Nov. 1, 1932. J. A. WHITE 1,885,164

FOURDRINIER MACHINE

Filed Dec. 31, 1931 4 Sheets-Sheet 1

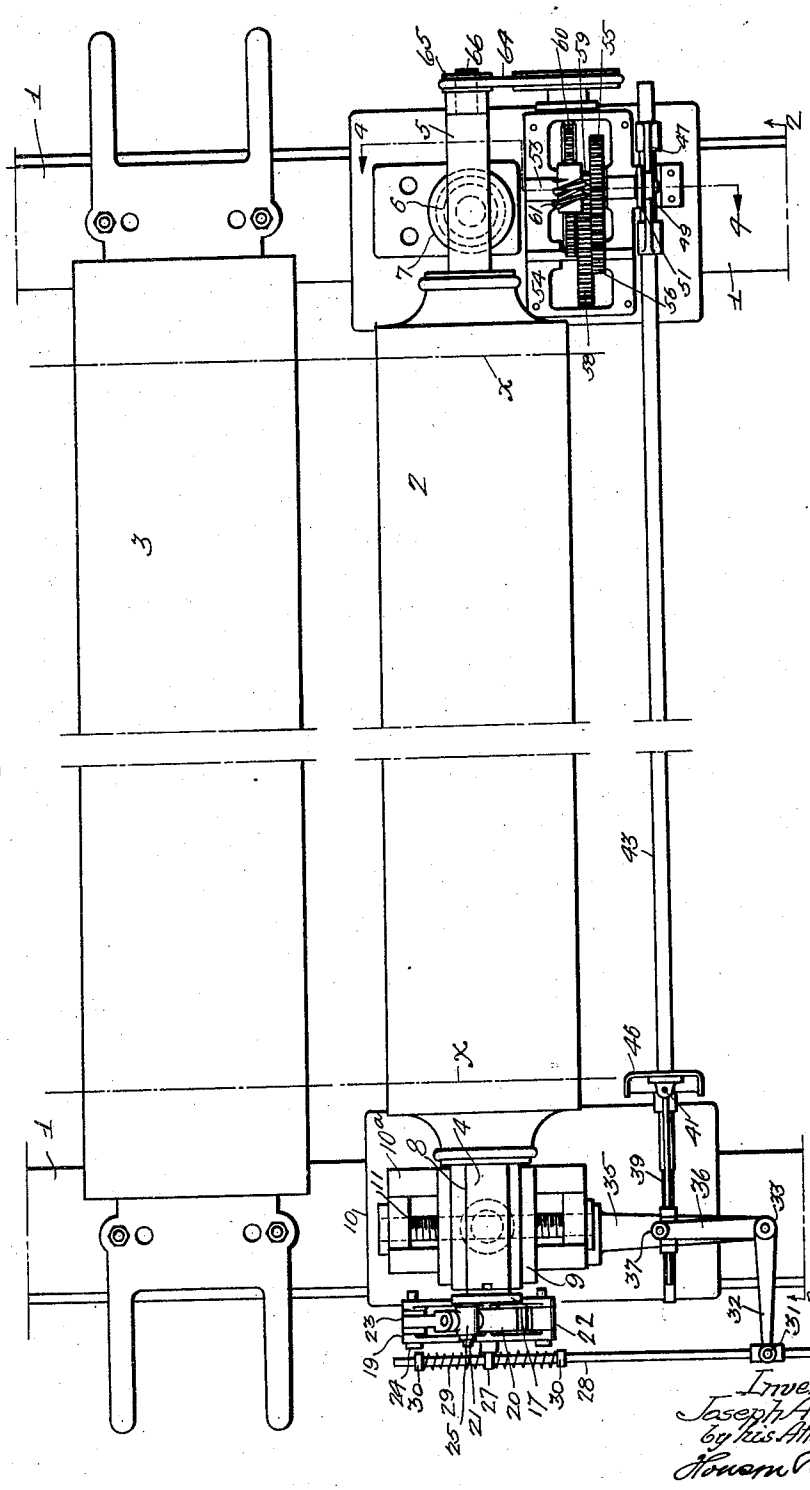


Fig. 1.

