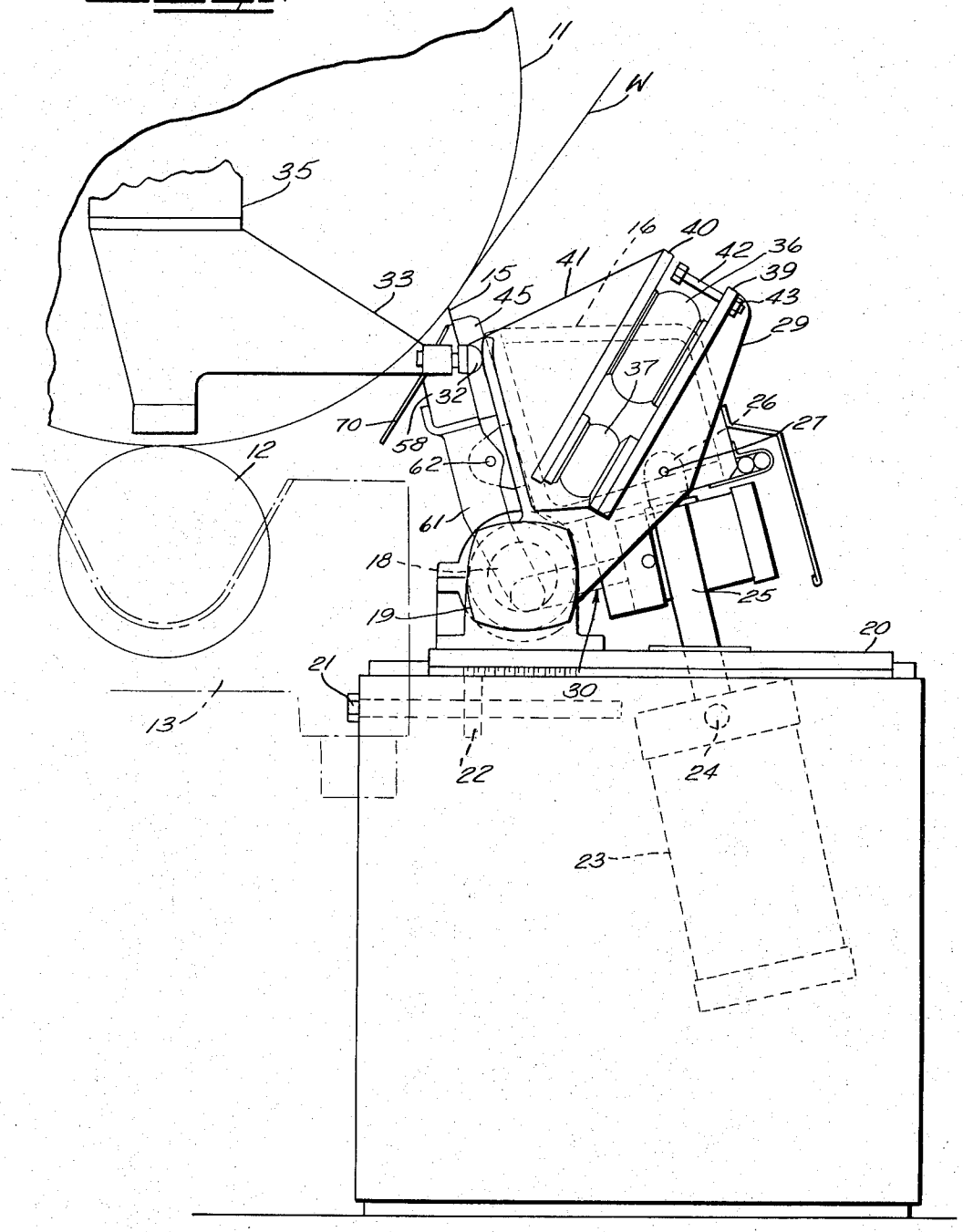
Dec. 26, 1967 C. REMPEL ET AL 3,359,940

BLADE HOLDING MECHANISM FOR COATERS

Filed Sept. 17, 1965 3 Sheets-Sheet 1

FIG. 1



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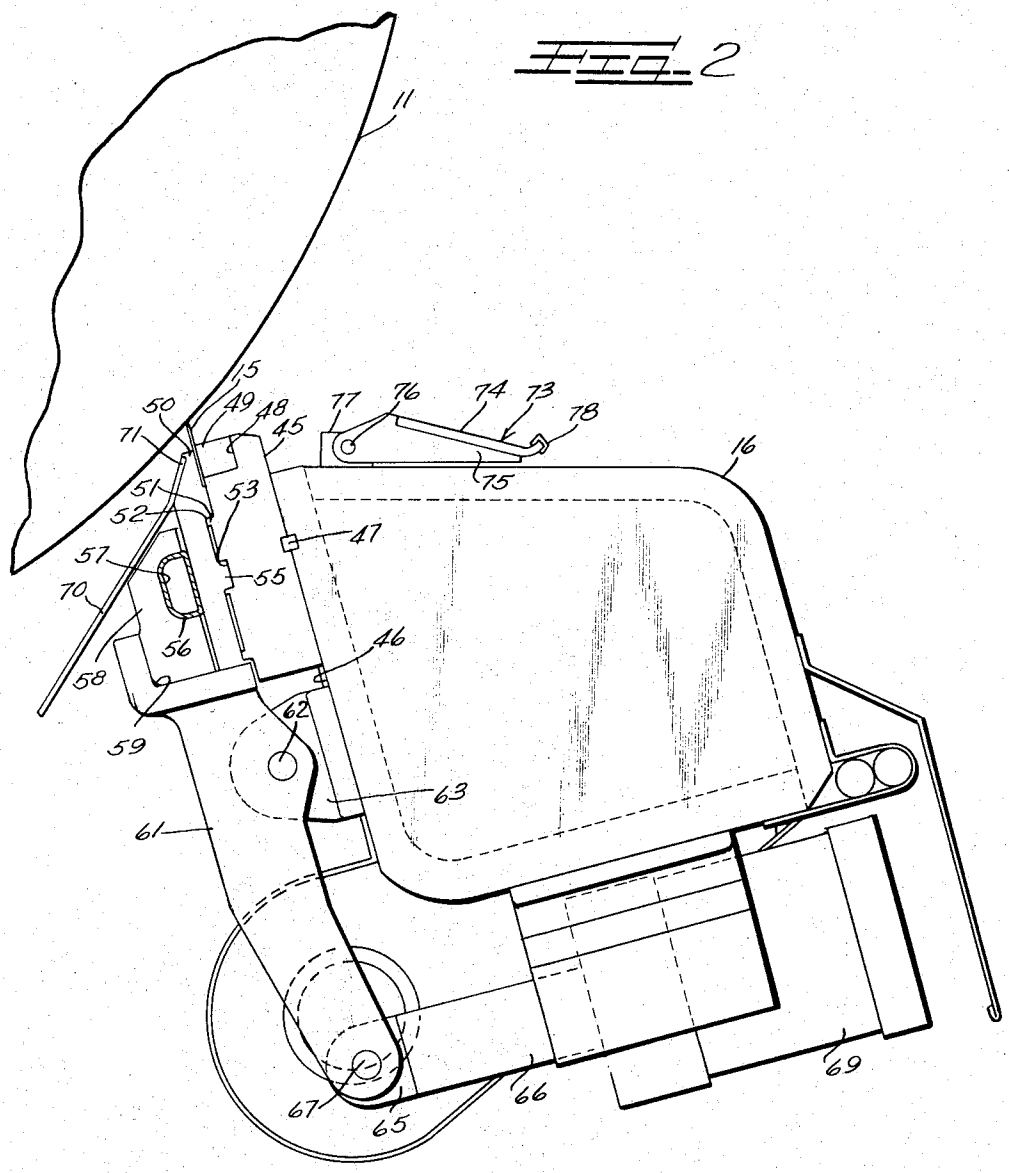
