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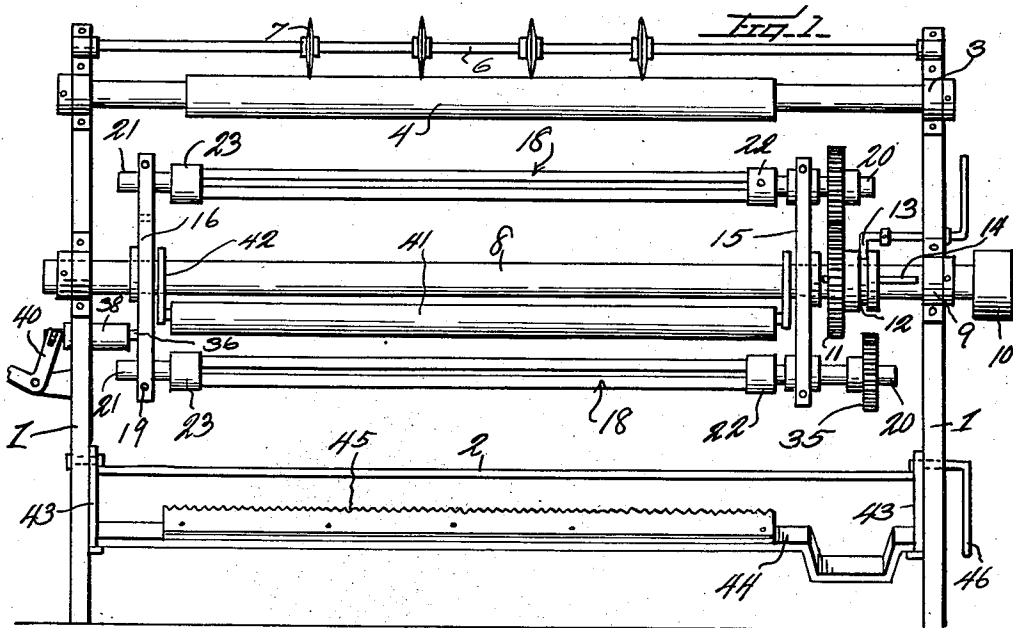
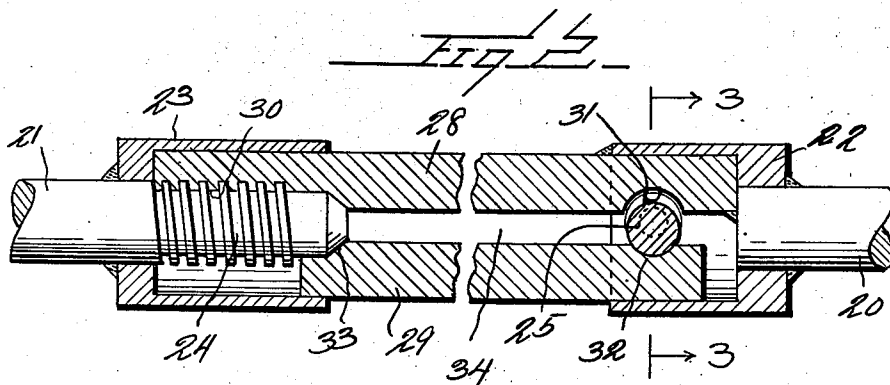
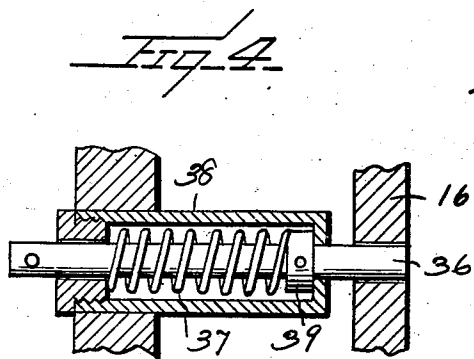
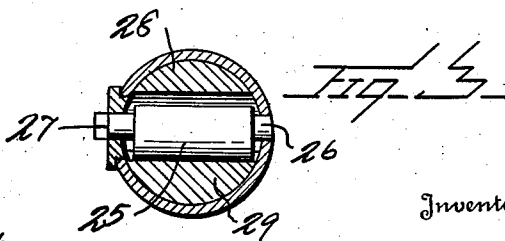
G. A. GERARD

