

Nov. 10, 1936.

A. WEISS

2,060,600

DOCTOR KNIFE MAINTAINING MECHANISM FOR PRINTING PRESSES

Filed Aug. 18, 1934

4 Sheets-Sheet 1

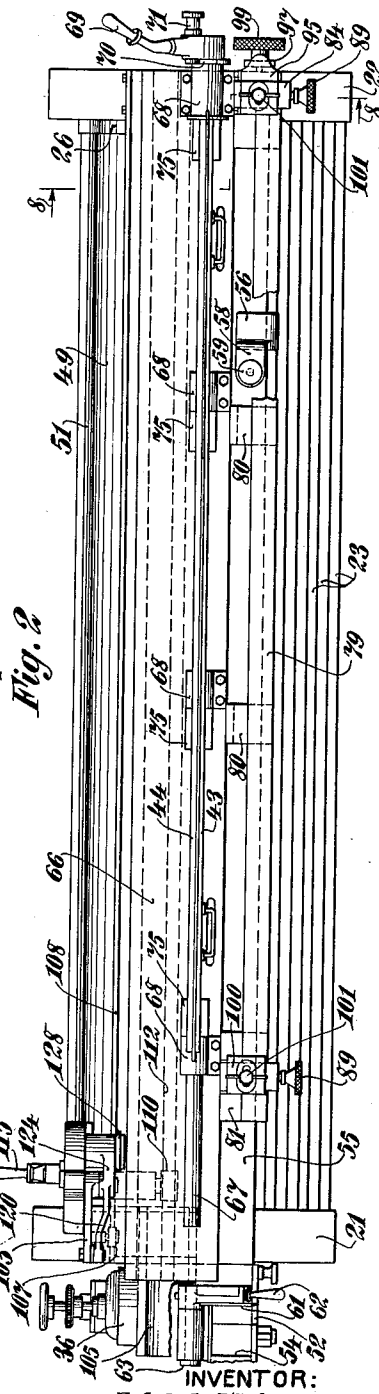
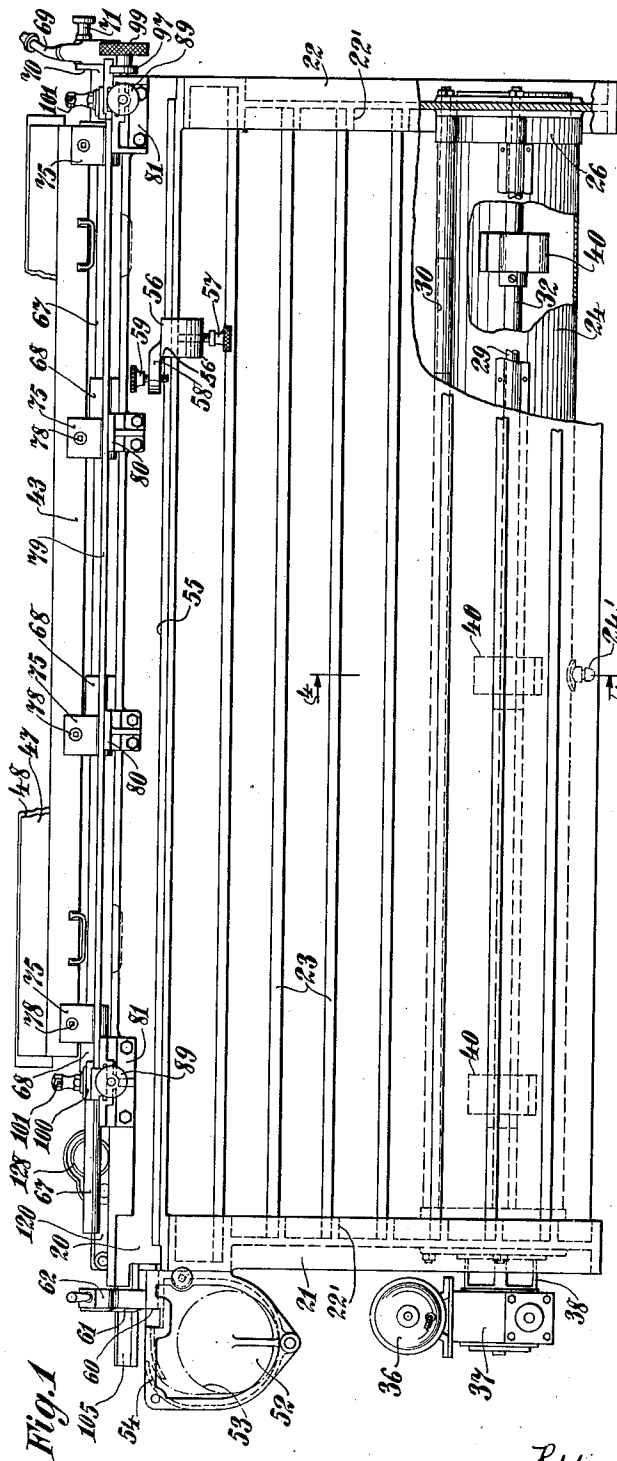