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BLADE HOLDING MECHANISM FOR COATERS

Filed Sept. 17, 1965 3 Sheets-Sheet 2

FIG. 2



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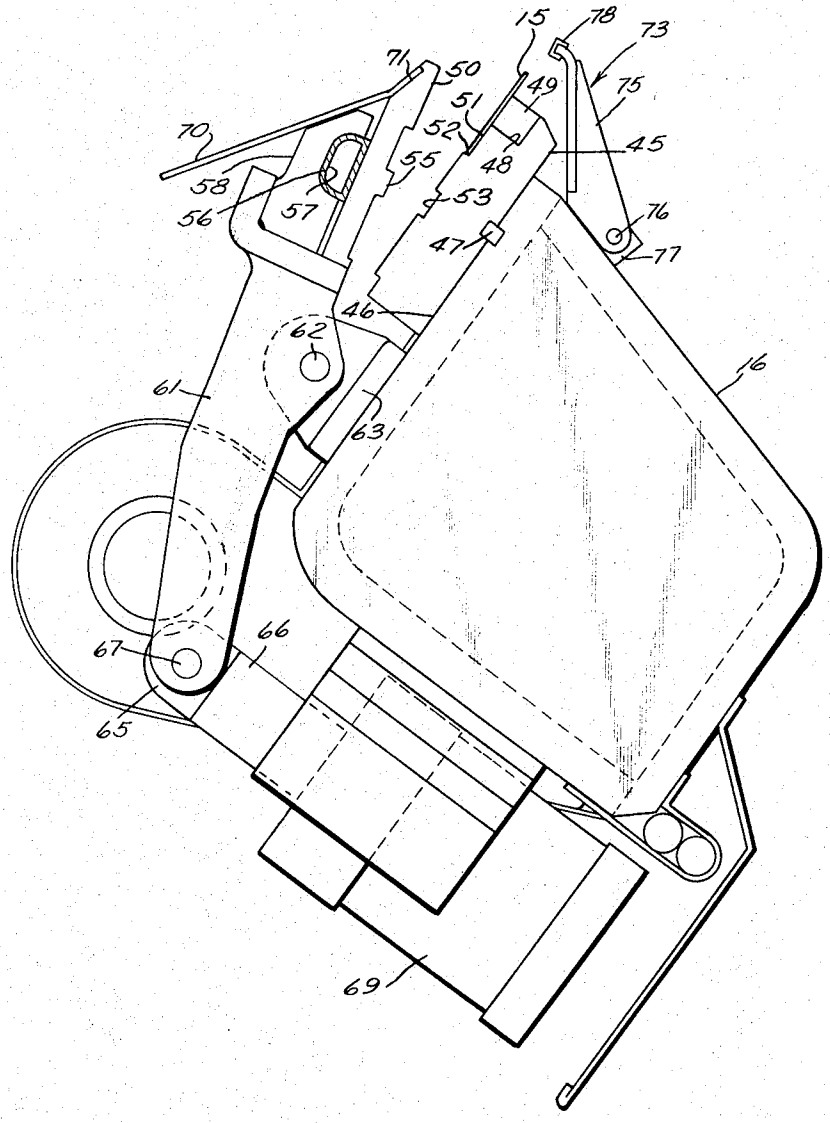
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BLADE HOLDING MECHANISM FOR COATERS