2,272,940

METHOD OF WINDING PAPER AND MECHANISM THEREFOR

Filed March 23, 1940

2 Sheets-Sheet 1



Inventor

George A. Gerard

By *Watson E. Coleman*
Attorney

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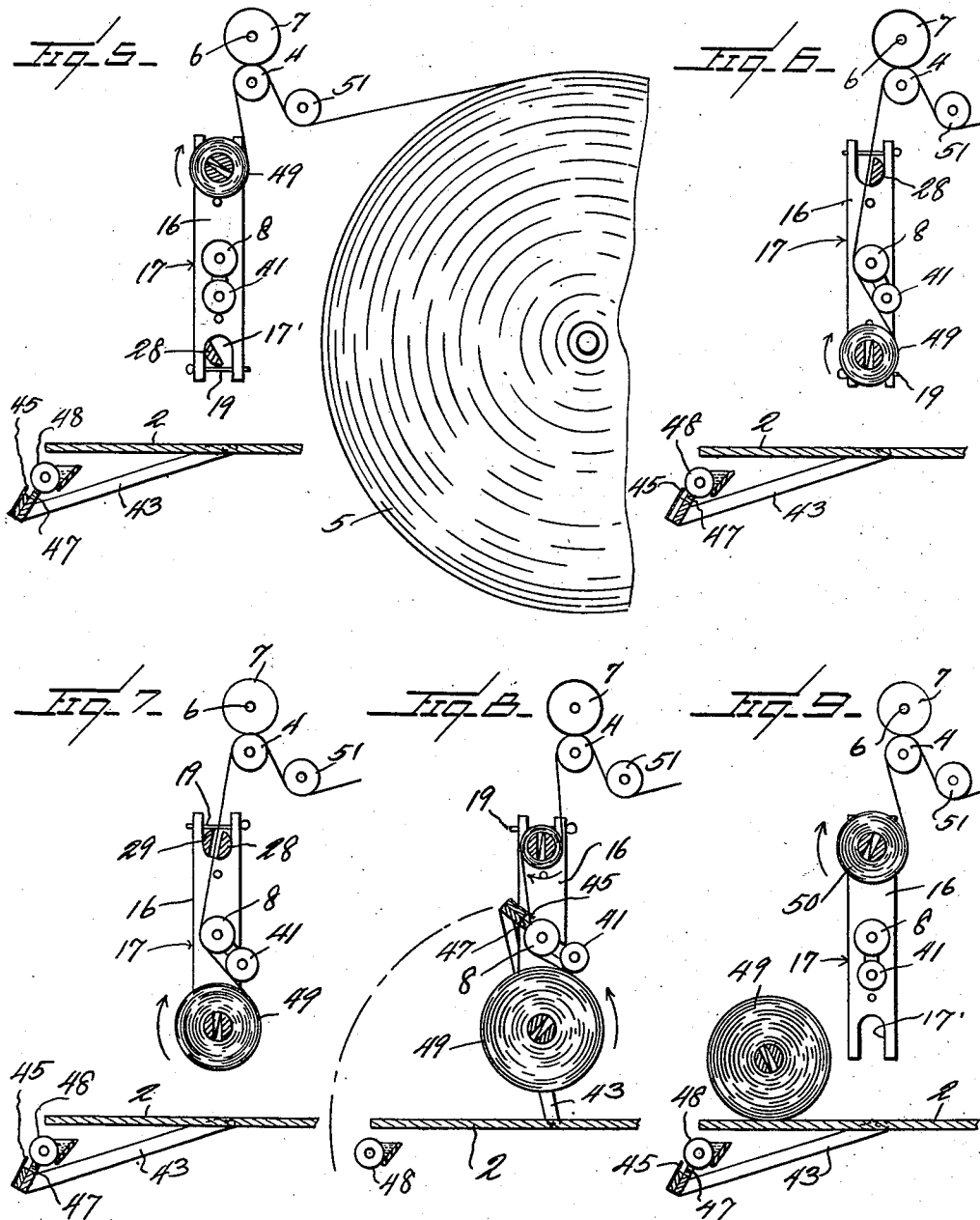
G. A. GERARD

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METHOD OF WINDING PAPER AND MECHANISM THEREFOR

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Inventor

George A. Gerard

By *Watson E. Coleman*
Attorney

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METHOD OF WINDING PAPER AND
MECHANISM THEREFOR

George A. Gerard, Short Hills, N. J.