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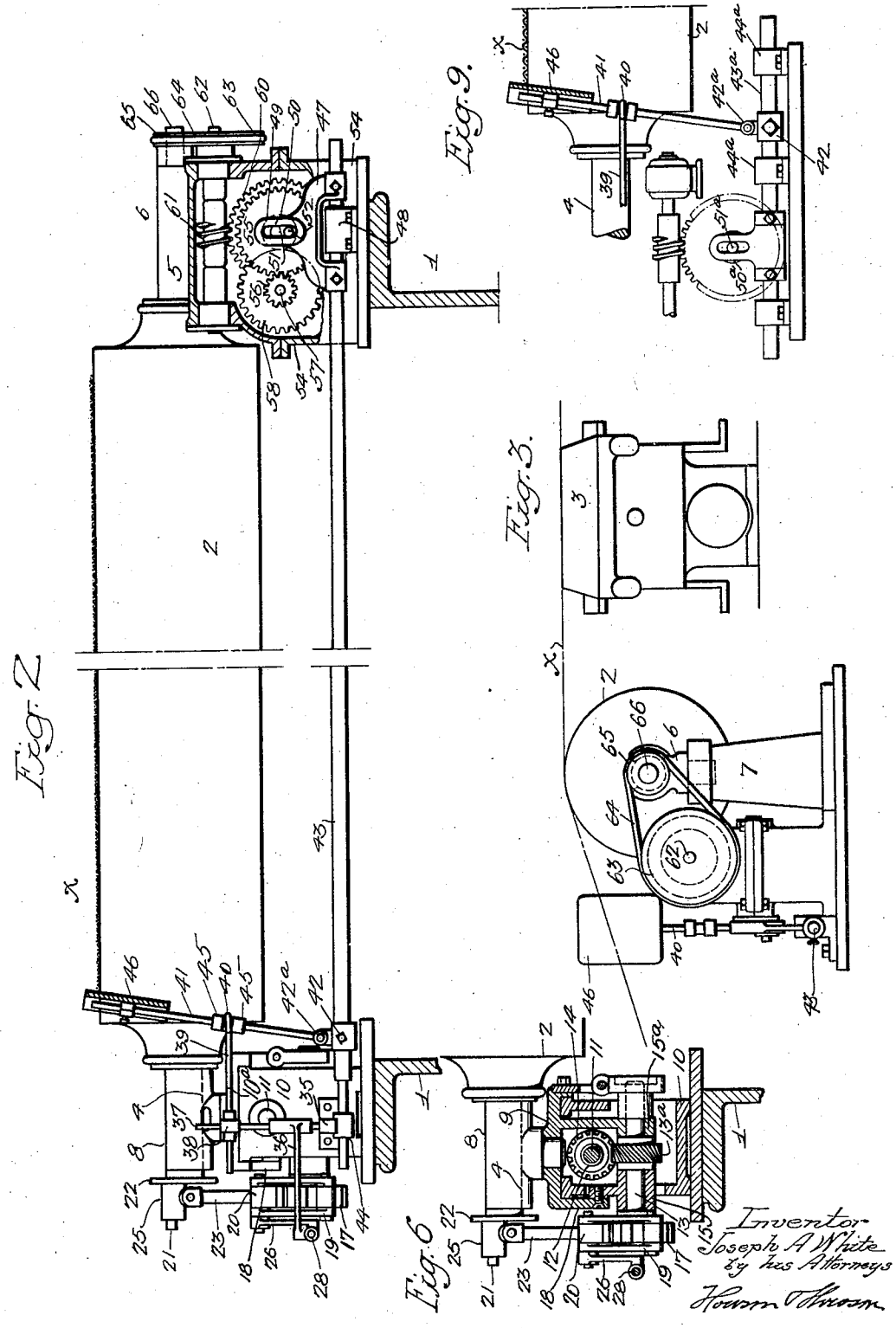


Fig. 2

Fig. 9.

Fig. 3.

Fig. 6

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Fig. 5.

