

Dec. 25, 1962

E. D. BEACHLER

3,070,461

BLADE COATER ASSEMBLY AND CHANGER

Filed Sept. 15, 1958

6 Sheets-Sheet 2

Fig. 2

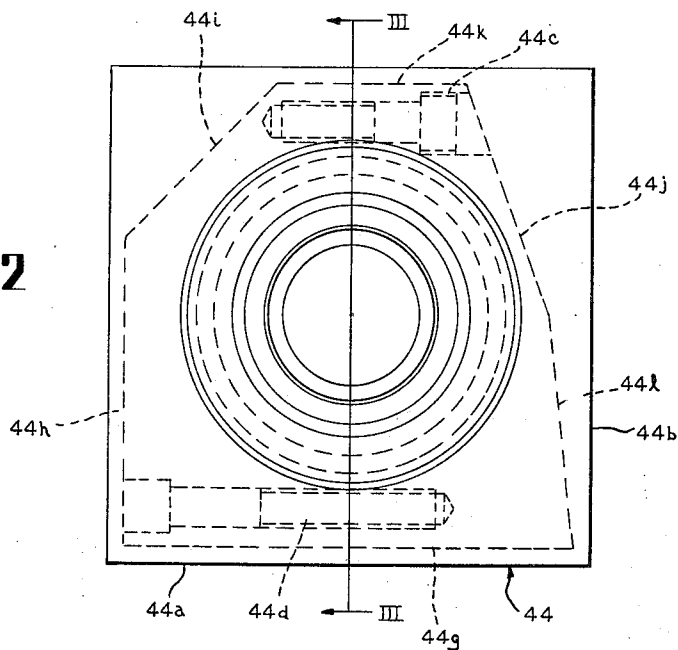
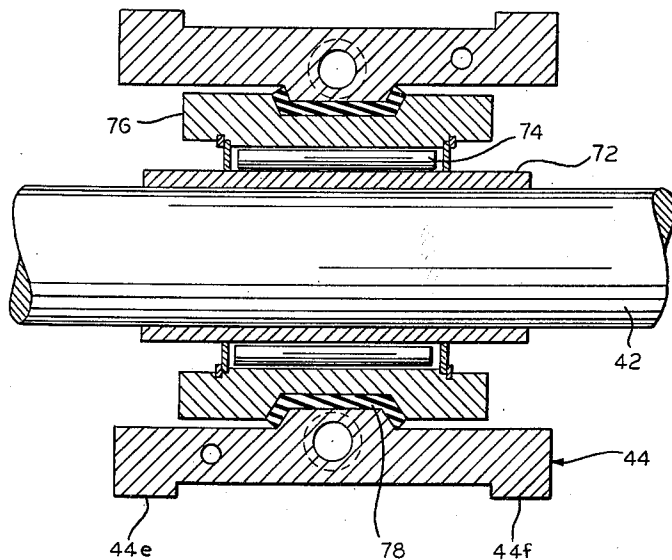


Fig. 3

INVENTOR.

EDWARD D. BEACHLER

BY

Hill, Sherman, Merani, Goss, Simpson
ATTORNEYS

Dec. 25, 1962

E. D. BEACHLER

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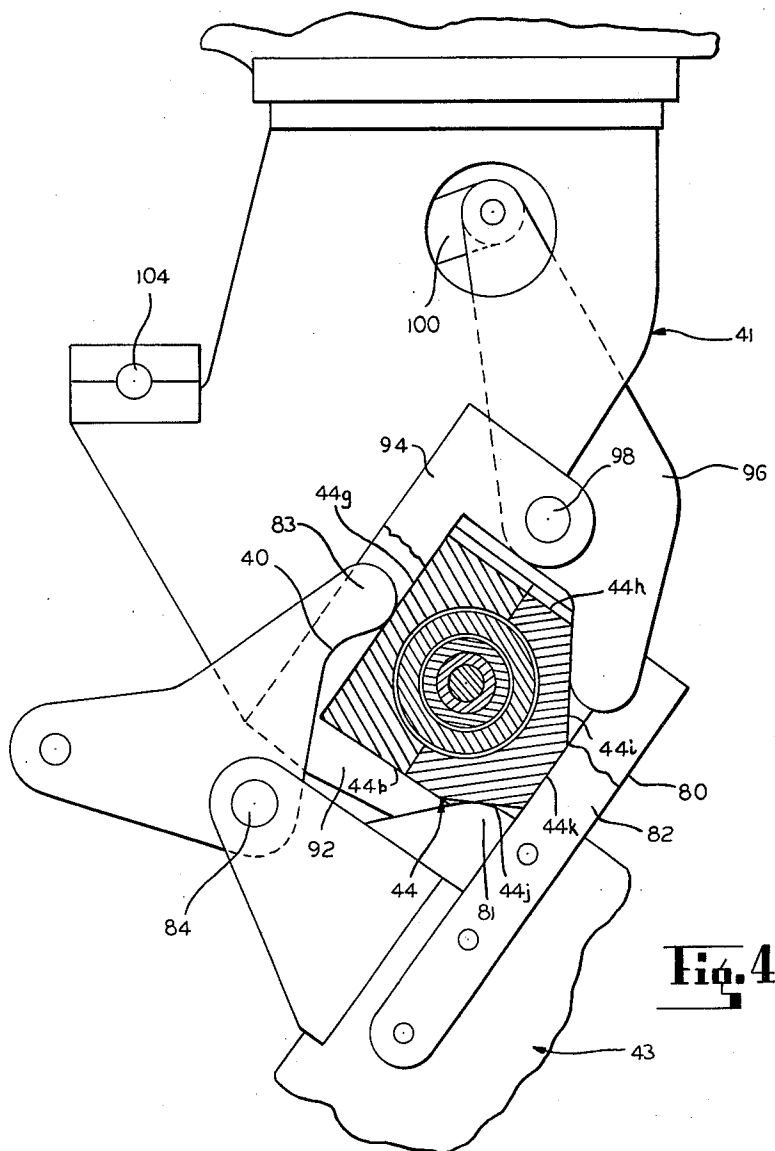


Fig. 4

INVENTOR.

