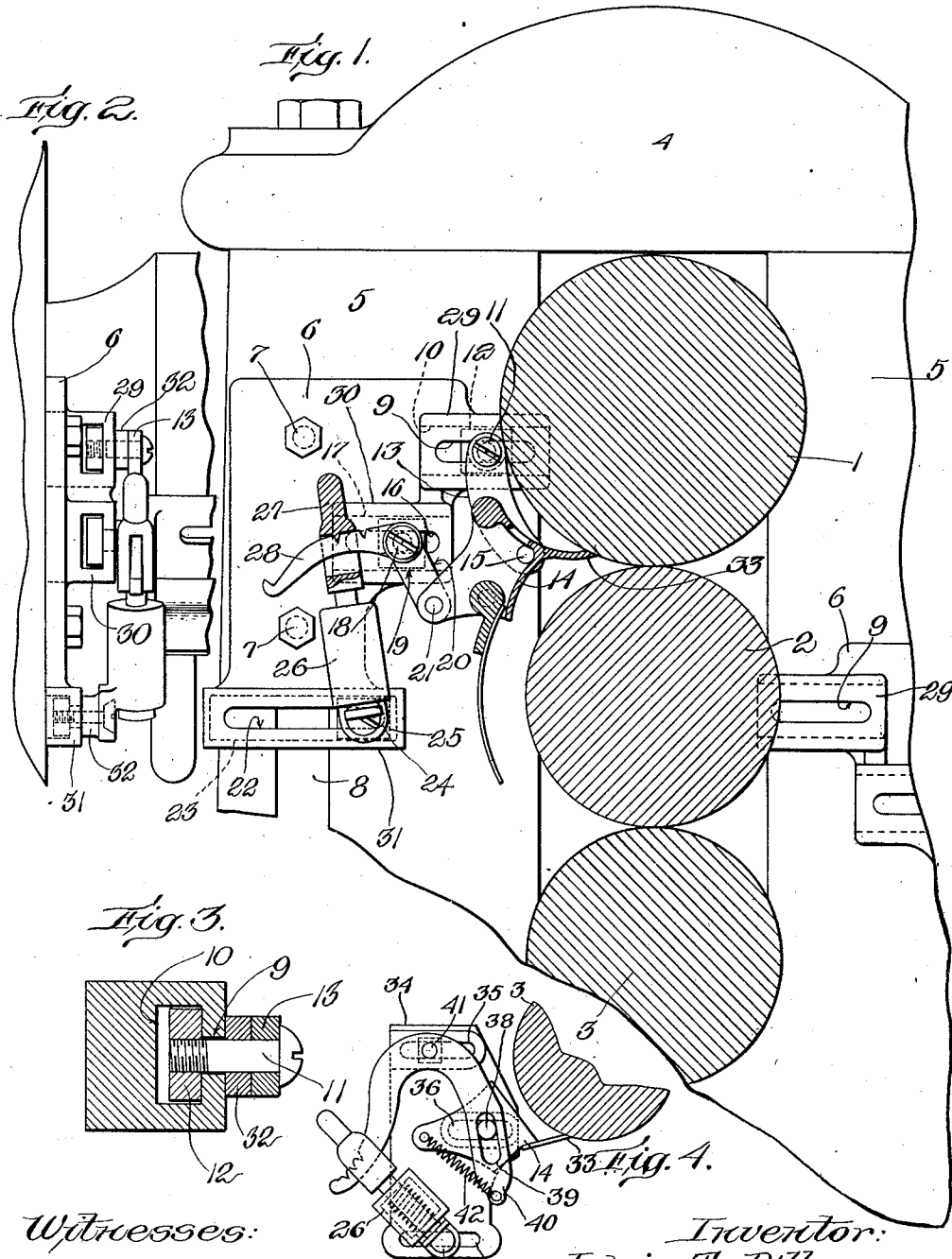


J. T. DILLON.
CALENDERING MACHINE DOCTOR.
APPLICATION FILED SEPT. 12, 1910.

1,005,175.

Patented Oct. 10, 1911.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOHN T. DILLON, OF LAWRENCE, MASSACHUSETTS.

CALENDERING-MACHINE DOCTOR.

1,005,175.

Specification of Letters Patent.

Patented Oct. 10, 1911.

Application filed September 12, 1910. Serial No. 581,672.

To all whom it may concern:

Be it known that I, JOHN T. DILLON, a citizen of the United States, and resident of Lawrence, in the county of Essex and State of Massachusetts, have invented an Improvement in Calendering-Machine Doctors, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is an improvement on the kind of doctor apparatus shown in U. S. Letters Patent No. 600,518, patented March 15, 1898, whereby a doctor is provided which is self-adjusting as to its axial alinement or point of engagement with the calendering roll, the object of my invention being to do away with the tendency of the doctor to chatter, mark the rolls, and clog in use.