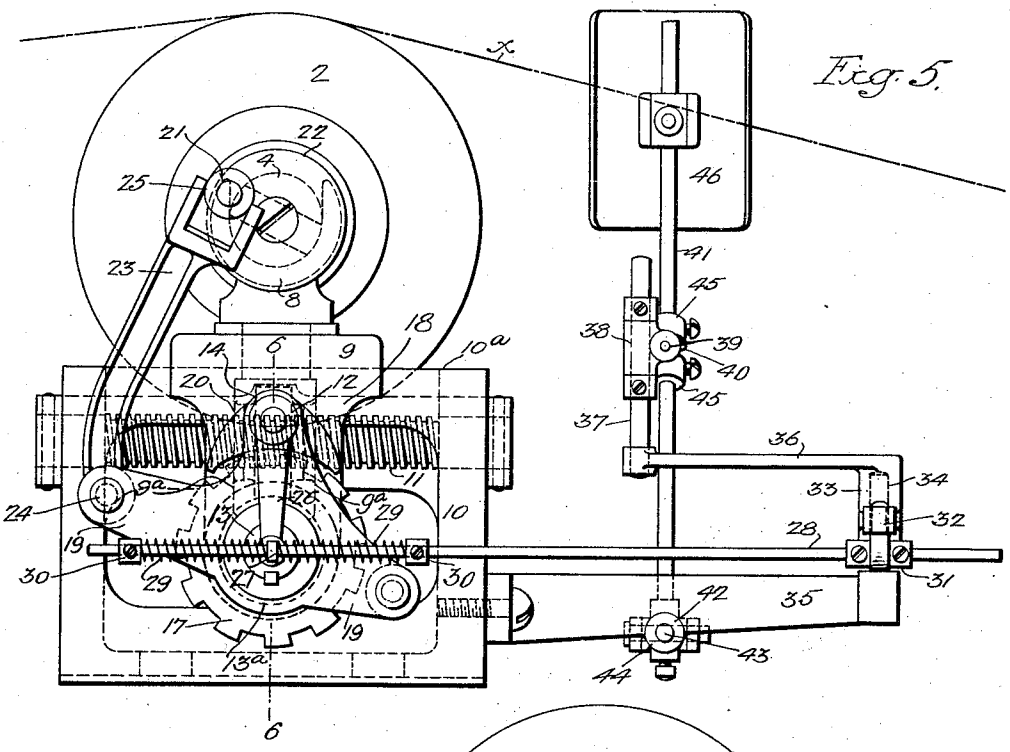
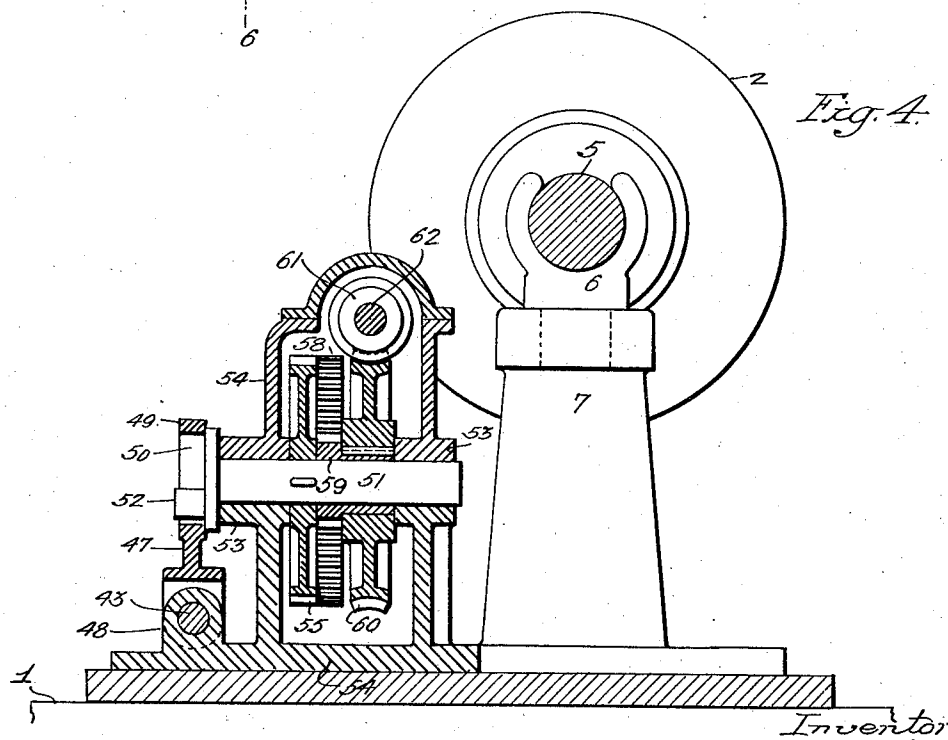


Fig. 4.