Fig. 2

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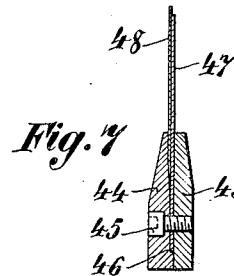
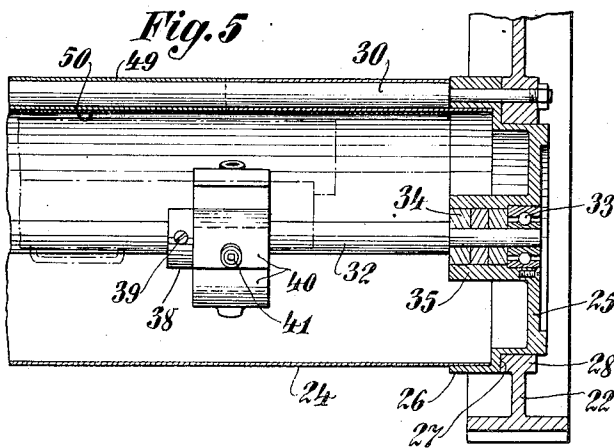
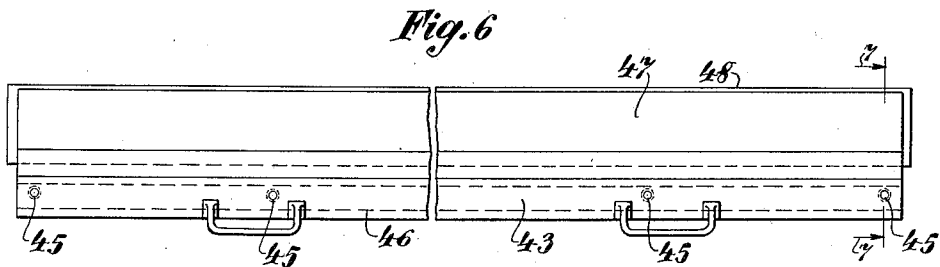
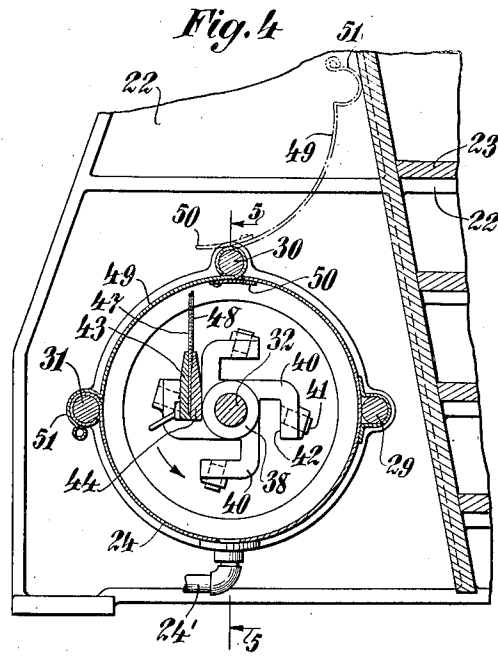
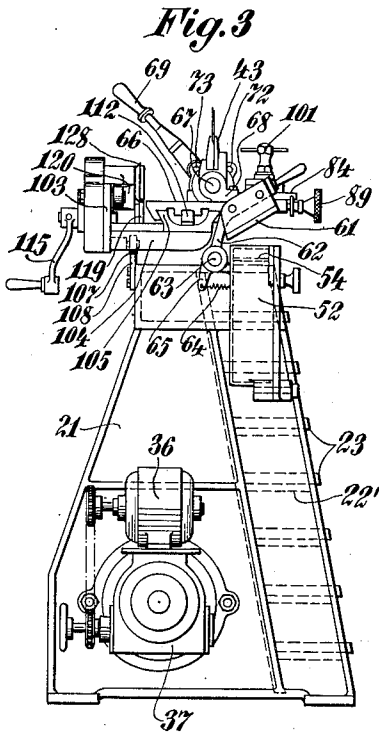
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DOCTOR KNIFE MAINTAINING MECHANISM FOR PRINTING PRESSES