In the patented doctor, when the blade wears, it changes its angle or position on the roll, which change causes it to chatter, mark the roll, and allow dirt or paper to pass through between it and the roll, this result being due to the blade swinging with a circular or arc-like motion, thereby, as it wears, tending to swing or rise higher and gradually lose its bevel and wear to a straight-across edge, instead of an oblique or beveled edge.

My present invention resides in providing a construction whereby, as the blade wears, the doctor moves or travels in a straight line (as distinguished from its previous arc-like movement) which allows it to keep its original position relatively to the roll, so that the blade maintains its bevel notwithstanding that the doctor is free to follow the roll into any position into which it may move. By my invention, the doctor is kept in its original position with relation to the roll irrespective of whatever wear may take place, thereby insuring perfect calendering of the paper. Moreover, by my invention the doctor pivots or centers of swinging motion of the principal parts of the doctor are shiftable, either together or relatively to each other, toward and from the stack of calendering rolls, whereby the original adjustment of the doctor as well as the automatic adjustment thereof above explained are permitted to be extremely fine and accurate and also whereby the peculiar twisting tendency of the doctor is practically eliminated,

together with the resultant objectionable features above mentioned.

In the drawings, in which I have shown preferred embodiments of my invention, Figure 1 is a transverse sectional view of a sufficient portion of the upper end of a calendering machine provided with my invention to enable the latter to be clearly understood; Fig. 2 is a fragmentary view thereof in front elevation; Fig. 3 is a cross sectional detail of the upper slide and guide-way, showing the general construction of all of them; and Fig. 4 shows a still further feature of my invention.

The doctor rolls 1, 2, 3, of any suitable or preferred kind and arrangement, are herein shown as mounted in a frame 4 on whose opposite uprights 5 the doctors are mounted in usual manner. Inasmuch as my improvement is substantially the same for all the doctors in the series, I have shown the same in detail for two rolls only.

In Fig. 1, I have shown my invention adapted to the mechanism of the aforesaid patent, and accordingly will explain this embodiment of the invention first. A suitable carrying plate, preferably a casting, 6, is secured by bolts 7 for vertical adjustment in a slot 8, and this casting is provided on its front face with a substantially horizontal slot 9 and way 10 for the pivot bolt 11 and its head 12 on which the link 13 of the doctor blade 14 is pivoted at 15. A similar slot 16 and way 17 are provided for the pivot bolt 18 and head 19 of the link or bell crank 20 which is pivoted at 21 to the adjacent part of the doctor blade 14. A third slot 22 and way 23 are provided for the pivot bolt 24 and bolt head 25 of the tension device 26, whose upper end 27 is adjustably mounted on the arm or extension 28 of the bell crank 20. For convenience, each of these three slotted bearings projects from the face of the plate 6, as clearly shown at 29, 30, 31, Fig. 2, and the pivotal members of the doctor are spaced still farther from these projecting slotted parts by washers 32. The beveled working edge of the doctor proper is indicated at 33.

In Fig. 4, where I have shown a more complete embodiment of the invention, containing further features of construction and advantage, a plate 34 is provided which is substantially the same in its general arrange-

ment and relation to the rolls as the plate 6 previously described, excepting that its horizontal slots 35, 36, 37 are differently located, the upper slot 35 being farther to the rear than the intermediate slot 36 and preferably in substantially vertical alinement with the lower slot 37. The doctor blade or doctor proper 14 is provided at its ends with a pivot pin 38 which rides freely in the slot 36 and also projects freely into a slot 39 provided in an A-shaped or inverted U-shaped arm 40. The arm 40 is adjustably pivoted at 41 in the slot 35 and held toward the roll by a tension device 26 the same as already described, adjustably pivoted in the slot 37, while a spring 42 is secured to the rear end of the doctor and the inner end of the member 40 for holding the doctor properly pressed against the roll. The spring device 26 acts through the arm 40 to hold the doctor forward, and the spring 42 holds the forwardly pressed doctor up against the roll.

From the above description it is to be observed that in both constructions provision is made for an automatic self-adjusting pressure of the doctor edge against the roll in a substantially straight-line movement within relatively small limits, in conjunction with means for adjusting the doctor pivots and its operating parts as a whole in the same straight-line movement toward the roll within greater limits, by which latter adjustment the doctor may be adjusted toward the roll at infrequent intervals to take up the considerable wear which has occurred between such intervals while the wear occurring during each of such intervals is taken up by the automatic adjustment which, in both forms within these smaller limits, is substantially in a straight line. Thus, in the form shown in Fig. 1, the links 13, 19 are so proportioned and connected to the doctor that, within small limits, the operative edge 33 of the doctor will have a straight-line automatic adjustment toward the roll, the longer adjustments necessary at intervals being effected by adjusting the pivots along the slots 9, 16 and 22 and this moving the active doctor edge up toward the roll to take up wear in the same straight line movement which the automatic adjustment accomplishes within smaller limits.