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12 Claims. (Cl. 242—56)

This invention relates to the class of winding and reeling and has to do particularly with an improved method and means of winding rolls of paper, more particularly small or counter rolls from major stock rolls.

A principal object of the present invention is to provide a method and means for carrying out the same of winding small or counter rolls of paper from a parent roll continuously whereby after the paper web has been initially started upon a winding shaft or reel, rolls may be continuously formed and separated one from the other without having to give further attention to the starting of the web on a winding reel.

Another object of the invention is to provide a method of the character stated together with means for carrying out the same, whereby winding reels are continuously alternately employed for the forming of small rolls of paper from a parent roll without requiring the operator of the machine to give further attention to the starting of the paper web after the initial roll has been started and whereby the severing of the web from each roll as the latter is completed and the securing of the end of the web to the body of the roll is automatically effected.

Still another object of the invention is to provide a means by which small rolls of paper may be continuously produced from a large or parent roll in such manner that the paper of each small roll will be tightly and evenly wound so that straight sides will be produced upon the finished roll.

A still further object of the invention is to provide in a mechanism for winding the paper rolls in the manner stated, an improved winding reel or core upon which the rolls are formed which is constructed in a novel manner to facilitate its quick removal from the finished roll and to facilitate its replacement upon the winding machine in such manner with respect to the paper web that a new roll of paper may be started thereon without requiring the operator of the machine to thread the paper web through the core or perform any other similar service in connection therewith.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding, however, that the invention is not to be confined to any strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from

the salient features of the invention as expressed in the appended claims.

In the drawings:

Fig. 1 is a view in elevation of the mechanism employed in carrying out the present method.

Fig. 2 is a longitudinal sectional view of a winding core or reel, the central portion of which has been broken away.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a detail sectional view showing means for securing the winding cores against rotation.

Figs. 5, 6, 7, 8 and 9 illustrate progressive steps in the carrying out of the method of winding small rolls of paper from a large or parent roll according to the present invention.

Referring now more particularly to the drawings, there is shown in Fig. 1 an upright frame structure which includes vertical side members or posts 1 between the lower ends of which a horizontally disposed platform 2 is supported onto which completed small rolls of paper are dropped after the required number of turns have been made thereon.

Extending transversely of the upper part of the frame structure and supported in suitable bearings 3 is a steel roll 4 over which the paper web either from a parent roll, such as is indicated by the numeral 5 in Fig. 5, or from a paper machine, is trained. Rotatably supported above this steel roll 4 is a shaft 6 carrying cutter wheels 7 which coast with the steel roll 4 to cut the paper web in strips of reduced width.

Beneath the steel roll 4 there is supported a power shaft 8 which is mounted at its ends in bearings 9 carried by the standards or posts 1, and this power shaft may be provided with any suitable means for facilitating the connection of a driving engine therewith, such as the belt pulley 10. Supported upon the shaft 8 is a shiftable driving gear 11 which has formed integrally therewith the peripherally grooved hub 12 in the groove of which a shifting fork 13 is engaged to facilitate sliding the gear 11 on the shaft 8, the gear being coupled to the shaft against rotation independently thereof by a key 14.

The drive gear 11 is mounted upon the shaft 8 adjacent one end thereof and between this gear and the remote end of the shaft there are mounted on the shaft 8 cross bars 15 and 16 which form the ends of a reel frame, which is indicated generally by the numeral 17. These bars are free to rotate on the shaft 8 and the shaft passes through them at their transverse centers as shown, so that each bar actually pro-

vides at each end of the rotary frame two oppositely directed radial arms.

Each end of each of the bars 15, 16 is formed to provide a cradle 17 for an end of a core or reel shaft 18 and the ends of these core shafts are maintained in position in such cradles by cross bolts or pins 19.