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4 Sheets-Sheet 2



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DOCTOR KNIFE MAINTAINING MECHANISM FOR PRINTING PRESSES

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4 Sheets-Sheet 4

Fig. 12

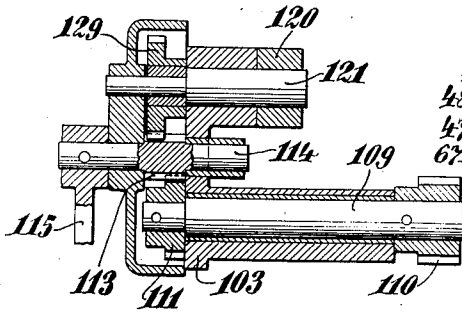


Fig. 14

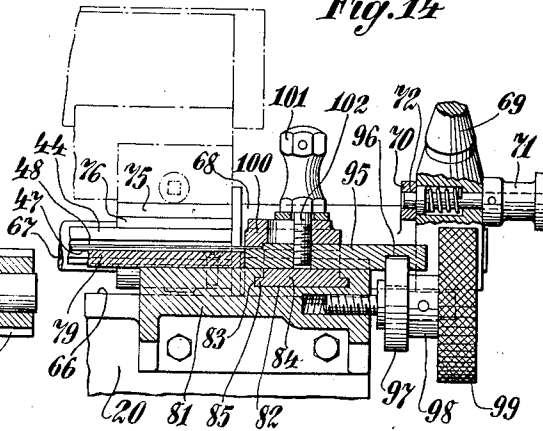


Fig. 13

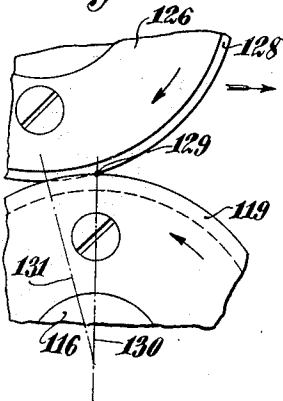
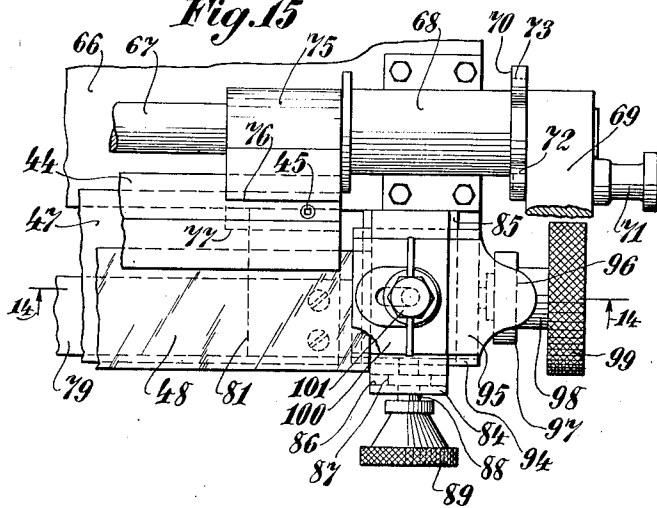


Fig. 15



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UNITED STATES PATENT OFFICE

2,060,600

DOCTOR KNIFE MAINTAINING MECHANISM
FOR PRINTING PRESSES

Adolph Weiss, Brooklyn, N. Y.

Application August 18, 1934, Serial No. 740,365

22 Claims. (Cl. 164—76)

The present invention relates to a device for the complete maintenance of doctor knives such as are now in common use on rotary intaglio printing presses, for the wiping of the printing surface of intaglio printing cylinders.

Such doctor knives during their use in the printing press are in contact on their wiping edges with the printing surface of the cylinder and serve to remove the surplus ink from this surface leaving ink only in the engravings which lie below said printing surface. The wiping action of the doctor cleans the unengraved portions of this surface in such manner that no discoloring will be noted on the printed material in the locations where said material has come in contact with these unengraved portions. However, due to the uneven wear, which is principally caused by the difference in the supporting surface on the cylinder for the doctor knife at its wiping edge due to the difference in the character and size of the engravings, the tendency of the wiping edge will be to lose its original efficiency and cause a fine film of ink to be left on the unengraved portions of said surface in various spots. When this condition arises it will be necessary to restore or to recondition the wiping edge to its original efficiency.

For such purpose the devices in current use resort to grinding mechanism or to hand filing, but none of these means have been found quite adequate for several reasons. Where grinding means are used, the tendency of the doctor knife is to become distorted longitudinally at its wiping edge and to become wavy. This is due to the severe change in temperature caused by the high friction exerted by the grinding wheel upon the doctor and will become aggravated as the relative thickness of said doctor knife diminishes.

In some instances cooling fluids are applied to the doctor during the grinding operation, but even this does not completely prevent distortion.

Moreover a worn doctor knife presents a very uneven line at the wiping edge and differences as much as $\frac{1}{8}$ " in height may be observed between the highest and lowest points of said line. If an attempt were made to remove these differences by grinding or filing with a single cut the amount of heat generated in removing the highest portions would hopelessly distort the doctor. Consequently it is necessary to proceed with great caution and considerable skill to gradually level down these differences with several cuts until a straight line has been created. This method is therefore evidently very lengthy and hazardous. The device shown in this invention

overcomes such difficulties and provides a simple device capable of efficiently removing the worn edge with a single cut, without a change in the temperature of the wiping edge to any extent, thus preventing any longitudinal distortion thereof. It furthermore requires very little skill to operate and is inherently foolproof to permit an unskilled operator to produce a doctor knife of such high quality as to rival the product of a highly skilled operator using current methods and devices.

Due to the uncertainty of the final results produced by current methods and devices as to the evenness of the wiping edge, it was necessary to provide various adjusting means on the printing press to compensate for the differences caused by such unevenness between the wiping edge and the printing surface. Consequently every change of doctor knife necessitated a readjustment of the wiping mechanism to bring the wiping edge into alignment with the printing surface, thereby causing considerable delay in resuming printing operation. The wiping edge produced by the device and method herein described and illustrated permits the maintenance of a permanent alignment between the wiping edge and the printing surface and consequently the readjustment of such alignment becomes unnecessary. In fact through the use of such device and method it becomes possible to operate a printing press where the means for adjusting such an alignment are completely eliminated, at the same time obtaining and maintaining an effective and clean wipe on the printing surface.

When the doctor knife and its holder are removed from the printing press for the restoration of the wiping edge, they have accumulations of ink thereon. These must be removed manually or otherwise previous to such restoration. The devices in current use are either very inefficient or very elaborate and constitute an independent device not combined with other operations. In my invention, the mechanism used for this operation is very inexpensive, efficient and simple, it also skilfully combines such mechanism with the supporting structure of the mechanism performing other operations. The result is a saving in cost, space and operating cost.

The life of a doctor knife in constant use is rather short since a large portion has to be wasted. Consequently a reserve stock of the raw material is usually kept in store. Furthermore it is quite important that the length of the doctor

knives be quite uniform, or they are apt to cause difficulties in the press. My invention combines the means for such storage and for the cutting of said doctors to a uniform length with the construction of the other mechanisms.