In the form shown in Fig. 4, a larger part of the straight-line movement adjustment is automatic, the spring 26 being adapted to automatically urge the operative edge 33 of the doctor with a straight-line movement toward the roll within the longer limits permitted by the slots 36, 39; in this form likewise a further extension of this straight-line adjusting movement may be effected by adjusting the pivots 24, 41 along in the slots 37 and 35 respectively.

In the construction shown in Fig. 1, any one or all of the pivots 11, 18, and 24 may be

shifted in their respective slots forward or backward and then clamped therein, thereby facilitating the adjustment of the doctor when the machine is originally set up, as well as accommodating it to its various adjustments as required in use.

In the construction shown in Fig. 4, the adjustments of the carrying means for the doctor in the top and bottom slots 35, 37 are hand adjustments, whereas the adjustment of the pivotal bearing 38 of the doctor proper in the slot 36 is automatic. As the edge 33 of the doctor wears, the doctor is permitted to move forward in a straight line by the sliding engagement of its pivot 38 with the slots 36 and 39, the doctor being held in continuous engagement with the roll 3 by the combined action of the tension devices 42 and 26, and the forward movement of the pivot 38 being permitted by the two slots 36, 39 which permit the doctor to move straight forward under the arc-like swinging movement of the member 40 from its pivot 41 as a center. The hand adjustment of the pivots 41 and 24 accomplish substantially the same fineness of adjustment when the machine is first set up and also as the doctor wears, which has already been described for substantially the same adjustments in the construction shown in Fig. 1. The edge 33 of the doctor has necessarily considerable thickness or is appreciably concave, to correspond to the arc or curve of the contacting surface of the roll which it engages. Accordingly it will be seen that the hand adjustments provide for accurate adjustment not only to compensate for the wear of the machine but also when the machine is first set up.

While I prefer the means for adjustment herein shown, it will be understood that, except as stated in the more restricted claims, my invention resides broadly in the provision of means for accomplishing the described adjustments irrespective of whether said means is embodied in the particular slotted plate construction herein shown or not, as many variations in structure may be resorted to without departing from the spirit and scope of my invention as defined in the appended claims taken in connection with the foregoing description.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a calendering machine, a pivotally mounted doctor having a longitudinal blade for edge engagement lengthwise of a calendering roll, means permitting said doctor as its front edge wears to have an automatic substantially straight-line movement toward and from the roll, and adjustable means for extending the range of said straight-line movement so as to maintain the engagement of the edge of the doctor with the roll at an

unvarying angle and position with relation to the roll in all stages of wear of the doctor.

2. In a calendering machine, a doctor having a longitudinal blade, directing means, including a positive guide for giving said doctor as its front edge wears an automatic substantially straight-line movement toward and from the roll, cooperating swinging means for moving said doctor toward the roll, means for yieldingly holding said swinging means and guided doctor together, and means for extending the range of said straight-line automatic adjusting movement throughout all stages of wear of the doctor.

3. In a calendering machine, a doctor having a longitudinal blade and a mounting permitting a substantially straight-line movement toward the roll, means for yieldingly urging the blade toward the roll, and means for bodily adjusting said parts to extend the range of straight-line movement of the doctor toward the roll to maintain the doctor at an unvarying angle and position with relation to the roll through all stages in the wear of the doctor.

4. In a calendering machine, a doctor having a longitudinal blade and a link mounting arranged to effect a substantial straight-line movement of the operative portion thereof toward the roll, yielding means for urging the doctor toward the roll, and means for adjusting said parts bodily and uniformly to extend the range of straight-line movement and cause the operative edge

of the doctor to engage the roll at an unvarying angle through all the stages of the wear thereof.

5. In a calendering machine, a doctor having a longitudinal blade, pivotal means for the movement of the doctor toward its roll, pivotal means for maintaining the doctor under a tendency to move forward, and provision for laterally adjusting the pivotal portions of said two means with relation to said blade and to the roll.

6. In a calendering machine, a doctor having a longitudinal blade, pivotal means for moving the doctor toward its roll, pivotal means for maintaining the doctor under a tendency to move forward, and provision for laterally and independently adjusting the pivots of said two means with relation to said blade and to the roll.

7. In a calendering machine, a doctor having a longitudinal blade, pivotal means for moving the doctor toward its roll with a straight-line movement, pivotal means for maintaining the doctor in operative engagement with its roll, provision for laterally adjusting the pivots of said two means, and a spring tending to move the doctor transversely of its said straight-line movement.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN T. DILLON.

Witnesses:

GEO. H. MAXWELL,
EDWARD MAXWELL.