Each of these core shafts on which the smaller rolls are wound comprises two end pieces or trunnions 20 and 21 which engage in the ends of the arms 15 and 16, and each of such trunnions has integrally connected with its inner end a socket member, the socket for the trunnion 20 being indicated by the numeral 22 while that for the trunnion 21 is indicated by the numeral 23. The trunnion 21 extends into the socket 23 and is screw-threaded as indicated at 24.

Extending transversely of the socket 22 is a cylindrical locking cam 25, the ends of which are eccentrically rotatably supported in opposite sides of the socket, as illustrated in Fig. 3, through the medium of the longitudinally extending pins 26, one of which is of polygonal form, as at 27, to facilitate connection of a wrench with the lock for turning the same.

The sockets 22-23 are operatively joined together by two spaced parallel bars 28 and 29. The bar 28 has one end permanently secured in the socket 22, as shown in Fig. 2, while its other end is removably engaged in the opposite socket 23, being provided upon its inner face with threads 30 whereby it may be threadably coupled with the threaded inner end of the trunnion 21 to be secured between such end and the wall of the socket 23 in the manner shown in Fig. 2. The opposite end is permanently secured in the socket 22 and is provided with a transverse recess 31 into which the locking cam 25 turns.

The bar 29 is completely detachable from the sockets 22-23, one end of this bar being insertible into the socket 22 and having a recess 32 formed transversely thereof for reception of the cam lock 25 while the other end is insertible into the end of the socket 23 between the unthreaded end portion of the trunnion 21 and the wall of the socket, the bar being provided with a shoulder adjacent the end which is introduced into the socket 23, as indicated at 33, for engagement against the adjacent end of the trunnion so as to limit the movement of the bar into the socket.

When the locking cam 25 is turned into locking position, it engages in the recess 32 of the removable bar 29 and binds the end of this bar against the wall of the socket 22, thus firmly securing the bar in spaced parallel relation with the bar 28 to provide the paper web receiving slot 34. Disengagement of the bar 29 from the sockets is effected by turning the socket 23 so as to unthread the extended or threaded end of the trunnion 21 from the bar 28, thereby removing the threaded end of this bar from the socket 23 or, in other words, moving the sockets apart. This will free the adjacent end of the bar 29 and the other end of the bar may be freed by turning the cam lock 25 so that such other end can be easily drawn out of the socket 22.

Each of the core bars 18 has the trunnion 20 thereof provided with a driven gear 35, these gears being in offset vertical planes but arranged sufficiently closely together to facilitate the selective connection with them of the drive gear 11. The post 1 carries a latching pin 36 which is shiftable transversely of this post inwardly toward the adjacent bar 16 for engagement with this bar so as to hold the same and consequently

the rotating frame 17 against rotation upon the shaft 8. Suitable spring means may be employed for normally urging the latching pin 36 into engaging position with the bar 16, as indicated at 37 in Fig. 4, this spring here being shown enclosed in a housing 38 and having one end bearing against the end of the housing and its other end bearing against a collar 39 which is fixed to the pin 36. The outer end of the latching pin is engaged by a bell crank or other suitable means 40 by which the retraction of the pin is effected.

The numeral 41 designates a brake roll which is supported from the shaft 8 between the bars 15-16, by the arms 42 which are journaled on the shaft to swing freely and the brake roll 41, therefore, is normally suspended beneath the shaft 8 and in parallel relation therewith.

Supported by and between the arms 43 which are pivotally attached to the posts 1 is a serrated cut-off knife supporting bar 44, the knife which is carried by this bar being indicated by the numeral 45 and extending longitudinally of the bar as shown, with the cutting or toothed edge directed upwardly. A lever 46 is connected with one of the arms 43 and facilitates swinging the knife 45 upwardly from a position beneath the platform 2 to a position above the lowermost one of the two core shafts 18. These core shafts are normally maintained by the latch pin 36 in vertically spaced relation. The bar 44 also carries a pasting rubber or dauber strip 47 which lies beneath and in parallel relation with the knife 45 and when the knife is in its lowered position, this pasting rubber contacts a paste transfer roller 48 which receives paste from any suitable source or in any suitable manner so as to transfer the paste to the end of a finished roll as such end is formed by the operation of the cutting knife 45.