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Fig. 7.

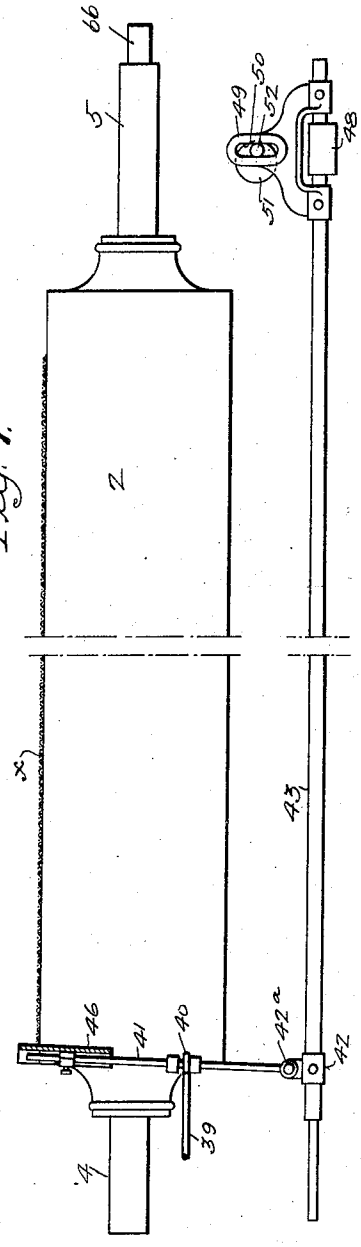
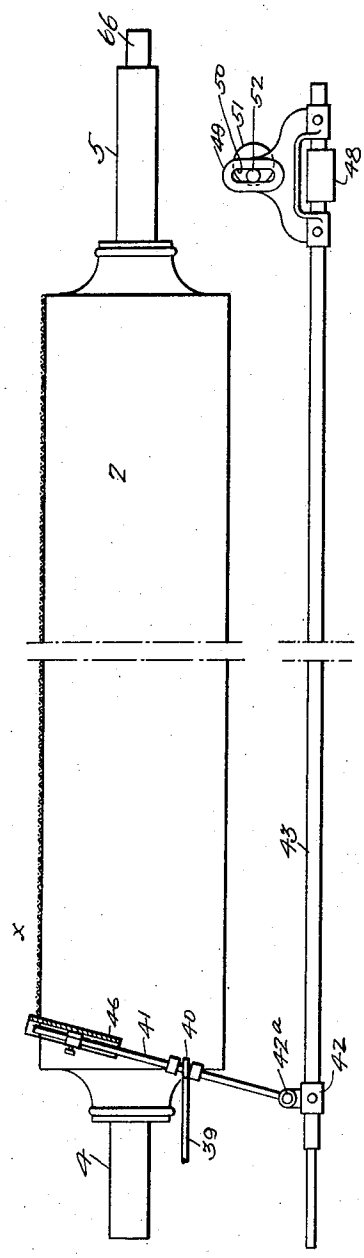


Fig. 8.



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UNITED STATES PATENT OFFICE

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FOURDRINIER MACHINE

Application filed December 31, 1931. Serial No. 584,191.

My invention relates to certain improvements in Fourdrinier paper making machines where the wire travels over guide rolls. This wire is an endless wire and quite long, and as it travels over the rolls it is liable to move to one side or the other of the rolls.

Prior to my invention means has been provided for retaining the wire in its normal position. This means is actuated by the movement of a pad which bears against one edge of the wire and through certain mechanism. One of the bearings of the roll over which the wire travels will be shifted in one direction or the other to skew the roll very slightly and the wire passing over this skewed roll is brought back to its normal position, after which the roll is returned to its normal position and will not be moved until the wire travels laterally to either side of its normal position.

One object of my invention is to prevent the grooving of the upper surfaces of the suction boxes by the wire as it travels over the boxes.

A further object of the invention is to provide means for continuously shifting the wire laterally over the guide roll and suction boxes to prevent the wire traveling in one path, preventing the grooving of the upper surfaces of the suction boxes.

A still further object is to provide means by which the continuous laterally shifting mechanism will act in conjunction with the wire adjusting mechanism so that the wire will travel in the path dictated by the continuous shifting mechanism, the continuous shifting mechanism skewing the roll through the wire adjusting mechanism.

