam roll. This yarn control bar extends substantially parallel to the cam roll shaft 2, one end of the bar being free. To cause the automatic threading of the yarn over the free end and under the control bar 43 as the winding operation starts, the free end of the rod is beveled from the top to the bottom of the bar as shown at 43* so that the top of the bar is shorter and the bottom of the bar is longer than the traverse of the yarn at this point. This obviates the necessity of the operator threading the yarn under the bar 43 for, as the winding operation starts, the yarn as it reaches the free end of the bar will, because of the downwardly beveled end, automatically pass over the end and under the bar. By causing the yarn to pass under the control bar 43 the yarn is prevented from jumping out of its guiding grooves in the cam roll 1, thus ensuring the yarn being caused to fully complete its traverse movement.

To permit either row of packages to be wound independently of the other row I provide a pawl and ratchet connection 45, 46, between the shaft 13 and the gear 12. This arrangement also allows for any variation in the speeds of the two motors 3.

In operation: For instance, if it be desired to render the package moving mechanism ineffective at the beginning of the winding operation on the empty core, the parts are so adjusted that the spring 26 exerts practically no friction on the blade 24, thus rendering the package moving mechanism ineffective until the package is wound to a predetermined size. As the package grows in size the spring 26 will travel upwardly along the blade 24 to a point where the friction between the spring and blade will be sufficient to render the package moving mechanism effective. As soon as this point is reached in the winding of the package the raising and lowering of the arm 23 fast on the rock shaft 10 will slowly move the package out of and into frictional contact with its cam roll, thus obviating any tendency of the yarn to "ribbon wind" on the package. It will be seen that this package moving mechanism will not affect in any way the throwing off of the package from its contact with the cam roll due to the completion of the package or due to the breakage or failure of the yarn supply.

By rendering the anti-ribbon wind mechanism ineffective until the package has been wound to a predetermined size, it will be seen that, at the start, the yarn may be wound more evenly upon the core for a number of layers, thereby allowing the yarn to be unwound uninterruptedly from the package at a subsequent operation, clear to the core without danger of snarling or sloughing.

As above pointed out the parts are so arranged that as the package of one row is moved out of contact with its cam roll the package of the opposite row will be brought into contact with its roll, hereby materially lessening the power required to drive the machine.

It will be understood that in using the term "yarn" I wish to include thread, cord or any other element suitable for use in winding packages.

It will also be understood that while I have described specifically the operation of only one traverse cam roll and the package driven frictionally thereby, the machine may include any number of such traverse cam rolls and packages.

It is evident that various changes may be resorted to in the construction, form and arrangement of the several parts without departing from the spirit and scope of my invention, and hence I do not intend to be limited to the particular embodiment herein shown and described, but

What I claim is:

1. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby and mechanism for automatically peri-

odically separating and contacting the package and roll without disturbing the parallelism of their contacting surfaces.

2. In a package winding machine, oppositely disposed yarn traversing cam rolls, packages frictionally driven thereby and means including a common mechanism for automatically periodically separating and contacting one package and roll alternately with the other package and roll without disturbing the parallelism of their contacting surfaces.

3. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby and mechanism for automatically periodically separating and contacting the package and roll, said mechanism being ineffective during a predetermined period in the winding of the package.

4. In a package winding machine, oppositely disposed yarn traversing cam rolls, packages frictionally driven thereby and means including a common mechanism for automatically periodically separating and contacting one package and roll alternately with the other package and roll, said mechanism being ineffective during a predetermined period in the winding of the packages.

5. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rocking support for the package and mechanism frictionally connected to the rocking support for automatically periodically separating and contacting the package and roll without disturbing the parallelism of their contacting surfaces.

6. In a package winding machine, oppositely disposed yarn traversing cam rolls, packages frictionally driven thereby, rocking supports for the packages and means including a common mechanism frictionally connected to the rocking supports for automatically periodically separating and contacting one package and roll alternately with the other package and roll.

7. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rocking support for the package and mechanism frictionally connected to the rocking support for automatically periodically separating and contacting the package and roll, said mechanism being ineffective during a predetermined period in the winding of the package.