In carrying out the paper winding method according to the present invention, the paper strip or web is brought over the steel roller 4 either from a large parent roll 5, as indicated in Fig. 5, or from a paper machine being passed beneath the cutting knives 7 and downwardly to the uppermost one of the core shafts 18. The paper is then threaded through such core shaft through the slot 34. The driving gear 11 is then engaged with the gear 35 of this uppermost core or winding shaft so as to start winding the paper thereon. The lower winding or core shaft is placed in position between the lower ends of the bars 15 and 16 with the bar 29 removed. This first step is illustrated in Fig. 5 where one of the smaller rolls is shown upon the upper core shaft and indicated by the numeral 49.

While the top roll is being formed or is winding, and without stopping the winding operation, the trip latch 36 is retracted so as to release the bar 16 with the result that the entire frame 17 will be turned over or will be caused to make one half a turn through the action of the driving gear 11 against the gear 35 with which it is in mesh. Since the latch 36 will immediately move back into operative position, it will be seen that it will function to prevent the arm 16 and the parts connected therewith from making more than this half turn. This brings the bar 28 of the lower core shaft around into the position shown in Fig. 6 and transfers the previously uppermost core shaft 18 to the lower position from which the previously lower bar has been removed, carrying the paper web or strip downwardly across the face of the shaft 8 and bringing it to bear

against the brake roller 41, forcing the latter backward as shown in Fig. 6. The bar 29 is now placed in position to complete the upper core shaft, as shown in Fig. 7, and the paper web now passes through the slot 34 which is formed between these bars, being continued to be added to the roll 49, as shown in this figure.

When the roll 49 is complete as shown in Fig. 8, the drive gear 11 is shifted or thrown over to disengage from the lowermost gear 35 and to engage with the uppermost gear 35 which is connected with the uppermost core shaft 18 whereupon this uppermost core shaft will begin to rotate to wind up the paper web thereon from the source of supply and also from the underlying roll 49, the roller 41 meanwhile acting as a brake, bearing against the lower roll 49, as shown in Fig. 8.

The lever 46 is now swung upwardly so as to bring the serrated cutting knife 45 up into the position shown in Fig. 8 where it will cut the web just above the shaft 8 and where the paste applying rubber or dauber strip 47 will simultaneously apply a line of paste material to the lower part of the cut web. The end of the roll, being held in place against the body of the roll by the brake roller 41 will have the adhesive pressed against the adjacent paper roll body 49, so that the end will be secured in place. The pins 19 supporting the lower core shaft 18 and the roll 49 may then be withdrawn to allow the roll to drop out onto the platform 2, as shown in Fig. 9. During this procedure a new roll or series of rolls 50 is being built up upon the upper core shaft, as shown in Fig. 9. After the paper roll 49 or a series of such rolls has been removed, the core shaft is taken out by unthreading or backing off the socket member 23 from the bar 28, this procedure releasing the adjacent end of the bar 29. The locking eccentric 25 is then turned up into the recess 31 so as to release the other end of the bar 29, thus permitting this bar to be entirely withdrawn from the paper roll and also permitting the bar 28 to be drawn out from the center of the paper roll, leaving the roll without a central core. The socket 23 is then replaced upon the end of the bar 28 and this bar with the two sockets and end trunnions is then placed back into position between the lower ends of the bars 15, 16, without the bar 29, thus preparing the frame 17 for a repetition of the procedure described in connection with the structure as illustrated in Fig. 5.

From the foregoing, it will be readily seen that after the end of the paper web has once been inserted through the slot of the uppermost core shaft 18, the procedure of forming the smaller paper rolls upon the core shafts may continue uninterruptedly until the parent roll or the source of supply is exhausted and during this procedure, the operator of the machine will not be required to start the paper web on either of the core shafts for the winding of any of the rolls.

In order that the paper web may be kept tight, a tension roll 51 may be employed in advance of the steel cutting roll 4 or between the same and the parent roll, as shown in the Figs. 5 to 9 inclusive.

What is claimed is:

1. Mechanism for winding rolls of material from a supply source, comprising at least two winding cores in spaced parallel relation, a driven rotatable shaft extending therebetween and in parallel relation therewith, supporting means for said cores which is mounted on the shaft for

free turning thereabout independently of the driven shaft, means for selectively coupling the driven shaft with the cores for effecting their turning on the supporting means and through the driven shaft, and means releasably holding the core supporting means against turning on the shaft.