Filed Sept. 17, 1965 3 Sheets-Sheet 3

FIG. 3



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3,359,940

BLADE HOLDING MECHANISM FOR COATERS

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Filed Sept. 17, 1965, Ser. No. 488,090
15 Claims. (Cl. 118—126)

ABSTRACT OF THE DISCLOSURE

Doctor and clamping mechanism for the doctor blade of trailing blade coaters. The doctor blade is supported on a machined holding plate mounted on the front face of the doctor back and is clamped to the holding plate by a clamping plate carried by a series of pivoted clamping arms. An inflatable tube between the clamping arms and the clamping plate maintains a uniform pressure across the clamping plate and doctor blade. The pivot for the clamping arms is spaced far enough away from the machined surface of the clamping plate, to enable separation and ready access to the holding and clamping plates, for cleaning. A positioning mechanism enables the angle of the doctor blade to be changed as required. This includes a stop for the doctor back and doctor blade which is carried by the main bearing support for the back-up roll. This maintains the stop in the same position relative to the back-up roll, regardless of the angle of adjustment of the doctor blade with respect to the back-up roll.

Summary of the invention and objects

This invention relates to improvements in doctor backs for coaters for coating traveling webs of paper and more particularly relates to an improved form of blade holder for holding the doctor blade to the doctor back.

The present invention has as its principal objects to provide an improved form of blade holder for holding a doctor blade to a doctor back arranged with a view toward maintaining a uniform clamping pressure on the doctor blade throughout the length thereof.

Another object of the invention is to provide a novel form of doctor blade holding mechanism for holding the doctor blade to the doctor back of a web coater, such as is used in the coating of paper and the like, so constructed and arranged as to provide uniform clamping pressure on the doctor blade throughout the length thereof and to widely separate the clamping means from the doctor blade and accommodate ready cleaning of the blade and clamping or holding mechanism, and thereby avoid the non-uniformity of the clamping surfaces caused by the drying up of coating on the clamping surfaces.

Still another object of the invention is to provide a simplified form of blade clamping or holding mechanism for clamping doctor blades to doctor backs of coaters and the like, in which the clamping surfaces are so arranged as to insure a trued doctor blade even though the clamping parts may warp.

A still further object of the invention is to improve upon the holding mechanisms for holding doctor blades to doctor backs by pivotally mounting the blade clamping members on the doctor back with the pivots thereof spaced a substantial distance from the doctor blade to increase the clamping leverage and enable wide separation of the clamping members for ready wash up of the doctor blade and clamping members.

A still further object of the invention is to improve upon the holding mechanisms for doctor blades formerly in use by clamping the doctor blade to the doctor back by a pivotally movable clamping bar retained in clamping engagement with the doctor blade by power, and by

equalizing the clamping forces througout the length of the doctor blade by the use of an inflatable pressure member extending for the length of the doctor blade and supplementing the power clamping means for the blade.

A still further object of the invention is to provide an improved clamping means for clamping a doctor blade to a doctor back, utilizing two accurately machined plates, one serving as a supporting plate for the doctor blade and the other serving as the clamping plate for the blade and having a machined fit therewith and supported on a series of pivoted clamping arms pivoted to the doctor back in spaced relation with respect to the clamping plate, to assure wide separation of the plates and moved by fluid pressure means to open and close the clamping means and to maintain the clamping means in clamped relation with respect to each other.