EDWARD D. BEACHLER

Hill, Sherman, Meroni, Cross & Simpson

ATTORNEYS

Dec. 25, 1962

E. D. BEACHLER

3,070,461

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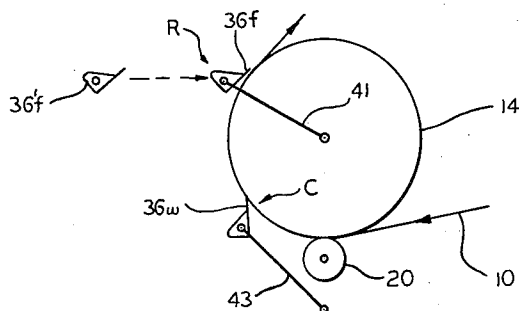


Fig. 5

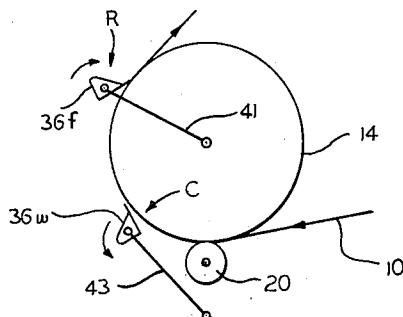


Fig. 6

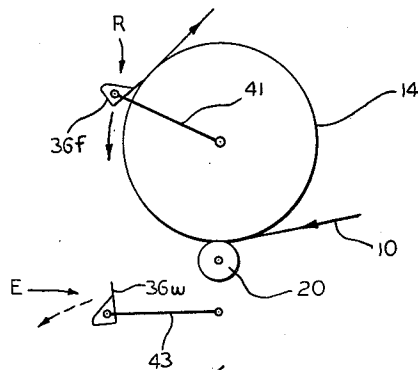


Fig. 7

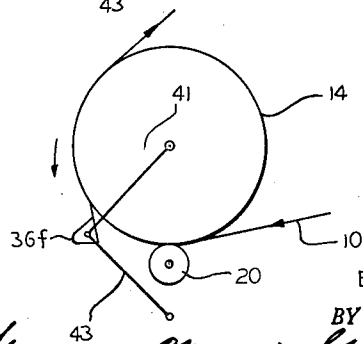


Fig. 8

INVENTOR.
EDWARD D. BEACHLER

BY
Hill, Sherman, Murai, Casselino
ATTORNEYS

Dec. 25, 1962

E. D. BEACHLER

3,070,461

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Fig. 9

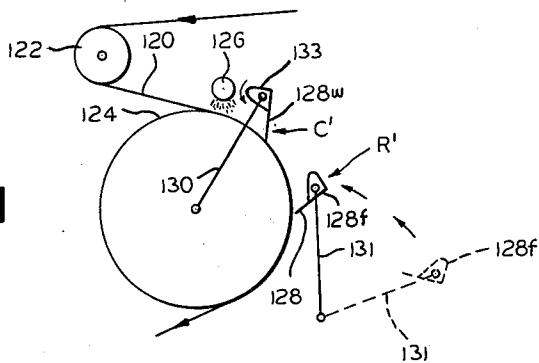


Fig. 10

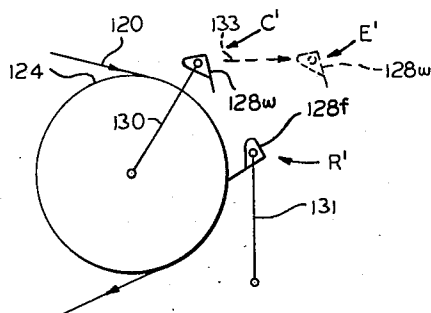


Fig. 11

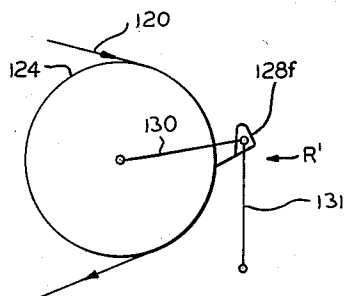
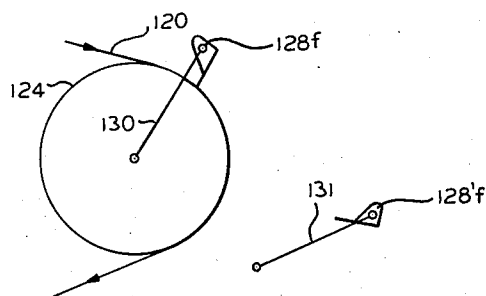


Fig. 12



INVENTOR.