2. A winding mechanism of the character described, comprising a winding frame having two rotatable longitudinally extending parallel core shafts, a driven shaft supporting said frame for turning thereon and independently thereof on an axis extending longitudinally between and parallel with said shafts, means for selectively applying rotary power to the core shafts from the driven shaft, means for releasably holding said frame against turning, and said frame being rotated by the driven shaft through the said selective power applying means when said holding means is released.

3. A winding mechanism of the character described, comprising a pair of supporting standards, a horizontally disposed shaft rotatably supported on and between said standards, a frame including two bar members each supported intermediate its ends upon said shaft for rotation thereon, said frame including two winding shafts each rotatably supported between a pair of bars to extend longitudinally of the first shaft, a driving wheel supported upon the first shaft and keyed thereto for longitudinally shifting thereon, a driven wheel supported upon each of said winding shafts adjacent the drive wheel and in offset parallel planes and adapted to be selectively engaged by and upon shifting of the driving wheel on its supporting shaft, a releasable holding means carried by one of said standards for engaging and holding said frame against turning, each of said winding shafts being longitudinally separable to facilitate connection therewith of the material to be wound thereon.

4. A winding mechanism of the character described, comprising a rotatably supported power shaft, a wheel keyed to said power shaft for limited longitudinal movement thereon, an elongated frame including two spaced parallel winding shafts supported upon the power shaft for rotation independently thereof on an axis extending centrally between the winding shafts, said winding shafts being independently rotatable, means for selectively establishing driving connection between said wheel and said winding shafts, releasable means for securing said frame against turning on the power shaft, and a material cutting knife pivotally supported to be swung upwardly into a position between the winding shafts when the latter are disposed one above the other for severing material extending from one winding shaft to the other winding shaft.

5. A mechanism for winding paper rolls from a source comprising a horizontally supported rotatable power shaft, a frame extending longitudinally of said shaft and including transverse end bars each supported on the shaft for free rotation thereon and parallel winding shafts, each of said winding shafts being rotatably supported between the bars and being readily detachable therefrom, each winding shaft including means for connecting the paper web thereto, means for selectively coupling the winding shafts with said first shaft whereby the winding shafts may be independently rotated, means for detachably holding said frame against rotation on the first shaft, a cutter knife extending longitudinal-

ly of said frame, means supporting said cutter knife below the frame whereby the knife may be swung upwardly and inwardly toward the frame to sever a paper web extending between the winding shafts.

6. A mechanism for winding paper rolls from a source comprising a horizontally supported rotatable power shaft, a frame extending longitudinally of said shaft and including transverse end bars each supported on the shaft for free rotation thereon and parallel winding shafts, each of said winding shafts being rotatably supported between the bars and being readily detachable therefrom, each winding shaft including means for connecting the paper web thereto, means for selectively coupling the winding shafts with said first shaft whereby the winding shafts may be independently rotated, means for detachably holding said frame against rotation on the first shaft, a cutter knife extending longitudinally of said frame, means supporting said cutter knife below the frame whereby the knife may be swung upwardly and inwardly toward the power shaft to sever a paper web extending between the winding shafts, and means carried by said knife for applying a line of adhesive to the paper web below the cut line whereby the end of such web beneath the cut line will be secured to a paper roll formed on the lower one of the winding shafts.

7. A mechanism for winding paper rolls from a source comprising a horizontally supported rotatable power shaft, a frame extending longitudinally of said shaft and including transverse end bars each supported on the shaft for free rotation thereon and parallel winding shafts, each of said winding shafts being rotatably supported between the bars and being readily detachable therefrom, each winding shaft comprising in the portion thereof lying between the pair of supporting bars, two parallel bar members, means coupling the parallel bar members of each winding shaft which is constructed and arranged whereby such bar members may be readily separated, means for selectively coupling the winding shafts with said first shaft whereby the winding shafts may be independently rotated, means for detachably holding said frame against rotation on the first shaft, a cutter knife extending longitudinally of said frame, means supporting said cutter knife below the frame whereby the knife may be swung upwardly and inwardly toward the frame to sever a paper web extending between the winding shafts, a brake roll extending longitudinally of the first-mentioned shaft and suspended therefrom for oscillation thereon and adapted to bear against a paper web extending between the winding shafts when the latter are disposed one above the other, and means carried by said knife for applying a line of adhesive to the paper web beneath the cut line whereby the end of the web beneath such cut line will be pressed by the brake roll against the paper roll formed on the lower winding shaft.