These objects I attain in the following manner, reference being had to the accompanying drawings, in which:

Fig. 1 is a plan view of sufficient of a Fourdrinier machine to illustrate my invention, the gear box cover being removed;

Fig. 2 is a transverse sectional view on the line 2—2, Fig. 1, the gear box being broken away to show the gearing;

Fig. 3 is a side view looking in the direction of the arrow 3, Fig. 1, and showing one of the suction boxes;

Fig. 4 is a sectional elevation on the line 4—4, Fig. 1;

Fig. 5 is a view of one side of the machine, showing the mechanism for skewing the guide roll;

Fig. 6 is a sectional view on the line 6—6, Fig. 5;

Figs. 7 and 8 are diagrams showing the action of the continuous shifting mechanism for the wire; and

Fig. 9 is a view of a modification of the invention.

Referring to the drawings: 1—1 are the side frames of a Fourdrinier paper making machine. 2 is the guide roll at the delivery end of the machine and 3 is one of a series of suction boxes which are located in advance of the guide roll.

The guide roll 2 has two trunnions 4 and 5. The trunnion 5 is mounted in a bearing 6, pivotally mounted in a standard 7, so that when the opposite end of the roll is skewed by mechanism described hereinafter, the bearing 6 will turn on its pivot. 8 is a bearing for the trunnion 4, which is pivotally mounted on a slide 9. The slide 9 is adapted to a slideway 10*a* on the upper surface of the frame 10. Fixed in the frame 10 is a screw threaded bar 11. On this bar 11 is a nut 12, having helical gear teeth 14 on its periphery, which mesh with the teeth of a helical gear wheel 13*a* on a shaft 13, Fig. 6. The shaft is mounted in bearings 15—15*a*, carried by the slide. The bearing 15 is an integral part of the slide 9, and the bearing 15*a* is secured to an apron 18 depending from the outer side of the slide. By this construction the shaft moves with the slide. The nut 12 is located between two cheek pieces 9*a* depending from the slide, so that as the nut is turned on the screw rod the slide will travel on the slide-way and skew the roll. The skewing of the roll in one direction or the other will shift the screen as it passes over the guide roll, and the wire will travel over the roll in the given path until it again moves out of a predetermined path when the mechanism will again skew the roll to bring the wire back to its normal position. Secured to the shaft 13 is a ratchet wheel 17 and on a rocker

19 pivotally mounted on the shaft is a double pawl 20, the teeth of which are arranged to mesh with the teeth of the ratchet wheel 17. The rocker 19 is actuated by the roll 2, through the medium of a crank pin 21 on a disk 22 on the end of the roll in the present instance, and this crank pin extends into a bearing 25 on an arm 23 pivoted at 24 to the rocker 19. As the roll rotates the rocker 19 will rock on its pivot through the arm 23. The double pawl 20 is loosely pivoted in the rocker 19 and has an arm 26 on which is a head 27, through which passes a rod 28. On each side of the head is a coil spring 29, held in tension by adjustable collars 30 on the rod 28, thus yieldingly holding the head 27 in a normal central position.

The rod 28 is adjustably secured to a block 31 swivelled in an arm 32 projecting from a vertical hub 33 mounted on a fixed spindle 34 projecting upwardly from a bracket 35 secured to the frame 10, the upper end of which forms the slideway 10*a*. On the hub 33 is an arm 36, on the outer end of which is a post 37 and on this post is adjustably mounted a bearing 38 for a rod 39. This arm has an eye 40 which encircles a rod 41, pivoted to a collar 42 on a transverse sliding bar 43, which extends from one side of the machine to the other. At the left side of the machine the bar is reduced and passed through a bearing 44 on the bracket 35.

On the rod 41 on each side of the eye 40 of the rod 39 are adjustable collars 45. On the upper end of the rod 41 is adjustably mounted a pad 46, which bears against the edge of the wire *x*, shown by dotted lines, which passes over the guide roll 2, so that when the wire moves the pad toward the left it will actuate the mechanism to skew the roll in one direction and when it moves with the wire when it is shifting in the other direction it will skew the roll in the other direction. This particular mechanism is now in use and can be modified without departing from the essential features of the invention, and it is used in combination with my improved mechanism, which I will now describe, which will shift the wire into different predetermined positions, but this shifting will not in any manner interfere with the automatic mechanism for returning the wire to the normal predetermined position.