EDWARD D. BEACHLER

BY

Hill, Sherman, Merri, Chase & Simpson
ATTORNEYS

Dec. 25, 1962

E. D. BEACHLER

3,070,461

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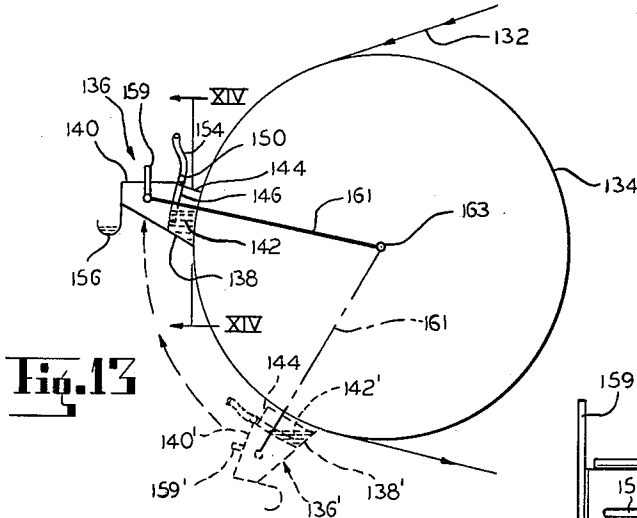


Fig. 13

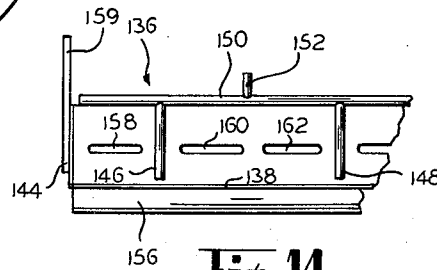


Fig. 14

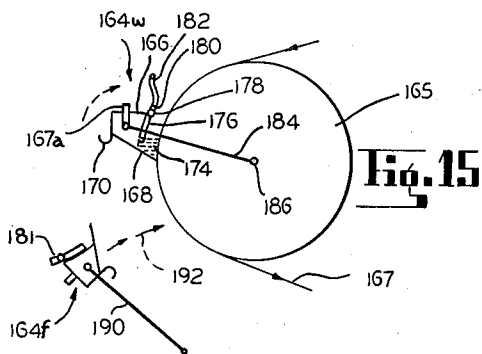


Fig. 15

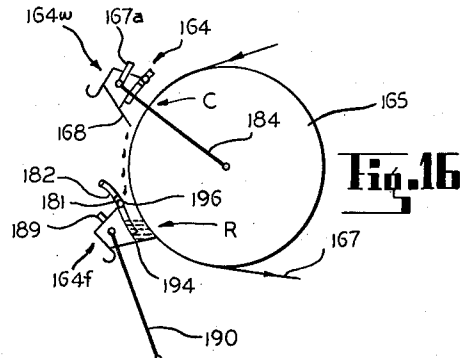


Fig. 16

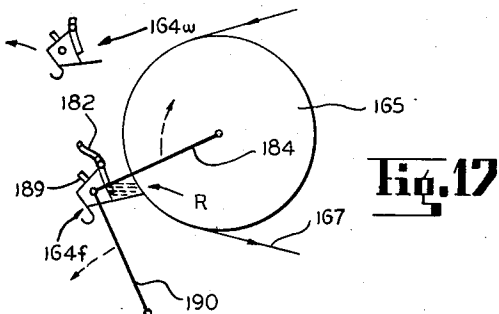


Fig. 17

INVENTOR.
EDWARD D. BEACHLER

BY
Hill, Sherman, Merani, Cass & Simpson
ATTORNEYS

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3,070,461

BLADE COATER ASSEMBLY AND CHANGER
Edward D. Beachler, Beloit, Wis., assignor to Beloit Iron Works, Beloit, Wis., a corporation of Wisconsin
Filed Sept. 15, 1953, Ser. No. 760,986
10 Claims. (Cl. 117-120)

The present invention relates to improvements in paper machines and more specifically to an improved mechanism for coating a web of paper using a trailing doctor blade and to a mechanism for removing a worn blade and replacing it with a fresh blade without stopping the machine and without adversely affecting the quality of the paper web.

The features of the invention contemplate use in combination with mechanism for applying a coating to a continuous web of paper such as employed in a paper-making machine. A rotating drum carries an endless web of paper and a doctor blade extends across the paper surface to smooth and knead coating onto the paper surface with the coating applied at or ahead of the blade, depending upon the arrangement employed. For continuous high speed operation in a paper machine, the blade is loaded to a fixed position relative to the paper surface, and the coating must be uniformly applied. The blade cannot run against a dry web of paper without damaging the web, and perhaps tearing or burning the blade. Excessive thicknesses or globs of coating cannot appear on the paper surface after it passes the coater, since these will create wet adhesive spots which will cause the paper to stick to surfaces, damaging or tearing the paper and making continuing operation impossible. These and other considerations have made it heretofore extremely difficult to change coating blades in a paper coating machine, and have normally made it necessary to stop the operation of the machine while the blade is being changed. Even if the machine is stopped completely, extreme difficulties are encountered in that wet spots occur in the paper if the coating flow is continued, causing the paper to weaken and tear, or the coating must be interrupted for a length of paper, creating a length of scrap.

Accordingly, it is an important object of the invention to provide mechanism making it possible to replace a worn doctor blade in a paper coating machine without affecting the quality of the paper being coated, and without creating any unsatisfactory paper areas.

Another object of the invention is to provide a mechanism for changing a worn coating blade which permits the paper machine to continue in its normal speed of operation, and without requiring any shut-down or interruption of the machine, and without creating any unsatisfactorily coated lengths of paper.

A further object of the invention is the provision of a mechanism for changing blades in a trailing blade paper coater having principles of operation especially well adapted to use with a nip type coater wherein coating material is applied by a rotating roll ahead of the location of the blade and also well adapted to use with a puddle type coater where coating is applied at the blade.

Another object is to provide an improved coating mechanism using the principles of the puddle coating for coating a paper web.

A feature of the invention is to provide a paper coating mechanism running a paper web over a drum and having swinging holding arms for holding a coating blade at a coating station, and a series of swinging replacement arms for holding a replacement blade at a location behind said coating station in the direction of paper movement and removing the worn coating blade while simultaneously bringing the replacement blade into loaded coating engagement with the paper, and arcuately moving the replacement blade along the drum to the coating station and

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thereafter gripping the fresh blade with the holding arms and releasing it with the replacement arms.