8. The method of winding material in rolls from a supply source, which comprises starting an end of the material on a winding core to form a roll, then moving said core from its initial position through an arcuate path and simultaneously moving a second core in the same direction through a corresponding arc and on the same axis into a preparatory winding position across the material between the first core and the source, continuing drawing the material

from said source across the second core and the winding of a roll of the material on the first core to completion, then discontinuing winding the first roll and starting winding the material on the second core without separating the first roll from the source, to start a roll on the second core, then severing the material between the two rolls and securing the end of the roll on the first core.

9. The method of winding sheet material into rolls from a supply source, which comprises mounting spaced parallel winding cores to extend across the material as it is fed from the source and to turn through a circle on a common axis paralleling the cores, starting an end of the material on one core, then turning the cores together on said axis to reverse the positions of the cores and to move the other core into a preparatory position across the sheet of material between the source and the first core, completing the winding of the roll on the first core while continuing the winding of material on the first core, then stopping the winding of the material on the first core and starting winding the material on the second core from the source and from the first roll until a second roll is started, then severing the material between the rolls and securing the free end of the first roll.

10. The method of winding paper rolls from a supply source, which comprises starting an end of the paper on a winding core, then shifting said core from its initial position while continuing the winding of the material thereon and moving a second core into position across the paper between the first core and the source, continuing the winding of a roll on the first core to completion, employing the increasing diameter of the roll on the first core to apply a pressure to the paper as it is wound on the roll then discontinuing winding the first roll and starting winding the paper on the second core without separating the first roll from the supply source to start a roll on the second core, then severing the paper between the two cores and at the same time applying adhesive to a face of the paper between the severing line and the second core and utilizing said pressure to press the adhesive bearing surface against the body of the roll on the second core.

11. Mechanism for winding paper rolls from a source, comprising a rotatably supported driven shaft, a frame extending longitudinally of the shaft and including a pair of transverse end bars each rotatably supported on the shaft for free rotation thereabout and parallel winding shafts, said winding shafts being rotatably supported between the bars and being detachable therefrom, each of said winding shafts being constructed to facilitate the attachment of a paper web thereto, means for selectively coupling the winding shafts with the driven shaft to effect the rotation of either winding shaft from the driven shaft, means holding said frame against rotation on the driven shaft, said frame when released by said holding means being rotated on the driven shaft through the connection between the driven shaft and one of the driving shafts, and a brake roll extending longitudinally of the driven shaft and suspended at its ends from the driven shaft for oscillation thereon, the brake roll being disposed between the driven shaft and a winding shaft to bear against a paper web being wound upon one of the winding shafts when said winding shafts are disposed one above the other.

12. Mechanism for winding paper rolls from a source, comprising a rotatably supported driven shaft, a frame extending longitudinally of the shaft and including a pair of transverse end bars each rotatably supported on the shaft for free rotation thereabout and parallel winding shafts, said winding shafts being rotatably supported between the bars and being detachable therefrom, each of said winding shafts being constructed to facilitate the attachment of a paper web thereto, means for selectively coupling the winding shafts with the driven shaft to effect the rotation of either winding shaft from the driven shaft, means holding said frame against rotation on the driven shaft, said frame when released by said holding means being rotated on the driven shaft through the connection between the driven shaft and one of the driving shafts,

5 a brake roll extending longitudinally of the driven shaft and suspended at its ends from the driven shaft for oscillation thereon, the brake roll being disposed between the driven shaft and a winding shaft to bear against a paper web being wound upon one of the winding shafts when said winding shafts are disposed one above the other, and a combined paper web severing means and paste applying means supported for movement 10 from an inoperative position to an operative position between the winding shafts to effect the division of the paper web between the winding shafts and the application of adhesive to one of the portions of the divided web, the said one of 15 the portions of the divided web being pressed against the paper roll by said brake roll.

GEORGE A. GERARD.