To shorten the delay of doctor knife changes it is customary to have a duplicate set of doctors and holders and hold them in readiness with the wiping edge restored when the doctors are being changed. In my invention the frame work of the machine is utilized to serve as a storage rack for the duplicate set and thereby save the cost and the space for such storage rack.

It will be noted, that this machine combines within a single structure practically all elements required for the maintenance of the wiping edge of doctor knives. These elements not only function normally but coact in numerous ways to serve a plurality of purposes.

In order that a doctor may be conditioned effectively, the present invention has been designed and an object thereof is to provide a mechanism by means of which a doctor may be accurately set or positioned in a holder and subsequently trimmed or cut to cause the edge thereof to be parallel to the holder and to be properly positioned with respect thereto.

A further object of the invention is to provide a device by means of which a doctor may be completely reconditioned after having been removed from a press, means being provided for removing ink therefrom and cleaning the same preparatory to setting and trimming the edge thereof.

A further object of the invention is to provide a doctor conditioning mechanism wherein the doctor may be tensioned prior to adjusting the same in the holder, the mechanism enabling the trimming or cutting of the doctor to be effected subsequently and without disturbing the adjusted position of the doctor in the holder.

A further object of the invention is to provide an improved cutting mechanism by means of which an edge of the doctor may be accurately and effectively trimmed or cut.

A further object of the invention is to provide a doctor conditioning mechanism wherein means is provided for flexing the doctor into a trimming or cutting position in order that the cutting operation may be effected more accurately.

Further objects, not specifically enumerated above, will be apparent as the invention is described in greater detail in connection with the accompanying drawings, wherein:

Figure 1 is a view in front elevation showing a doctor conditioning mechanism constructed in accordance with the present invention.

Figure 2 is a plan view of the device shown in Figure 1.

Figure 3 is a view in end elevation, taken from the left as viewed in Figure 1.

Figure 4 is a partial view in section, taken on the line 4—4 of Figure 1, and looking in the direction of the arrows.

Figure 5 is a partial view in section, taken on line 5—5 of Figure 4, and looking in the direction of the arrows.

Figure 6 is a detail plan view showing a doctor and doctor holder.

Figure 7 is a view in section, taken on line 7—7 of Figure 6, and looking in the direction of the arrows.

Figure 8 is a partial view in section, taken on line 8—8 of Figure 2, and looking in the direction of the arrows. This view showing the cutting mechanism as well as the doctor holder frame and

the means for positioning and tensioning the doctor in the holder.

Figure 9 is a partial view in section taken on line 9—9 of Figure 8, and looking in the direction of the arrows.

Figure 10 is a detail view showing the cutter drive and adjusting mechanism.

Figure 11 is a view in section, taken on line 11—11 of Figure 9, and looking in the direction of the arrows.

Figure 12 is a view in section, taken on line 12—12 of Figure 9, and looking in the direction of the arrows.

Figure 13 is an enlarged view showing the relation between the blades of the cutting mechanism.

Figure 14 is a view in section, taken on line 14—14 of Figures 8 and 15, and looking in the direction of the arrows.

Figure 15 is a partial plan view showing the doctor tensioning and setting mechanism above referred to.

Referring to the above drawings, the mechanism in which the present invention is embodied is shown as being formed of a bed plate 20 which is supported upon end standards 21 and 22. The end standards are formed with opposed and correspondingly spaced ledges 22' upon which shelves 23 rest to provide storage spaces for doctors.

Between the end standards 21 and 22 a doctor cleaning mechanism is provided to remove ink and sediment from the doctor and holder as it comes from the printing press. This cleaning mechanism is formed as a cylindrical receptacle 24 (Figures 1, 4, and 5). The receptacle is mounted in end sleeves 25 which are formed with cylindrical flanges 26 within which the ends of the receptacle 24 are received in such fashion as to form a liquid seal therebetween. The end heads 25 are further formed with annular shoulders 27 which are received within an annular recess formed by an annular flange 28 on the respective end standards 21 and 22. Three tie rods 29, 30, and 31 are shown as tying the receptacle and end heads to the flanges 28 of the end standards, thus forming the receptacle as an integral part of the doctor conditioning mechanism.

Axially of the receptacle 24 a shaft 32 extends, being journaled in the end heads by means of bearings 33. Packing glands 34 are received within cylindrical bearings 35, formed in the end heads in order that an effective fluid seal may be maintained at the bearings for the shaft 32. One end of the shaft 32 extends through the end head carried by the standard 21 and is driven by a motor 36 through a suitable transmission 37. The motor and transmission may be mounted upon the standard 21 by means of a bracket 38 in a convenient manner.

Upon the shaft 32 and at spaced points, are mounted collars 38, the collars being secured to the shaft 32 by means of set screws 39. These collars are formed with a plurality of L-shaped arms 40, in the ends of which set screws 41 are received. The arms thus form a plurality of aligned recesses 42 in which the doctor and doctor holder may be secured prior to the cleaning thereof.