Still another object of the invention is to provide a clamping means for clamping a doctor blade to a doctor back utilizing a support plate extending the length of the doctor back and secured thereto and clamping the doctor blade to the doctor back by a clamping plate extending for the length of the doctor blade and movably mounted on a series of spaced clamping arms pivoted to the doctor back and moving the clamping plate into clamping engagement with the support plate by power, in which a back-up bar backs up the clamping plate and is mounted on the clamping arms and has an expansible pressure member extending for the length thereof maintaining uniform pressure on the clamping plate througout the length thereof and thereby holding the doctor blade in alignment, even though the back-up bar may warp.

Still another object of the invention is to provide an improved form of blade holding mechanism for holding a doctor blade to a doctor back in which a support plate extends along the front face of the doctor back and is secured thereto and has a uniformly machined blade holding recess with a blade abutment insert recessed therein and extending for the length of the blade for aligning the blade with its clamping plate, in which the clamping plate is clamped to the blade by a series of fluid pressure operated clamping arms and is maintained in true clamping alignment with the blade by an inflatable fluid pressure operated member extending for the length of the clamping plate.

Still another object of the invention is to provide an improved form of retractible guard for a doctor blade, preventing gouging of the back-up roll, and protecting the blade from damage when adjustably moving the blade toward the doctor back and serving as a safety guard, preventing injury that may be caused by brushing along the bare blade.

A still further object of the invention is to provide a novel and improved form of support for the doctor blade and doctor back of a flooded nip coater, in which the limit of movement of the doctor blade toward the back-up roll of the coater is obtained by an improved form of stopping arrangement always stopping the doctor blade in the same relative relation with respect to the back-up roll regardless of variations in load angle of the doctor blade.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

FIGURE 1 is a fragmentary view in side elevation of a flooded nip coater constructed in accordance with the principles of the present invention, with the coating pan partially shown in phantom and the bearing support for the back-up roll broken away;

FIGURE 2 is a view in side elevation of a doctor back with the supports and adjusting mechanism therefor removed, in order to illustrate the clamping mechanism for the doctor blade; and

FIGURE 3 is a view somewhat similar to FIGURE 2 but showing the clamping means for the doctor blade open and the doctor blade and doctor back in a wash up position.

In the embodiment of the invention illustrated in FIGURE 1 of the drawings, **10** generally designates a coating device, which comprises a back-up roll or drum **11**, partially wrapped by a traveling sheet or web W, and an applicator roll **12** picking up coating material from a coating bath pan **13**, partially indicated by dot-dash lines.

The applicator roll **12** picking up coating material from the coating bath pan **13** applies the coating material to the sheet W wrapped beneath and traveling with the back-up roll **11** in the nip between said applicator roll and back-up roll.

The coating device also includes a doctor blade **15** mounted on and extending along the front face of a doctor back **16**, trunnioned on a base **17** on trunnion shafts **18** journalled in trunnion supports **19**. The trunnion supports **19** are mounted on and extend upwardly of a support plate **20** mounted on the top of the base **17**, for adjustable movement toward and from the axis of the back-up roll **11**, to vary the angle of the doctor blade **15** with respect to the back-up roll. Adjustment of the support plate **20** along the top surface of the base **17** is attained by operation of an adjustment screw **21** threaded in a nut **22** depending from the support plate. The adjustment means is no part of the present invention so need not herein be shown or described further.

At least one fluid pressure operated cylinder **23** is provided to hold the doctor back in position about the axis of the trunnion shaft **18** and to pivot said doctor back away from the back-up roll **11** into a threading position, and into an extreme retracted clean up position, such as is shown in FIGURE 3.

The cylinder **23** is trunnioned to the base **17** beneath the adjustable support plate **20** on trunnion pins **24** in a conventional manner. The cylinder **23** has a piston (not shown) therein having a piston rod **25** extensible therefrom, having a clevis **26** at its upper end, pivotally connected by a pivot pin **27** to an arm **29** of a bell crank **30**. The bell crank **30** is pivoted for movement about an axis coaxial with the axis of the trunnion pins **18**. The bell crank **30** has a second upright arm **31** extending upwardly of the pivot thereof in angular forwardly spaced relation with respect to the arm **29** and engageable with an adjustable stop **32** on an arm **33** extending from a bearing bracket **35** for the back-up roll **11** toward the doctor back **16**. The adjustable stop **32** may be a micrometer stop to provide a fine adjustment of the position of the doctor blade **15** with respect to the face of the back-up roll **11**. The adjustable stop **32** being mounted on the bracket or arm **33** extending from the main bearing bracket for the back-up roll **11**, will always be in the same location relative to the back-up roll for all positions of adjustment of the angle of the doctor blade with respect to the back-up roll.

It should be understood that the stop for the doctor back when adjustably moved toward the back-up roll has heretofore been attained by the piston of the positioning cylinder when the piston reaches the end of its travel. This has meant that the length of travel of the piston must be changed each time the doctor back is adjusted toward or from the back-up roll, to change the angle of the doctor blade. The necessity of readjusting the travel of the piston each time the load angle is changed is therefore eliminated by mounting the stop on the bearing for the back-up roll.