8. In a package winding machine, oppositely disposed yarn traversing cam rolls, packages frictionally driven thereby, rocking supports for the packages and means including a common mechanism frictionally connected to the rocking supports for periodically separating and contacting one package and roll alternately with the other package and roll, said mechanism being ineffective during a predetermined period in the winding of the packages.

9. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby and mechanism for automatically periodically moving the package out of and into contact with its cam roll without disturbing the parallelism of their contacting surfaces.

10. In a package winding machine, oppositely disposed yarn traversing cam rolls, packages frictionally driven thereby and means including a common mechanism for automatically periodically moving the packages alternately out of and into contact with their cam rolls.

11. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby and mechanism for automatically periodically moving the package out of and into contact with its cam roll, said mechanism being ineffective during a predetermined period in the winding of the package.

12. In a package winding machine, oppositely disposed yarn traversing cam rolls, packages frictionally driven thereby and means including a common mechanism for automatically periodically moving the packages alternately out of and into contact with their cam rolls, said mechanism being ineffective during a predetermined period in the winding of the packages.

13. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rocking support for the package and mechanism frictionally connected to the rocking support for automatically periodically moving the package out of and into contact with its cam roll without disturbing the parallelism of their contacting surfaces.

14. In a package winding machine, oppositely disposed yarn traversing cam rolls, packages frictionally driven thereby, rocking supports for the packages and means including a common mechanism frictionally connected to the rocking supports for automatically periodically moving the packages alternately out of and into contact with their cam rolls.

15. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rocking support for the package and mechanism frictionally connected to the rocking support for periodically moving the package out of and into contact with its cam roll, said mechanism being ineffective during a predetermined period in the winding of the package.

16. In a package winding machine, oppositely disposed yarn traversing cam rolls, packages frictionally driven thereby, rocking supports for the packages and means including a common mechanism frictionally connected to the rocking supports for periodically moving the packages alternately out of and into contact with their cam rolls, said mechanism being ineffective during a predetermined period in the winding of the packages.

17. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rock shaft, a rocking support for the package loosely mounted thereon, coacting friction members carried by the shaft and rocking support respectively and mechanism acting through said friction members for automatically periodically rocking the shaft to bring the package out of and into contact with its cam roll.

18. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rock shaft, a rocking support for the package loosely mounted thereon, coacting friction members carried by the shaft and rocking support respectively and a common mechanism acting through said friction members for automatically periodically rocking the shaft to bring the package out of and into contact with its cam roll, the friction members being ineffective during a predetermined period in the winding of the package.

19. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rock shaft, a rocking support for the package loosely mounted thereon, coacting friction members carried by the shaft and rocking support respectively, mechanism acting through said friction members for automatically periodically rocking the shaft to bring the package out of and into contact with its cam roll and

manually controlled means for adjusting the friction between said friction members.

20. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rock shaft, an arm fixed thereto, a friction blade member pivoted to the arm, a rocking support for the package loosely mounted on the rock shaft, an arm fixed to the rocking support and a friction spring member carried by the arm in contact with the face of the blade and mechanism acting through said friction blade and spring member for automatically periodically rocking said shaft to bring the package out of and into contact with its cam roll.

21. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rock shaft, an arm fixed thereto, a friction blade member pivoted to the arm, a rocking support for the package loosely mounted on the rock shaft, an arm fixed to the rocking support and a friction spring member carried by the arm in contact with the face of the blade and mechanism acting through said friction blade and spring member for automatically periodically rocking said shaft to bring the package out of and into contact with its cam roll, the friction members being ineffective during a predetermined period in the winding of the package.

22. In a package winding machine, a yarn traversing cam roll, a package frictionally driven thereby, a rock shaft, an arm fixed thereto, a friction blade member pivoted to the arm, a rocking support for the package loosely mounted on the rock shaft, an arm fixed to the rocking support and a friction spring member carried by the arm in contact with the face of the blade, mechanism acting through said friction blade and spring member for automatically periodically rocking said shaft to bring the package out of and into contact with its cam roll and manually controlled means for adjusting the friction between said friction members.

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