Other objects, features and advantages of the invention will become more apparent with the disclosure of the preferred embodiments thereof in the specification, claims and drawings, in which:

FIGURE 1 is a front elevational view of a coating mechanism for a paper machine with mechanism for supporting and transferring doctor blades, and embodying the principles of the present invention;

FIGURE 2 is a detailed front elevational view of an end member for supporting the doctor blade and for enabling transfer and loading thereof;

FIGURE 3 is a vertical sectional view taken along line III-III of FIGURE 2, and showing details of construction and the relationship between the supporting member and the doctor blade;

FIGURE 4 is a perspective view illustrating the manner in which releasable grippers transfer the doctor blade;

FIGURE 5 is a schematic illustration of the coating mechanism showing a step in changing coating blades;

FIGURES 6, 7 and 8 are views similar to FIGURE 5, and illustrate further sequential steps in changing coating blades;

FIGURES 9 through 12 illustrate diagrammatically the structure and operation of another embodiment of the invention;

FIGURES 13 illustrates in somewhat schematic form a further embodiment of the invention;

FIGURE 14 is a sectional view taken substantially along line XIV-XIV of FIGURE 13; and

FIGURES 15 through 17 illustrate diagrammatically a further form of the invention.

As shown on the drawings:

As illustrated particularly in FIGURE 1, the mechanism operates to coat a traveling web of material, such as paper, and may be located at a coating station in a paper-making machine. A traveling paper web 10 passes over the surface 12 of a cylindrically shaped rotating drum 14 mounted for rotation on a support bearing 16, carried on a bracket 18, which is mounted on suitable framework.

A coating material is applied to the surface of the paper 10 by a coating applicator or roll 20, which is supported for rotation about an axis parallel to the axis of the drum in a position to form a coating nip 22 between the paper and roll 20. Coating is received on the surface of the roll from a coating pan 24 positioned so that the lower surface of the roll dips into the pan as it rotates. Means may be provided in some instances for driving the coating roll at a peripheral speed substantially equal to that of the peripheral speed of the drum 14 or the coating roll may be rotated by contact with the web. The coating roll 20 is shown as mounted on a bell crank arm 25 pivotally mounted at 26. The roll is carried on an upper arm 28 of the bell crank, and a lower arm 30 is connected to the end of a piston rod 32 connected to a piston slidable in a coating nip cylinder 34. The piston within the cylinder is operated by fluid to close the coating nip during coating operation, and an adjustable stop bolt 23 mounted on a bracket 27 adjusts the pressure between the paper web 10 and coating roll 20. The coating roll 20 may be dropped away from the web at the end of a coating run. The coating material on the surface of the paper web 10 is kneaded into the paper and spread smooth by a coating doctor blade 36. As will be appreciated by those skilled in the art, the doctor blade assembly 36 has a long straight edge 38, and the blade is loaded or placed in a position wherein the edge 38 will apply a smoothing pressure to the coating on the surface of the paper, spreading it to a flat, thin, even, smooth layer. A slight excess of the coating may be applied

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to the paper which will drip down to be caught by an appropriate receiver. The coating blade is supported by a blade back 40 having a cylindrical shaft 42 projecting from the end to be journaled in a blade supporting block 44, as will be explained later in connection with the detailed showings of FIGURES 2 and 3.

As will be appreciated by those skilled in the art, the drum 14, the coating roll 20 and the doctor blade 36 extend laterally across the coating mechanism and are normally operated in a horizontal position. Inasmuch as the rear end of the machine is substantially identical in construction to the front end, which is shown in FIGURE 1, only one end is shown for purposes of simplification of the drawings.

The coating machine is designed to continue operation continually with a continuous endless web of paper being fed through the machine, and the coating process being continually performed. After a substantial period of operation, the coating blade 36 will become worn or chipped and will be unsatisfactory for further use. It is then necessary to replace the worn blade, removing it from the machine and placing a fresh, new, reconditioned blade in place. Damage to the machine may occur suddenly, making it necessary to effect a quick change, if a continued satisfactory output of coated paper is to be expected. Accordingly, it is a feature of the present invention to be able to continue operation of the machine and replace a worn blade with a fresh blade without affecting the quality of the paper coated, and to effect the changing quickly and at any time during operation. This is accomplished by providing a blade replacing member or arm 41, which holds a fresh blade in readiness. A blade holding member or arm 43 supports the operating blade in coating position during operation. For purposes of description, the location of the blade in operating position will be referred to as the blade operating station or coating station C, and the location at which a replacement blade is held in readiness will be referred to as the blade replacement position or station R. When the worn blade is carried from the machine, it is moved to an ejecting position which will be referred to as E.

In addition to the holding arm 43 and the replacing arm 41, each of the arms are provided with means for tilting or loading the blade. The blade can thus be tilted away from the drum where it does not engage the paper, or it can be placed in a loaded position where it spreads the coating material on the paper. This mechanism will be described later in connection with details of the carrying arms and mechanisms for supporting the blade thereon.

Referring to FIGURES 5 through 8, the sequence of operations and the sequential position of the worn blade and the fresh replacement blade will be described in the operation of blade changing. FIGURE 5 illustrates the mechanism as it appears in normal operation with a blade 36w in coating relationship with the paper web 10. The blade is coating position at the coating station C by the holding arm 43. A replacement or fresh blade 36f is supported at a ready position at the replacement station by the replacement or transfer arm 41. The blade 36f is out of contact with the paper web 10.

When the blade 36w becomes worn, the operation of the replacing mechanism is started. Inasmuch as this mechanism operates in timed sequence, it may be operated manually or be operated by a timing mechanism, such as operating cams controlling switches or the like, as will be appreciated by those skilled in the art. The timed sequence of operation may be achieved in numerous ways and, therefore, details of the device for controlling the operating mechanism need not be specifically shown.