The doctor back **16** and doctor blade **15** are loaded by two loading diaphragms **36** and **37** mounted at their outer ends on a plate or pressure pad **39**, shown in FIGURE 1 as formed integrally with the arm **29** of the bell crank **30** and mounted on a plate or pressure pad **40** at their opposite ends. The pressure pad **40** is shown as being formed integrally with a loading arm **41** which may be secured to

an outer end of the doctor back **16** and which is shown as extending angularly upwardly and rearwardly therefrom.

The diaphragms **36** and **37** are shown in FIGURE 1 as being in the form of air springs of a conventional construction, and may be supplied with air under pressure to delicately load the doctor back **16** and doctor blade **15** with respect to the web W, or to accurately space the doctor blade from the web and back-up roll **11**, as required in certain coating conditions.

A stop bolt **42** is shown as being threaded in the plate or pressure pad **39** and as being locked in position by a nut **43**. The head of the stop bolt determines the retracted position of the loading arm **41** with respect to the lever arm **29** of the bell crank **30** and prevents complete collapse of the diaphragms **36** and **37**.

Referring now in particular to FIGURES 2 and 3, showing the doctor back with its support and loading arms removed in order to more clearly illustrate the invention, and to particularly show the details of the clamping means for clamping the doctor blade **15** to the doctor back **16**, a blade supporting plate **45** extends along a front face **46** of the doctor back **16** and faces in the general direction of the back-up roll **11**. The blade supporting plate **45** has a substantial surface extending along the front face **46** of the doctor back and is located with respect to the doctor back as by a key **47**. The blade supporting plate **45** is also bolted or otherwise secured to the front face of the doctor back.

The blade supporting plate **45** has a rectangular recess **48** formed therein and opening to the front and top thereof and forming a recess for a holding insert bar **49**. The bar **49** forms an abutment bar for the rear face of the blade **15** and may be bolted or otherwise secured to the blade supporting plate **45**. The bar **49** may be machined to the exact size of the recess **48** to cooperate with a clamping plate **50** engageable with the front face of the doctor blade **15** and holding the balde to the blade supporting plate **45**. The bar **49** may also be undersized and shimmed to accommodate adjustment of the bar for blades of different thicknesses. Where necessary the bolting means for bolting the bar **49** to the recess **48** may be in the form of jacking screws to jack the bar, to provide a true front abutment face of the bar abutting the blade **15**. The recess **48** and holding insert bar **14** being accurately machined, the bar **49** normally provides a true front face engaging the back face of the blade **15**, and it ordinarily is not necessary to jack the bar to provide a true blade engaging face, except where warpage of the bar **49** or plate **45** may occur.

The blade supporting plate **45** also has a forwardly stepped recess **51** formed therein providing an abutment and seating recess for the blade **15** and having a lower shoulder **52** against which the bottom of the blade seats. The blade supporting plate **45** also has a forwardly opening rectangular slot **53** extending therealong beneath the blade seating recess **51**, for receiving a tongue **55** of the clamping plate **50**. The recess **51**, shoulder **52**, slot **53** and forwardly facing surfaces between said recess and slot are all true and accurately machined surfaces to be interengaged by corresponding trued and accurately machined surfaces on the clamping plate **50**, during an operation of clamping the blade **15** in position.

The clamping plate **50** is movably mounted on and extends above the tops of a series of clamping arms **61** spaced along the front face of the doctor back at suitable intervals and is abutted by an inflatable tube **56** recessed within a recess **57** formed in a loading or back-up bar **58**, extending for the length of the clamping plate **50**. The loading bar **58** is mounted in shouldered recesses **59**, of right angled clamping bar holders **60**, mounted on and extending upwardly of the tops of the clamping arms **61**. The clamping arms **61** and their mountings on the front face of the doctor back are all of the same construction, so one only need herein be shown and described in detail.

The clamping arm **61** is pivoted intermediate its ends in downwardly spaced relation with respect to the clamping plate **50** on a pivot pin **62**, mounted in an ear **63**, suitably secured to the front face **46** of the doctor back **16** and extending forwardly therefrom. The lower end of the clamping arm **61** is pivotally connected to a connector end **65** of a piston rod **66** on a pivot pin **67**. The piston rod **66** is extensible from a cylinder **69** extending along the bottom of the doctor back **16** and suitably supported thereon. The cylinder **69** may be an air cylinder and the application of fluid under pressure, such as air, to the head end thereof will move the clamping arm **61** in a direction to position the clamping plate **50** into clamping engagement with the front face of the blade **15**.

It will be noted from FIGURE 3 that the pivot for the clamping arms **61** is spaced a sufficient distance beneath the machined surfaces of the supporting plate **45** and the clamping plate **50**, to enable said surfaces to be widely separated for washing, to accommodate a thorough washing of the machined surfaces, and thereby prevent the drying up of coating on the surfaces, which would counteract the close tolerance machining of the machined surfaces of the clamping plate **50** and support plate **45**.