A typical doctor and doctor holder assembly is shown in Figures 6 and 7 wherein the holder is formed of plates 43 and 44 which are secured by means of set screws 45. The plate 44 is preferably recessed at 46 to receive a reinforcing blade 47 and the doctor 48 is secured between the reinforcing blade 47 and one of the plates of

the holder, being securely clamped in such position by means of the screws 45. This assembly, when removed from a press, is inserted in one of the aligned sets of recesses 42 and secured in position by means of set screws 41. A solvent is introduced into the tank 24 and the motor 36 energized to rotate the shaft 32 in the direction indicated by the arrow of Figure 4. This direction of rotation avoids the violent scooping of solvent within the tank and causes the doctor and holder to be repeatedly immersed in the solvent within the tank in order that cleaning thereof may be effected. To avoid rapid evaporation of the solvent and splashing thereof from the tank, the tank is formed with a segmental cylindrically shaped lid 49 (Figures 2 and 4) which may be hinged upon the tie rod 30. The lid is formed with a sealing flange 50 which prevents loss of the solvent through the hinge joint and the other end of the lid is formed with a notched portion 51 in order that it may clip over the rod 31 and hold the same yielding in closed position.

In the event that a new doctor is to be prepared, a magazine 52 (Figures 1, 2, and 3) is provided. This magazine is secured to one of the end standards (here shown as being secured to end standard 21) and is adapted to receive a coil of spring steel from which the doctor may be made. This coil is indicated in dot and dash lines at 53 in Figure 1, and as shown therein, the outer end of the coil is extended through an outlet 54 in order that a length of the material may be drawn therethrough and placed upon a table 55 (Figures 1, 2, 3, and 8). This table is formed on the bed 20 and carries a clamp 56 slidably thereon. A set screw 57 and cooperating dowels enable the clamp to be secured to any desired position along the length of the table 55. The clamp 56 is provided with a stop shoulder 56' and a flange 58 is formed on the clamp 56 carrying a set screw 59, the flange 58 being spaced from the table 55. In this fashion, the material is drawn through the outlet 54 of the magazine 52 and placed in abutting relationship with respect to the stop 56'. Screw 59 is then tightened and the free end of the material is thus secured in the desired position.

The magazine 52 is formed with a stationary cutting edge 60 over which the material lies when drawn from the outlet 54 and a movable cutting member 61, mounted upon an arm 62 which is hinged at 63, cooperates with the stationary cutting edge 60 to cut the material lying thereon when the arm 62 is actuated manually. A spring 64 (Figure 3) is connected to an arm 65 which is formed on the lever 62, to urge the movable cutting member into the position shown in Figure 3.

Upon the bed 20, a table 66 is formed (Figures 3 and 8). Above the table 66 a shaft 67 is journaled by means of brackets 68 (Figure 3). This shaft is provided with a manually operated lever 69 in order that the shaft may be rocked into a plurality of positions. A flange 70 is formed on one of the brackets 68 (Figures 1, 8 and 14) and a spring-pressed pin 71, carried by the lever 69 is adapted to engage recesses 72, 73 and 74 which are formed in the flange 70.

The shaft 67 is provided with a plurality of collars 75 which are formed with arms 76 and 77 to receive the doctor holder assembly shown in Figures 6 and 7. Set screws 78 serve to clamp the holder assembly between the arms 76 and 77

and thus the assembly may be rocked into a plurality of positions as shown in Figure 8.

In introducing a holder assembly into the arms 76 and 77, the shaft 67 is turned to the position shown in solid lines in Figure 8 in which position the holder assembly is lowered into the recesses formed by the arms. The pin 71 is then released and the lever 69 and shaft 67 rocked into the right hand position shown in dot and dash lines in Figure 8. In this position, the doctor and reinforcing blade lie upon a table 79 which is supported in spaced relation to the table 66 by means of brackets 80 (Figures 1 and 2). At either end of the table 79 means is provided for clamping the doctor and applying longitudinal tension thereto. This means is shown in plan view in Figure 2 and in detail in Figures 8, 14 and 15.

Upon the bed 20, brackets 81 are provided. These brackets are formed with grooves 82, extending transversely of the axis of shaft 67. The grooves are formed with undercut extensions 83 and receive plates 84 slidably therein. The plates 84 are formed with flanges 85 which are adapted to engage in the undercut portion 83 of the grooves 82 and thus the plates 84 are secured effectively in the brackets 81 with provision for sliding motion in the grooves. The plates 84 are formed with grooves 86 which receive flanges 87 formed upon threaded shafts 88 which are adapted to be screwed in and out of the brackets 81 by means of knurled knobs 89. In this fashion, the transverse position of the plates 84 with respect to the table 79 is adjusted.

Upon one of the plates 84, a groove 94 is formed in a direction transverse of the plates 84 (that is, parallel to the axis of shaft 67). The groove 94 receives the plate 95 slidably, the plate 95 being formed with a slot 96 within which a collar 97 is formed upon which a threaded shaft 98 is received. The shaft 98 is threaded into its corresponding bracket 81 and is manipulated by means of a knurled knob 99 to move the plate 95 longitudinally of the table 79. The plate 95 is provided with a separate clamping plate 100 which is clamped thereto by means of a bolt 101 which is formed on a pin 102 which engages the plate 95. The clamping plate 100 is adapted to be clamped down upon the adjacent end of the doctor which projects beyond the holder and reinforcing plate, as shown in Figure 6, when the doctor is moved into the position shown to the right in dot and dash lines in Figure 8. After loosening the set screws 45 in the holder, the ends of the doctor are clamped by manipulating the bolts 101. The position of the doctor with respect to the holder is then properly gauged to position the doctor properly between the clamping surfaces of the holder. Tension is applied to the doctor by backing off the plate 95 and its corresponding clamp 100. This tension tends to rigidify the doctor blade in such manner that it will tend to respond with its whole body instead of locally only to the adjustment to be made to establish the distance of projection of the doctor knife from its holder. This adjustment is accomplished by means of the knurled knobs 89 which cause by means of their corresponding shoulders 87 the plates 84 to move with their corresponding clamps 100 transversely to the shaft 67. The object of this adjustment is to provide the worn edge of the doctor 48 to be sufficiently projected from its holder 44 as to afford the said worn wiping edge to be com-

pletely removed during the trimming operation to be next described. After the doctor has been properly adjusted the set screws 45 are again tightened. In this connection, it is to be noted that provision for longitudinally tensioning the doctor is made at only one of the clamping plates 100 although each clamping plate 100 is transversely adjusted with respect to the axis of the shaft 67.