With the drum 14 operating at normal speed, the fresh blade is tilted or loaded against the web 10. The worn blade 36 then is moved out of coating contact with the paper web 10. This may be accomplished by tilting the blade back out of loaded position, as shown in FIG-

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URE 6, or may be accomplished by movement of the holding arm 43 away from the drum. Thus, as the web 10 continues its travel, there will be no unsmooth coated areas. The fresh blade 36f is not brought against the paper any substantial time ahead of the unloading of the worn blade since engagement of the coating blade with dry coated paper for any appreciable time will cause a burn or other damage. Ideally the fresh blade engages the paper web at the point, or just ahead of the point on the paper web where the worn blade was lifted off the paper.

From the positions of FIGURE 6, the holding arm 43 carries the worn blade 36w to the ejecting position E, as shown in FIGURE 7. The transfer arm 41 now swings the fresh blade 36f arcuately down along the periphery of the drum 14 into the coating station C, with the blade performing its coating function while being moved into the station.

In the ejecting station E, as shown in the positions of FIGURE 7, the worn blade 36w is removed such as by a crane. The holding arm 43 then swings up into the coating station C and the fresh blade 36f is transferred from the arm 41 to the arm 43. The holding arm 43 first grips the fresh blade 36f and holds it in the loaded tilted position, FIGURE 8. The replacement or transfer arm 41 then releases the blade and moves back up to the replacement station R, FIGURE 5, where a new fresh blade 36f' is moved into the transfer arm 41 and is supported there to be in readiness for another change of blades as shown in FIGURE 5. Thus, the holding arm 43 and the transfer arm 41 have functioned as first and second transfer arms in carrying the blades, and as first and second holding arms for holding the new blade in the coating station.

The elements of the machine are shown in FIGURE 1 in a position intermediate FIGURES 7 and 8, for purposes of illustration, although in normal running, the elements will be as they appear in FIGURE 5.

As shown in FIGURE 1, the holding arm 43 is pivotally supported at 46 on a pin or the like supported on a frame bracket 48. A piston rod 50 is secured by a connector 52 to the holding arm 43, and is connected to a piston slidably located in a holding arm operating cylinder 54 which is pivotally supported at 56 on a frame piece 58. Pressurized fluid admitted to the ends of the cylinder 54 will cause movement of the holding arm 43 between the operating or coating position C, and the ejecting position E. The blade replacement arm 41 is mounted for pivotal movement on the bearing 16, coaxial with the drum and is moved between the replacement position, shown in the position of FIGURE 5, and the coating position, shown by the solid line position of FIGURE 1, by driving a segment gear 60 which is secured to the arm 41. The segment gear is in mesh with a driving pinion 62 which is rotatably supported on a bearing bracket 64 which is suitably driven by mechanisms, not shown.

The limits of travel of the replacement arm 41 will be controlled by the rotation of the pinion 62, and the limit of travel of the holding arm 41 to the coating position is controlled by the adjustment of a stop bolt 68, adjustably mounted on a frame bracket 70.

Each of the arms 41 and 43 are provided with releasable grippers at their ends. These grippers are arranged to coact with the block 44 at the ends of the coating blade assembly so as to grip the block at the same axial location, and in the same rotational position.

The block is shown in detail in FIGURES 2 and 3 with the shaft 42 at the end of the blade assembly 36 carrying a bearing bushing 72 which is rotatably held in bearings 74 carried within a sleeve 76 inside of the block 44. The sleeve is suitably mounted on the block, such as by a rubber bushing 78. The bearing block 44 is formed in two parts 44a and 44b, which are suitably bored and threaded so as to be clamped together by studs 44c and 44d. The bearing block is illustrated as having slight flanges 44e

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and 44f at its edges with intermediate flat surfaces 44g, 44h, 44i, 44j, 44k, and 44l, which are at angles to each other and are located to rigidly receive releasable clamps or connectors on the arms 41 and 43.

As illustrated in FIGURES 1 and 4, the arm 43 is provided with a pair of spaced holding fingers 80 and 82 which grip against the surfaces 44h and 44k of the block 44, a shoulder 81 which engages surface 44l, and a movable gripping finger 83, which grippingly engages the surface 44g of the block. The movable gripping finger is mounted on a pivotal pin 84 on the arm 43 and is rocked between gripping and release position by being connected to a piston rod 86 which is connected to a piston slidably located within a gripping cylinder 88. The cylinder is mounted on a pivotal pin 90 on the arm 43. The gripping finger 83 holds the blade 36w at the coating station, and pivots away from the block 44 to release the blade after it has been removed from the machine. For purposes of carrying away the worn blade, and for carrying in a new blade to the replacing arm 41, a crane or like carrier may be employed moving in from the tending aisle along side of the machine.

The replacing arm 41 is provided with holding fingers 92 and 94 which engage surfaces 44g and 44l and which are separated from each other so that the gripping finger 83 of the holding arm and the shoulder 81 may pass therebetween to be in gripping engagement with the surface of the block 44 when the blade is being transferred from the replacing arm 41 to the holding arm 43. The replacing arm also has a gripping finger 96 which is pivotally mounted on a pin 98 and which is pivoted between holding and release position by a connected piston rod 100, having a piston slidably located in a gripping cylinder 102. The cylinder is carried on a pin 104 on the replacing arm 41. Pressurized fluid is admitted to the gripping cylinders 88 and 102 in the proper timed relationship to grip and release the block 44 at the end of the blades for supporting the replacement blade, for transferring the replacement blade from the replacing to the holding arm, and for removing the worn blade.