It should also be understood that the clamping plate **50**, mounted on the upwardly facing surface of the clamp holder **60** for slidable movement therealong towards and from the blade supporting plate **45**, when positioned in a clamping position by the clamping arms **61** and held in such a position by the cylinder **69** and piston **66**, is moved into tight clamping engagement with the doctor blade **15** by inflation of the inflatable tube **56**, which may be inflated by air, and which may be bonded to the rear face of the clamping plate **50**. The inflatable tube **56**, therefore, supplies the pressure to clamp the clamping plate **50** to the blade **15** and to uniformly hold said clamping plate into engagement with the front face of the blade supporting plate **45**, and hold the blade true regardless of warpage of the back-up bar **57**.

It should also be understood that a plurality of cylinders **69** may be provided to actuate the clamping arms **61**, and that an individual cylinder may be provided for each clamping arm under certain operating conditions.

In FIGURE 3, the doctor back is shown as being tilted about the axes of the trunnion pins **18** into a clean up position. In this position of the doctor back, the piston rod **66** may be retracted by the admission of fluid under pressure to the piston rod end of the cylinder **69** to the full extent of its retracted travel, to open the clamping plate **50** with respect to the supporting plate **45** into position to accommodate the free cleaning of coating from the machined surfaces of the supporting plate and clamping plate, at the termination of a coating run, to avoid the collection of coating material on the machine surfaces, as well as on other critical parts of the holding mechanism.

An angular deflector **70** is recessed in a rectangular recess **71** of the clamping plate **50**, and extends angularly downwardly of the clamping plate **50** over the back-up bar **58** and beyond the upper ends of the clamping arms **61**, to protect the back-up bar and to prevent coating from lodging in the space between the back-up bar **57** and the front face of the clamping plate **50**.

A retractible blade guard **73** is pivotally mounted on the top of the doctor back **16**. The blade guard **73**, as herein shown, comprises a plate **74** supported on spaced arms **75**, extending rearwardly therefrom and pivotally mounted on the top of the doctor back **16** on pivot pins **76** extending through ears **77** extending upwardly of the top of the doctor back. The guard plate **74** is shown as having a channel-like rubber tip **78** fitting along the advance edge thereof, to protect persons working around the doctor from injury which may be caused by brushing against the advance edge of the guard and to prevent the guard from gouging the back-up roll **11**, when in a safety guarding position. The blade guard **73** is normally in the retracted position shown in FIGURE 2 when the coater is

in operation and is moved into its extended position during the threading or wash up operations to protect the doctor blade and also to prevent injury of the operator by the sharp edge of the blade.

While we have herein shown and described one form in which our invention may be embodied, it may readily be understood that various variations and modifications in the invention may be attained without departing from the spirit and scope of the novel concepts thereof.

We claim as our invention:

1. In a doctor for coaters and the like,
a doctor back having a front face,
and a top surface extending rearwardly of said front face,
a doctor blade adapted to be mounted on said doctor back and extending therealong,
a clamping plate clamping said doctor blade to said doctor back,
a series of clamping arms spaced along said doctor back and pivoted to said front face for movement towards and from said doctor blade about coaxial axes spaced downwardly of said blade,
means mounting the clamping plate on said arms for movement thereby into engagement with said doctor blade,
a power means moving said clamping arms toward and from said doctor back and holding said clamping plate in clamping engagement with said doctor blade,
a guard transversely pivoted to said top surface of said doctor back for movement about an axis parallel to the axis of pivotal movement of said clamping arms, and manually positionable over the doctor blade to act as a safety guard for said doctor blade when said clamping plate is released from said doctor blade during clean up of said clamping plate and doctor blade.

2. In a doctor for coaters and the like,
a doctor back having a front face,
a doctor blade adapted to be mounted on said doctor back to extend along said front face,
means supporting said doctor blade to extend along said front face of said doctor back,
a series of clamping arms spaced along said doctor back in advance of the front face thereof and pivoted for movement toward and from the front face of said doctor back,
a back-up bar extending along said clamping arms,
a clamping plate mounted on said clamping arms for movement toward and from said back-up bar,
fluid pressure cylinder piston means for moving said back-up bar and clamping plate toward the front face of the doctor back and maintaining said clamping plate in clamping engagement with the doctor blade,
and an inflatable tube extending along said back-up bar and engaging said clamping plate, and maintaining a uniform clamping pressure thereon throughout the length thereof.

3. In a doctor for coaters and the like,
a doctor back having a front face,
a doctor blade extending along said front face of said doctor back,
means clamping said doctor blade to said doctor back comprising a blade supporting plate secured to and extending along the front face of said doctor back and having a doctor blade seating recess extending therealong,
a clamping plate for clamping said doctor blade to said recess,
spaced clamping arms supporting said clamping plate for movement into and out of clamping engagement with said doctor blade,
coaxial pivotal mountings for said clamping arms, spaced downwardly along said front face of said doctor back a substantial distance beneath said blade

seating recess, to accommodate wide separation between said clamping plate and said doctor blade,

power means for moving said clamping arms to move said clamping plate into and out of clamping engagement with said doctor blade,

and power means interposed between said arms and clamping plate comprising an inflatable tube, inflatable to maintain a uniform clamping pressure on said clamping plate for the length of the doctor blade.