After the doctor has been set, tensioned, and clamped in the holder, the shaft 67 is rocked in a counterclockwise direction (as viewed in Figure 8) into the left hand position thereof as shown in dot and dash lines in Figure 8. In this position, the pin 71 engages aperture 74 and the doctor engages the table 66 in such fashion as to be flexed upwardly thereby. In such flexed position the doctor is ready to be trimmed or cut and this operation is effected by the cutting mechanism shown in Figures 8, 9, 10, 11, 12, and 13.

As shown in Figures 8 through 13, the cutting mechanism is mounted upon a carriage 103 which is formed with a bracket 104 having dove-tailed portions 105. These dove-tailed portions are slidably received in cooperating dove-tailed grooves 106 which are formed in the underside of the bed 20 and thus permit the carriage 103 to be slid along the side of the table 66. The carriage 103 may be provided with supporting collars 107 which are adapted to roll over a supporting track 108 carried by the frame of the machine, thus relieving the dovetailed supporting members from the strain of the overhanging mechanism.

A shaft 109 (Figure 12) is journaled in the carriage 103 and has secured to the ends thereof pinions 110 and 111. The pinion 110 is adapted to engage a gear rack 112 which is secured to the bed 20 between the dove-tail grooves 106. Pinion 111 engages a gear 113 on the shaft 114 to which a manually operated crank 115 is secured. The shaft 114 is journaled in the carriage 103 and, in this fashion, rotation of the crank 115 causes the pinion 110 to advance along the rack 112 and thus move the carriage 103 longitudinally of the table 66.

Journaled in the carriage 103 is a shaft 116 upon which a hub 117 is secured. A pinion 118 is also secured to the shaft 116 and engages the gear 113. A cutter disc 119 is secured to the hub 117 and is thus rotated as the carriage is advanced along the table 66. A lever 120 is pivoted upon an axis 121 and the end of the lever is adapted to be adjustably secured to the carriage 103 by means of the nut and bolt locking mechanism 122. This mechanism is slidably received within a slot 123 formed in the carriage 103 in order that the position of the lever 120 may be conveniently adjusted. Lever 120 is formed with an extension 124 upon which a shaft 125 is journaled. Shaft 125 is formed with a hub 126 and, at the other end thereof has a gear 127 secured thereto. A cutting disc 128 is secured to the hub 126 and gear 127 engages a gear 129 which is journaled upon the axis 121 and also engages the gear 113. In this fashion, gears 118 and 127 rotate in opposite directions, the speed of rotation thereof being the same by forming gears 118 and 127 with an equal number of teeth on each.

The gear ratios between the rack 112 and pinion 110 and between the gear 113 and pinion 111 bear such relation to the gear ratios between the gear 113 and the pinions 118 and 127 that

the peripheral speeds of the cutter discs 119 and 128 equal the longitudinal speed of travel of the carriage 103 along the table 66. The reason for mounting the cutter blade or disc 128 adjustably upon the carriage 103 is to provide for the securing of a desired overlap between the cutter blades and also for enabling the cutting point which is the intersecting point between the cutting edges of the two discs to be adjusted in order that it may be positioned directly over the axis of the shaft 116. This is illustrated in Figure 13 wherein the cutting point is shown at 129, and the radius thereof on the axis of shaft 116 is shown by the dot and dash lines 130. The overlap between the blades 119 and 128 is illustrated in Figure 13 and includes that portion of the blades lying between the radius line 130 and a radius line 131.

A summary of the operation of the mechanism will show that the device includes a convenient and effective means for cleaning the doctor, pressure blade, and holder, this mechanism including the solvent tank 24 from which the solvent may be drained through a fitting 24'. The doctor assembly after being secured in the rotating arms 40, is dipped into the solvent a sufficient number of times to remove the sediment and ink therefrom. This prevents the sticking of the doctor and pressure blade and enables the mechanism to be accurately and easily adjusted. This cleaning operation takes place without scooping and violent agitation of the solvent.

The doctor assembly is then inserted in the rocking holder in a vertical position therein and the holder is rocked through 90° in order that the doctor and pressure blades may lie upon the table 79. In such position the set screws 45 are loosened and the overhanging ends of the doctor are clamped under the clamping plates 100. The clamping plates are then adjusted transversely of the axis of the shaft 67 by means of the knurled nuts 89 and after the doctor is properly positioned with respect to the holder, the knurled nut 99 is turned to set up a desired tension in the doctor. After this is accomplished and the edge of the doctor is accurately gauged and parallel with the edge of the holder, the set screws 45 are tightened and the rock shaft 67 swung to the left in the position indicated in dot and dash lines in Figure 8.