Each of the arms 41 and 43 is provided with a powered tilting mechanism for forcing the edge of the blade against the web which is known as "loading" the blade against the web. The doctor blade 36w is provided with a loading arm 106 which load the blade against the paper when pressure is applied to it. The loading arm is secured to the blade assembly such as by being connected to the stiffening back on which the blade is mounted or to the shaft 42 at the end. An adjustable stop bolt 108 is mounted on the holding arm 43 to adjust the loaded position of the blade. The loading arm 106 connects to a piston rod 110 connected to a piston slidably located in a blade loading cylinder 112. Fluid pressure directed to the ends of the cylinder will control the position of the piston therein to tilt the blade to non-coating position, or to loaded position.

The replacing arm 41 is provided with blade loading mechanism which connects to a blade loading arm 114 to move the blade between loading position and a position away from the drum. The arm 114 is connected to a piston rod 116, connected to a piston slidably located with a blade loading cylinder 118. Fluid is admitted to the ends of the cylinders to move the blade away from the drum or to move the blade to loaded position.

FIGURES 9 to 12 illustrate a mechanism wherein the principles of the invention are applied to a paper coating device employing a different form of application of the coating material. In FIGURE 9, the elements are in normal operational position. A paper web 120 passes over a roll 122 and is carried forward through the paper machine of a drum 124. Coating is applied to the paper from a spray device 126 located ahead of the coating station C'. The blade is supported in the coating station by a holding arm 130. A fresh blade 128f is held by a replacement

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arm 131 at a replacement station R'. The replacement station is located behind the coating station C' in the direction of web travel.

When the blade 128w becomes worn, it is moved by tilting or swinging out of loaded position and moved, FIGURE 10, in the direction of the arrow 133, out of engagement with the paper web 120 to the ejecting station E'. At substantially the same time, but to prevent any length of paper from failing to be engaged by a coating blade, blade 128f is pivoted inwardly to loaded position. Ideally the blade 128f will engage the spot or just ahead of the spot where the blade 128w left the paper web. The blade 128w is then removed from the machine to be ejected from the ejecting station E' as shown by the dotted line position of the blade 128w.

The holding arm 130 then pivots downwardly, FIGURE 11, to the replacement station R' where it grips the blade 128f and the blade is released by the transfer arm 131. The blade is then pivoted upwardly into the coating station C' by the holding arm 130, where it stops and holds the blade during normal operation of the machine. In pivoting from station R' to station C' the blade 128f is moved arcuately over the surface of the drum 124 and is in loaded engagement while being moved.

Replacement arm 131 pivots down to obtain a fresh blade, as shown by the blade 128f', and the blade is carried back into the replacement station R'. With the blades in this position, the machine is operated normally until the blade 128f at the coating station C' becomes worn, whereupon the cycle is repeated.

FIGURE 13 illustrates a coating mechanism which may be termed a puddle coater with the coating material being formed in a pool confined against the moving paper web by the doctor assembly.

A paper web 132 is carried on the surface of a back-up roll or drum 134 to receive a coating. The coating is applied by a doctor assembly 136 which is shown by the solid line illustration in the operating position relative to the web and back-up roll.

The doctor assembly 136 includes a doctor blade 138 mounted on a stiffening doctor back 140. As illustrated in FIGURE 13, a puddle of coating liquid 142 is formed between the blade 138 and the back 140 to flow against the web 132 as it is carried on the drum past the blade. As illustrated in FIGURE 14, an end dam 144 at the assembly end confines the puddle of coating liquid at the end of the doctor blade assembly.

The coating liquid is supplied to the puddle through multiple pipes, such as 146 and 148 which discharge into the bottom of the puddle 142. The pipes are fed from a supply header 150 which is fed coating liquid through a connector tube 152. A supply hose 154 or the like is removably connected to the tube to supply coating liquid.

The excess of coating in the puddle spills into a full width trough 156 which extends the length of the doctor back and is mounted thereon. Large slotted openings such as 158, 160, and 162 are formed through the doctor back to permit overflow of coating liquid from the puddle 142 to the trough 156. A suitable return line (not shown) will lead from the trough back to the coating plant for necessary rescreening, pumping, etc.

The doctor back, as in aforescribed structures, is formed of rigid material such as stainless steel, and has journals carried in bearings with means such as a loading arm 159 to which pressure may be applied by a loading cylinder, not shown, for loading the doctor blade 138 against the web on the back-up cylinder.

The doctor assembly 136 is supported on a pivotal arm 161 pivotally mounted at 163 coaxial with the back-up drum 134. Means are provided for pivoting the arm 161, similar to mechanism described in connection with the embodiments of the other figures.

A novel method of starting the operation of the coating mechanism is employed with the doctor assembly first being supplied with a preliminary puddle not deep enough

to spill over the doctor blade, and the doctor assembly later loaded against the paper rotated upwardly to permit spillage over the front of the blade and to permit the puddle to contact the paper surface.

As illustrated in the dotted line position 136' of the doctor assembly, FIGURE 13, the doctor blade 133' contacting with the doctor back 140' for the doctor blade retains a puddle 142' as coating material is fed thereto. The puddle is not deep enough to spill over the front edge or contact edge of the blade 133'. The arm 161 is then pivoted upwardly from the dotted line position to the full line position to cause the puddle to spill over the front of the blade and engage the web 132 and the blade is loaded against the paper by applying loading pressure to the loading arm 159'. Thus, a substantial puddle of coating fluid is available immediately for uniform coating as soon as the coating operation starts. The doctor assembly is pivoted up to the solid line position of FIGURE 13 for the coating operation.

FIGURES 15 through 17 illustrate a form of the invention wherein puddle coating is employed in a mechanism which permits changing the coating blade assembly during operation without shutting down the machine and permitting continuous operation.