4. In a doctor for coaters and the like,

a doctor back having a front face,

a doctor blade adapted to extend along said front face of said doctor back in advance thereof and upwardly therealong,

a blade supporting plate secured to and extending along the front face of said doctor back and having a doctor blade seating recess extending therealong,

a clamping plate engageable with the front face of said doctor blade,

spaced clamping arms supporting said clamping plate for movement into and out of clamping engagement with said doctor blade,

coaxial pivotal mountings for said clamping arms, spaced downwardly along said front face a substantial distance beneath said blade seating recess of said support plate,

a back-up bar mounted on said clamping arms and extending therealong,

said clamping plate extending along said back-up bar and moved thereby into engagement with said support plate and said doctor blade seated thereon upon movement of said clamping arms toward said support plate,

fluid pressure operated cylinder and piston means for moving said clamping arms toward and from said support plate and for holding said clamping arms in position with respect to said blade supporting plate,

and an inflatable tube extending along said back-up bar and engaging said clamping plate, said tube being inflatable to exert a uniform pressure on said clamping plate throughout the length thereof, to uniformly clamp the doctor blade to said blade seating recess.

5. In a doctor and in combination with a back-up roll for coaters and the like,

a doctor back having a front face facing generally in the direction of the back-up roll, and mounted for movement toward and from said back-up roll about an axis parallel to the axis of rotation of said roll and spaced therefrom,

fluid pressure means for moving said doctor back into doctoring cooperation with said back-up roll and retracting said doctor back into a washup position,

a doctor blade adapted to extend along said doctor back and be positioned thereby in doctoring cooperation with said back-up roll,

means clamping said doctor blade to said doctor back comprising a blade supporting plate secured to and extending along the front face of said doctor back and upwardly therefrom and having a doctor blade seating recess extending therealong,

a plurality of parallel spaced clamping arms pivotally mounted on said front face of said doctor back in downwardly spaced relation with respect to said blade receiving recess,

fluid pressure operated means for pivotally moving said clamping arms toward and from said blade supporting plate,

a back-up bar supported on said arms and extending upwardly therefrom,

a clamping plate movably mounted on said arms and backed up by said back-up bar and moved by said arms toward said blade supporting plate into a clamping position, and separated from said blade supporting plate by said arms into a widely open clean up position, and an inflatable tube recessed in said back-up plate and having engagement with said clamping plate for the length thereof, for exerting a uniform clamping pressure on said clamping plate and the blade seated in said blade supporting plate upon the supply of fluid under pressure to said inflatable tube.

6. In a doctor and in combination with a back-up roll for coaters and the like,

a doctor back having a front face facing in the general direction of the back-up roll and pivotally mounted for movement toward and from the back-up roll,

means holding said doctor back in position and moving said doctor back toward and from the back-up roll,

a blade supporting plate extending along the front face of said doctor back and rigidly secured thereto,

said blade supporting plate having a forwardly and upwardly opening machine finished blade seating recess extending therealong,

a doctor blade seated in said recess,

a clamping plate,

a plurality of parallel spaced clamping arms pivotally mounted on said doctor back in advance of the front face thereof and having upper support ends, a back-up bar mounted on said clamping arms and extending along said clamping plate,

fluid pressure operated means for moving said clamping arms, back-up bar and clamping plate toward and from said blade supporting plate,

said clamping plate having a face machine finished to accurately conform to said recess and the machine finished front face of said blade supporting plate and the blade seated in said recess, and movable into said recess by operation of said clamping arms into clamping engagement with a doctor blade seated in said recess, and power means between said back-up bar and clamping plate for exerting uniform clamping pressure on said clamping plate throughout the length thereof.

7. A doctor in accordance with claim 6

wherein the blade supporting plate has an upwardly and forwardly opening recess therein stepped rearwardly of the seating recess for said doctor blade and

wherein a removable insert bar is mounted in said upwardly and forwardly opening recess and forms a clamping abutment surface for the rear face of said doctor blade,

8. A doctor in accordance with claim 6

wherein the blade supporting plate has a recess extending therealong opening to said first mentioned recess and to the top of said support plate,

wherein a removable clamping insert bar is mounted in said recess and forms a clamping abutment surface for the rear face of the doctor blade,

wherein the back-up plate has a recess therein opening to said clamping plate,

and wherein the power means comprises an inflatable tube extending along said recess into engagement with an adjacent face of said clamping plate for exerting uniform clamping pressure on said clamping plate throughout the length thereof.