As above noted, in the under position of the doctor assembly, the doctor and reinforcing blade engage the table 66 and are flexed upwardly thereby. This produces a curved profile of the doctor and the reinforcing blade causing a longitudinal cross tension upon both tending to rigidify the flexed portion of said blades resting upon the table 66. It also tends to remove any wavy condition that may exist in the longitudinal edge of the doctor knife. The wiping edge of the doctor knife to be trimmed will be found in this position to lie in a horizontal plane even with the line corresponding with the meshing point of the cutter discs 128 and 119, so that in this position the cutter discs will engage the doctor knife without any lifting or depressing action thus not disturbing the natural position of the overhanging edge. The carriage 103 which has previously been moved to one end of the table is then advanced along the table 66 by means of the manual lever 115. Inasmuch as the travel of the carriage along the table 66 equals the peripheral speed of the rotor blades 119 and 128 the cutting of the edge of the doctor takes place without any tearing action thereon and in this fashion, a clean and accurate

cut results. While the holder and doctor are in the cutting position, the edge may be stoned or honed to smooth the same and if desired a bevel may be formed thereon.

In the wearing of the doctor, certain portions of the edge wear away more quickly than other portions thereof by reason of the irregularity of the engravings of the printing cylinder. As a result, a wavy edge is formed on the doctor and, in reconditioning the doctor, it is important that no portion of the doctor be heated to a greater degree than other portions thereof. Under the old methods of reconditioning the edges of doctors, the high points of the edges receive more grinding than the low points and thus great heat is created at the high points. This materially affects the temper of the edge of the doctor at these points and impairs the serviceability of the doctor. In accordance with the present invention all portions of the edge of the doctor are treated alike and the temperatures thereof are uniform thus avoiding uneven heating along the length of the doctor and the deleterious effects thereof.

It will be noted that the fulcrum shaft 67 is in a parallel plane with the guideways 106 of the carriage carrying the trimming knives 128 and 119 and that the disposition of these elements and the axes in the brackets 77 for the doctor knife holder 44 is such as to create a trimmed edge parallel with the base line of the doctor knife holder 44. It will also be noted that the disposition of these elements is such as always to cause the trimmed wiping edge of the doctor knife 48 to be the same distance from the said opposite edge of the doctor knife holder 44 and the amount of the longitudinal projection of the doctor 48 from its holder 44 is thereby maintained constantly uniform. This disposition of these elements is to provide a uniform alignment between the gauging edge of the holder 44 and the wiping edge of the doctor 48. Such disposition of these alignments is utilized in the printing press where the doctor knife and its holder are mounted on aligned axes which in turn are in constant alignment with the axis of the printing cylinder or respectively with the printing surface. In such manner a permanent alignment is obtained between the wiping edge and the printing surface and thereby the necessity of frequent readjustment of such alignments is eliminated.

I claim as my invention:

1. A machine for doctor knife maintenance comprising a support for a doctor knife holder, a table for supporting the doctor knife, and adjusting means associated with said table to adjust the position of said doctor knife with respect to said holder.

2. A machine for doctor knife maintenance comprising a support for the doctor knife holder, means associated with said support to locate said holder in a predetermined position, and adjusting means adapted to engage a doctor knife endwise and to move said doctor knife with respect to the holder to adjust the distance of projection of said doctor knife from said holder.

3. A machine for doctor knife maintenance comprising a support for a doctor knife holder, means associated with said support to locate and maintain said holder in a fixed position, and adjusting means adapted to engage a doctor knife on each end to longitudinally tension the same and to adjust the longitudinal projection of said doctor while under said tension.

4. A machine for doctor knife maintenance comprising a support for the doctor knife and its holder and cutting means movable longitudinally of the holder for the removal of the worn wiping edge of a used doctor, said cutting means removing said edge in a single cut.

5. A machine for doctor knife maintenance comprising a support for the doctor knife and its holder, adjusting means to adjust the longitudinal projection of said doctor knife with respect to its holder and means for reconditioning the worn wiping edge of a used doctor knife.

6. A machine for doctor knife maintenance comprising a support for the doctor knife and its holder, means on said support to locate said holder in a fixed alignment thereon, and cutting means for reconditioning the worn wiping edge of a used doctor, said cutting means being adapted to restore said wiping edge parallelism with said alignment of said holder.

7. A machine for doctor knife maintenance comprising a support for the doctor knife and its holder, means on said support to locate and maintain said holder in a fixed alignment thereon, adjusting means cooperating with said support to regulate the longitudinal projection of said doctor beyond its holder, and cutting means for the restoration of the worn wiping edge of a used doctor, said cutting means being parallel with said alignment of said support to cause the restored wiping edge to be parallel with said alignment of said holder and to cause the projection of the restored wiping edge beyond said holder be maintained to a predetermined constant extent.

8. A machine for doctor knife maintenance comprising means for restoring the worn wiping edge of a used doctor, said means including a carriage, means to mount the carriage movably upon the machine, a pair of knives on the carriage, means to move the carriage and means to actuate the knives while the carriage is moving to remove the worn edge with a single cut.

9. A machine for doctor knife maintenance comprising a pair of cutting discs capable of cutting away the worn wiping edge of a used doctor knife, mechanical means to impart to said discs simultaneously both a rotating and longitudinal movement, the peripheral speed of said discs being in synchronism with the longitudinal surface speed thereof.