As illustrated in FIGURE 15, and in connection with FIGURES 16 and 17, a back-up drum 165 supports a moving paper web 167. A doctor blade assembly 164w is shown in operating position having a doctor back 166 with a connected doctor blade 168. The assembly 164w has a construction similar to the assembly 136 shown in detail in FIGURE 14, and is provided with a trough 170 extending the length of the blade and is supplied with overflow coating liquid through slots in the doctor back. A puddle 174 is contained by the blade 168 and back 166 with end dams, at the end of the blades, which are omitted from the drawings for clarity, containing the end of the puddle. Coating liquid is supplied to the puddle by pipes 176 discharging to the bottom of the puddle, and supplied by a header 178 fed through a connector tube 180 from a hose 182. The doctor assembly is supported on a pivotally mounted arm 184 pivoted at 186 coaxial with the drum 165.

A standby doctor blade assembly 164f is supported on a replacement arm 190 which is pivotally mounted and provided with power means for pivoting the coating blade assembly 164f. It will be understood, of course, that a pair of replacement arms are provided with one at each end of the blade assembly 164f, just as there are a pair of holding arms such as 184 for each end of the blade assembly 164w.

When the blade 168 becomes worn and the new blade assembly 164f is to be placed into the machine on the run, the hose 182 is shifted to the tube 181. The replacement arm 190 is pivoted along the dotted line path 192 of FIGURE 15, to the position shown in FIGURE 16. By applying pressure to the loading arm 189, the doctor blade 194 of the doctor blade assembly 164f is loaded against the paper web 162. At substantially the same time, but slightly later to insure that there will be no length of paper passing which is not engaged by a coating blade, the blade 168 is tilted to the unloaded position, as shown in FIGURE 16. The upper doctor blade 168 is unloaded by releasing pressure on the loading arm 167a and tilting blade assembly 164f so that the puddle in the blade assembly 164f can gradually run down into the lower doctor assembly.

As illustrated in FIGURE 16, when the coating material has run into the puddle of the lower blade, the worn doctor assembly 164w is then removed from the holding arm 184 and the arm is pivoted down to receive the blade assembly 164f from the replacement arm 190 to the holding arm 184. When this is complete, and the blade assembly 164f is pivoted upwardly to the operating position shown in FIGURE 15, the replacement arm 190 is then pivoted back to receive a new standby doctor blade.

As a summary of operation of the embodiment of FIGURES 1 through 8, with reference to FIGURE 1, and FIGURES 5 through 8, a blade 36w is normally held in loaded relation to the paper web 10 carried on the rotating drum 14. When the blade 36w becomes worn, the replacement blade 36f is tilted into coating loaded relationship with the paper, and the worn blade 36w is tilted out of loaded relationship. The worn blade 36w is then pivoted to the ejecting station E, the blade 36f is swung down to the coating station C, and the holding arm 43 moves back up to grip the blade 36f. The replacement arm 41 then moves back to the station R, where a fresh blade 36f' is held for repeating the cycle when the coating blade again becomes worn.

Thus it will be seen that I have provided an improved coating machine which meets the objectives, advantages and features hereinbefore set forth. The machine is well adapted to high speed automatic operation and, as will be apparent from the foregoing disclosure, operation can be continued indefinitely with worn blades being exchanged without effecting the quality of the coated paper. This eliminates costly shut-down periods which were heretofore necessary, and eliminates the inconvenience and cost caused by waste lengths of paper being formed, weakening, and damage to the paper which accompanied shut-down and stopping of the coating mechanism when blades are changed.

I have, in the drawings and specification, presented a detailed disclosure of the preferred embodiments of my invention, and it is to be understood that I do not intend to limit the invention to the specific form disclosed, but intend to cover all modifications, changes and alternative constructions and methods falling within the scope of the principles taught by my invention.

I claim as my invention:

1. The method of starting operation in a coating machine having a cylindrical drum for supporting and carrying a continuous web of paper and a doctor assembly with a doctor blade and a back attached thereto to form a channel therebetween, the method comprising the steps of supporting the doctor blade assembly with the channel facing upwardly, filling the channel to form a puddle of coating liquid therein, moving and loading the blade against the drum surface with a web of paper therebetween at a location below the center of the drum, and moving the blade assembly arcuately upwardly over the surface of the drum whereby the puddle will flow to the edge of the blade to provide an immediate and substantial flow of coating liquid to the coating blade edge.

2. The method of interchanging blades while operating a coating machine utilizing a doctor blade for smoothing a coating against a moving paper web carried on a supporting surface which comprises the steps of supporting a coating doctor blade in operating position with a puddle of coating liquid formed between the blade and moving paper web, moving a replacement blade into coating position beneath the coating blade and loading it against the moving paper web, moving the edge of the coating blade out of contact with the moving paper web to permit the puddle of coating material in the coating blade to flow gravitationally downwardly into the puddle of the replacement blade, and thereafter moving the replacement blade up into the position of the coating blade.

3. A mechanism for coating paper in a paper making machine comprising in combination a moving surface for carrying a web of paper along a path to advance it through a paper making machine, means defining a paper coating station along said path, a blade holding member located at said coating station adapted to support the blade in coating relation to a web of paper moving along said path, a blade replacement member adapted to support a replacement blade and to move the blade into coating engagement with the paper web, and means for moving said

blade replacement member and said blade holding member into blade interchanging relationship while maintaining the blade in coating engagement with the web so that said replacement blade is supported by said blade holding member.