9. A doctor for web coaters and the like comprising,

a doctor back pivotally mounted for cooperative movement toward and from a back-up roll of the web coater,

said doctor back having a front face facing in the general direction of the back-up roll and having a blade supporting plate extending along the front face of said doctor back and upwardly therefrom,

keying means locating said blade supporting plate with respect to said doctor back,

other means rigidly securing said blade supporting plate to said doctor back,

said blade supporting plate having a machine finished

recess extending for the length thereof opening to the top and front of said plate, and forming a doctor blade seating recess and having a removable insert bar recessed in and extending along the top thereof and having a front face in general alignment with a front face of said blade seating recess,

said blade supporting plate also having a downwardly spaced machine finished slot extending therealong, opening to said front wall,

a plurality of clamping arms transversely pivoted to the front face of said doctor back in downwardly spaced relation with respect to said support plate,

fluid pressure operated means for moving said clamping arms toward and from said support plate,

and a clamping plate carried by said clamping arms and extending upwardly therefrom and having a machine finished face generally conforming to the machine finished face of said support plate and including a tongue extending therefrom fitting within said slot in said support plate and assuring uniform clamping of a doctor blade to said blade seating recess.

10. A doctor in accordance with claim **9**,

wherein the clamping plate is movably mounted on said clamping arms for movement toward and from said support plate,

wherein a backing plate backs up said clamping plate,

and wherein an inflatable tube carried by said backing plate has engagement with an adjacent face of said clamping plate for the length thereof, for exerting a uniform pressure on said clamping plate to effect uniform clamping of the doctor blade to said insert for the length thereof.

11. A doctor in accordance with claim **9**,

wherein a retractible guard is transversely pivoted to the top surface of said doctor and extends for the length thereof and is positionable to extend over said doctor blade during a web threading and cleaning operation and is retractible to be free from said doctor blade during a coating operation.

12. In a device for coating a traveling web of paper, in combination:

a back-up roll wrapped by a traveling web,

an applicator roll in nip defining relation with respect to said back-up roll applying coating to a web passing in the space between said rolls,

a stationary bearing support for said back-up roll,

a doctor blade on the outgoing side of said back-up roll,

a doctor back supporting said doctor blade and operable to move said doctor blade toward and from said back up roll and to vary the angle of said doctor blade with respect to said back-up roll,

spaced trunnion supports for supporting said doctor back for adjustable movement about an axis parallel to the axis of rotation of said back-up roll,

fluid pressure means for moving said doctor blade and doctor back toward and from said back-up roll,

other means adjusting the position of said doctor back with respect to said back-up roll and varying the angle of the doctor blade with respect to said back-up roll,

and stop means mounted on and extending from said bearing support for said back-up roll toward said doctor back and limiting movement of said doctor back and doctor blade toward said back-up roll,

said stop means always being in the same position relative to said back-up roll regardless of the position of adjustment of said doctor back and blade with respect to said back-up roll, to change the blade angle of said doctor blade.

13. A coating device in accordance with claim **12**,

wherein the doctor back is rectilinearly adjustable toward and from the back-up roll to vary the angle of the doctor blade with respect to the periphery of the back-up roll,

and wherein fluid pressure operated loading means are provided to load said doctor blade with respect to said back-up roll.

14. A doctor in accordance with claim **12**,

wherein the means for moving the doctor back and blade toward and from the back-up roll about the axis of pivotal movement of said doctor back comprises,

at least one fluid pressure operated cylinder and piston,

a bell crank pivoted for movement about an axis coaxial with the axis of pivotal movement of the doctor back,

an operative connection from said cylinder and piston to one arm of said bell crank,

fluid pressure operated diaphragms interposed between said one arm of said bell crank and said doctor back for loading said doctor blade,

wherein the doctor back is mounted for rectilinear movement in a horizontal plane toward and from the back-up roll to vary the angle of the doctor blade with respect to said back-up roll,

wherein the stop means comprises a stop arm mounted on the bearing support for said back-up roll and extending toward said doctor back and having a stop on the end thereof facing said doctor back,

and wherein the bell crank has a second upright arm engageable with said stop and limiting movement of said bell crank and doctor back toward said back-up roll.

15. In a doctor for coaters and the like,

a doctor back having a front face,

a doctor blade extending along said front face of said doctor back,

means clamping said doctor blade to said doctor back comprising a blade supporting plate secured to and extending along the front face of said doctor back and having a doctor blade seating recess extending therealong,

a clamping plate for clamping said doctor blade to said recess,

spaced clamping arms supporting said clamping plate for movement into and out of clamping engagement with said doctor blade,

coaxial pivotal mountings for said clamping arms, spaced downwardly along said front face of said doctor back a substantial distance beneath said blade seating recess, to accommodate wide separation between said clamping plate and said doctor blade,

fluid pressure operated cylinder and piston means connected between said doctor back and clamping arms for moving said clamping plate into and out of clamping engagement with said doctor blade and for holding said clamping plate into engagement with said doctor blade,

and pressure means interposed between said clamping arms and said clamping plate and operable to maintain a uniform clamping pressure on said clamping plate for the length of said doctor blade.

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