10. A machine for doctor knife maintenance comprising a pair of rotatable cutting discs being in cutting engagement and adapted to remove the worn wiping edge of a used doctor knife, means to impart to said discs, simultaneously positive revolving and longitudinal movements during the cutting operation, the direction of rotation of said discs at their engaging portions being opposite to the direction of their longitudinal movement.

11. A machine for doctor knife maintenance comprising a pair of rotatable cutting discs in cutting engagement and adapted to remove the worn wiping edge of a used doctor knife, means to impart to said discs, simultaneously positive revolving and longitudinal movements during the cutting operation, the direction of rotation of said discs at their engaging portions being opposite to the direction of their longitudinal movement, the peripheral speed of said discs being in synchronism with the longitudinal surface speed thereof.

12. A machine for doctor knife maintenance comprising a frame, a carriage slidably supported on said frame, a pair of cutting discs rotatably supported on said carriage, said discs adapted to remove the worn wiping edge of a used doctor,

a train of meshing gears on the carriage in driving connection with the discs, and means to rotate one of said gears, said gears being adapted to cause the rotation of said discs and a simultaneous longitudinal travel of said carriage.

13. A machine for doctor knife maintenance comprising a frame, a carriage slidably supported on said frame, a pair of cutting discs rotatably supported on said carriage, said discs adapted to remove the worn wiping edge of a used doctor, a train of meshing gears on the carriage in driving connection with the discs, and means to rotate one of said gears, means engaging one of the gears to cause the carriage to be moved upon motion of the gears, said gears being adapted to cause the rotation of said discs and a simultaneous longitudinal travel of said carriage, the gears being further adapted to cause the peripheral speed of said discs on their cutting edges to coincide with the surface speed of said carriage.

14. A machine for doctor knife maintenance comprising a frame, a carriage slidably supported on said frame, a pair of cutting discs rotatably supported on said carriage, said discs adapted to remove the worn wiping edge of a used doctor, a train of meshing gears on the carriage in driving connection with the discs, and means to rotate one of said gears, means engaging one of the gears to cause the carriage to be moved upon motion of the gears, said gears being adapted to cause the rotation of said discs and a simultaneous longitudinal travel of said carriage, the gears being further adapted to cause the direction of rotation of said discs at their cutting position to be reverse to the direction of movement of said carriage.

15. A machine for doctor knife maintenance comprising a frame, a carriage slidably supported on said frame, a pair of cutting discs rotatably supported on said carriage, said discs adapted to remove the worn wiping edge of a used doctor, a train of meshing gears on the carriage in driving connection with the discs, and means to rotate one of said gears, means engaging one of the gears to cause the carriage to be moved upon motion of the gears, said gears being adapted to cause the rotation of said discs and a simultaneous longitudinal travel of said carriage, the gears being further adapted to cause the peripheral speed of said discs on their cutting edges to coincide with the surface speed of said carriage, and being further adapted to cause the direction of rotation of said discs at their cutting position to be reverse to the direction of movement of said carriage.

16. A machine for doctor knife maintenance comprising a station for adjusting the longitudinal projection of the doctor knife with respect to its holder, a cutting station for removing the worn wiping edge of a used doctor knife, a movable support for the doctor and its holder, and means to move said support to locate said doctor in said adjusting or in said cutting station.

17. A machine for doctor knife maintenance comprising a station for adjusting the longitudinal

projection of the doctor knife with respect to its holder, a cutting station for removing the worn wiping edge of a used doctor knife, a movable support for the doctor and its holder and means to move said support to locate said doctor in said adjusting or in said cutting station, and means to lock said support in either of said positions.

18. A machine for doctor knife maintenance comprising a table, a support for the doctor knife and its holder, and means for moving the support in such manner that said doctor knife will become deflected from its normal plane when said doctor knife is resting on said table whereby the doctor knife will be maintained in a substantially rigid condition to permit the same to be conditioned.

19. A machine for doctor knife maintenance comprising a cutting mechanism for the removal of the worn wiping edge of a used doctor knife, said mechanism including a pair of cutting discs in cutting engagement and means to impart to the discs a rotating and a simultaneous longitudinal movement during the cutting operation, a support for the doctor knife holder, a table for the support of said doctor knife during the cutting operation, and means to move the support in such relative manner as to cause the said doctor to be under a longitudinal cross tension when it comes to rest on said table.

20. A machine for doctor knife maintenance comprising a cutting mechanism for the removal of the worn wiping edge of a used doctor knife, said mechanism including a pair of cutting discs in cutting engagement and means to impart to the discs a rotating and a simultaneous longitudinal movement during the cutting operation, a support for the doctor knife holder, a table for the support of said doctor knife during the cutting operation, and means to move the support in such relative manner as to cause the said doctor to be under a longitudinal cross tension when it comes to rest on said table and to present the wiping edge of said doctor to be trimmed in an even level with the line of engagement of said cutting discs with said doctor corresponding with the point of engagement of said discs.

21. A machine for doctor knife maintenance comprising a movable support for the doctor knife and its holder, a mounting station at which the doctor knife and its holder are secured in the support, a conditioning station at which conditioning operations are performed upon the doctor knife, and means to move the support to position the holder in either of the two said stations.

22. A machine for doctor knife maintenance comprising a movable support for the doctor knife and its holder, a mounting station at which the doctor knife and its holder are secured in the support, a conditioning station at which conditioning operations are performed upon the doctor knife, an adjusting station at which the position of the doctor knife with respect to the holder is adjusted, and means to move the support to position the holder in either of the three said stations.

ADOLPH WEISS.