4. A mechanism for coating paper in a paper making machine comprising in combination a moving surface for carrying a web of paper along a path to advance it through a paper making machine, means defining a paper coating station along said path, a blade holding member located at said coating station adapted to support the blade in coating relation to a web of paper moving along said path, a blade replacement member adapted to support a replacement blade and to move the blade into coating engagement with the paper web, means for moving said blade replacement member and said blade holding member into blade interchanging relationship while maintaining the blade in coating engagement so that said replacement blade is supported by said blade holding member, and means for supplying a coating liquid to a blade held by the blade holding member to form a coating puddle carried by the blade.

5. A mechanism for coating paper in a paper making machine comprising in combination a rotatable back-up drum for supporting a moving paper web, a pivotally mounted holding arm for releasably supporting a doctor blade at a coating station, means for moving the holding arm between the coating station and a replacement station, a replacement arm operative to releasably support a standby blade, means for moving the replacement arm between a standby station and said replacement station, and means for supplying a puddle of coating liquid to a standby doctor blade in the replacement station whereby a coating puddle may be formed on the standby doctor blade and whereby the standby blade may be released for transfer from the replacement arm to the holding arm while performing a coating operation in the replacement station to be moved into the coating station.

6. In a paper coating mechanism having a trailing coating blade with holding members for supporting the blade at a coating station and carrying a worn blade from the coating station and a transfer member for carrying a fresh blade into the coating station, releasible gripping assembly for supporting a doctor blade on the holding member and on the transfer member comprising a support block located at the end of the coating blades having holding surfaces for receiving gripping members, a first releasible gripping member adapted to be carried on the holding member and operative to grip said holding surfaces on the block, and a second releasible gripping member adapted to be carried on the transfer member and operative to grip said holding surfaces on the block at substantially the same axial location as the first gripping member and simultaneously with said first gripping member for improved transfer of blades between the holding member and the transfer member.

7. A paper coating mechanism for a paper making machine comprising in combination a paper carrying drum for transferring a continuous web of paper through a paper machine, a pivotally supported holding arm for supporting a worn coating doctor blade at a coating position on the periphery of the drum, means for applying a coating to a web of paper, a transfer arm mounted for pivotal movement about an axis coaxial with the axis of the drum, releasible gripping means at the end of the holding arm for holding the doctor blade in the coating position, a first blade pressure tilting device carried on the holding arm and operative to tilt and hold a worn blade in pressing position against the web, a second blade pressure tilting device on the transfer arm operative to tiltably move a fresh coating blade into pressing position against the web on the drum, means on the transfer arm for releasibly gripping the fresh coating blade, operating means connected to said first tilting device and said holding arm and moving a coating blade out of the coating

station, operating means connected to said second tilting device moving the fresh coating blade into coating relationship with the paper to engage the paper at least by the location where the worn blade in the coating station is moved from the paper, and means for moving the transfer arm about its pivotal support into the coating station whereby the fresh transfer blade can be released by the gripping means of the transfer arm to be held by the gripping means of the holding arm.

8. A paper coating mechanism for a paper coating machine comprising in combination a drum having a cylindrical outer surface for carrying a paper web along a paper treatment path, a blade holding member located at a coating station along the drum and operative to support a blade in coating relationship with a paper web traveling over the drum, a blade pressure tilting device carried on the holding member and operative to tiltably press the blade into coating relationship with the paper web, a blade transfer member positioned along the drum surface behind the blade coating station at a blade transfer station, a second blade pressure tilting device on the blade transfer member and operative to move a replacement blade in tilting movement and to coating relationship with a paper web carried on the drum, means for moving the holding member out of the blade coating station to carry a worn blade from the machine, means for moving the blade transfer member along an arcuate path coaxial with the center of the drum whereby a fresh replacement blade may be held in coating relationship to the paper web while the replacement blade is being arcuately moved into the coating station, a first releasible gripping means on the blade holding member for releasing the worn blade and gripping the fresh blade carried by the blade transfer member, and a second releasible gripping means on the blade transfer member for releasing the fresh replacement blade to the blade holding member and for grippingly receiving another fresh replacement blade.

9. A paper coating mechanism for a paper making machine comprising a drum having a paper carrying surface for advancing a paper web through a paper making machine, said drum having a blade operating station along its peripheral surface and having a blade replacement station along its peripheral surface spaced from the operating station in the direction of web travel over the drum, a first blade transfer member movable between the blade operating station and a blade ejecting position to carry a worn blade out of the machine, a second blade transfer member movable from the blade replacement station to the blade operating station to carry a fresh blade into an operating position, means on said first transfer member for releasibly supporting a blade, means on said second blade transfer member for releasibly supporting a blade, first power means connected to said first transfer member and operative to move the first transfer member into the blade ejecting position to eject a worn blade from the machine and to move the first blade transfer member into the blade operating station to receive a fresh blade from the second transfer member, and second power means connected to said second transfer member and operative to move the second transfer member into the blade replacement station to apply a fresh blade to a web on the drum and into the operating station to carry the fresh blade into operating position to be transferred to the first transfer member.

10. A changing mechanism for blades having end supports with the blades being provided for a coating station on a paper machine having a rotating coating drum and means for applying a coating material to a web of paper carried on the drum, the changing mechanism comprising a holding member for supporting a blade at the coating station and movable out of the coating station, a transfer member for moving a replacement blade into the coating station, a first carrier attached to the holding member and having a pair of axially spaced first gripping fingers for gripping the end support of a blade and having a rela-

tively movable first gripping finger for gripping the blade end support, and a coacting second gripping member carried on the transfer member and having a pair of axially spaced second gripping fingers positioned to engage the blade end support and having a relatively movable second gripping finger positioned to engage the blade end support, with said second movable gripping finger positioned to engage the blade end support between said pair of first fingers of the first gripping member, and said first finger positioned to engage the blade end support between said second pair of fingers, said gripping members simultaneously engaging the blade end support at the same axial location for transferring the load of the blade.

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