The bar 43 extends from one side of the machine to the other and secured to the bar is a head 47 which spans a bearing 48 mounted on the frame 54. The head has an extension 49 in which is a vertical slot 50. 51 is a shaft having an eccentric pin 52 which extends into the vertical slot 50 of the head 47. This shaft is mounted in bearings 53 on a frame 54. Secured to the shaft is a gear wheel 55 which meshes with a pinion 56 on a shaft 57, which is also mounted in the bearings in the frame 54 and on the shaft 57 is a gear wheel 58, which meshes with the pinion 59, loose on the shaft 51, and secured to the hub of the pinion is a worm wheel 60, which meshes with a worm 61 on a shaft 62, having its bearings in the upper portion of the frame 54. On the end of the shaft is a pulley 63, around which passes a spring belt 64, which in turn passes around a pulley 65 on the reduced portion 66 of the trunnion 5 of the roll 2. By the above described mechanism the eccentric pin 52 is driven from the roll 2. The gear reduction is such that the pin makes a full revolution about every seven minutes in the present instance, but the movement will depend upon the travel of the moving wire over the guide roll 2. As the transverse bar is slowly moved longitudinally by the pin 52 it shifts the fulcrum 42*a* of the arm 41 and as the pad 46 is resting against the edge of the wire the rod 39 is moved, and this movement skews the roll, causing the wire to positively move laterally over the roll and suction boxes, and if the wire should move out of the given path as dictated by the reciprocating rod, then the rod 39 will be moved by the pad 46 and its arm to either skew the roll further or reduce the skewing, depending upon the abnormal lateral movement of the wire, thus correcting the travel of the wire and causing it to reassume its position on the roll as dictated by the reciprocating rod.

While I have shown the mechanism for positively moving the wire laterally as driven from the guide roll, it may be driven by a separate motor or from other parts of the paper-making machine without departing from my invention, the main idea being to rotate the crank shaft at a given speed so that the wire will be positively and continuously shifted over the surface of the guide roll and the suction boxes.

In Fig. 9 a modification is shown, in which the shaft 50*a* on which is a crank pin 51*a*, is driven by an electric motor. The rod 43*a* is a short shaft mounted in bearings 44*a* on which is a collar 42 carrying the fulcrum 42*a* of the arm 41, carrying the pad 46.

I claim:

1. The combination in a Fourdrinier paper-making machine, of suction boxes; a guide roll; an endless wire passing over the suction boxes and guide roll; a pad bearing against the edge of the wire; means for skewing the roll to shift the wire laterally on the roll; and positive means connected to the pad and the said shifting means for positively moving the mechanism to continuously shift the wire on the roll.

2. The combination in a Fourdrinier paper-making machine, of suction boxes; a guide roll; an endless wire passing over the suction boxes and guide roll; a pad bearing against the edge of the wire; means for skewing the roll to shift the wire laterally on the

roll; and positive means connected to the pad and the said shifting means for positively moving the mechanism to continuously shift the wire on the roll, the first mentioned means also acting independently of the positive mechanism to align the wire on the roll in the event of its moving independently of the positive mechanism to one side or the other of its path.

3. The combination in a Fourdrinier paper-making machine, of a guide roll; an endless wire arranged to pass over the guide roll; a pad bearing against the edge of the wire; and mechanism for skewing the roll; mechanism for imparting a definite lateral movement to the wire; a pad bearing against the edge of the wire pivotally connected to the mechanism for positively giving the wire a continuous positive lateral reciprocating motion and also pivotally connected some distance from the first-mentioned pivot with the mechanism for skewing the roll.

4. The combination of a guide roll for a Fourdrinier paper-making machine, of an endless wire passing over the roll; an arm having a pad bearing against one edge of the wire; a rod extending across the machine, to which the lower end of the arm is pivoted; means for slowly reciprocating the rod; a sliding bearing for the roll; means for moving the bearing to one side or the other of the center line through the roll when it is in its normal central position; a rod pivotally connected to the pad arm, some distance from the pivot connecting it to the transversely movable rod; a double pawl connected to the last-mentioned rod; a ratchet wheel with which the pawl engages; and means between the ratchet wheel and the sliding bearing for moving the bearing to skew the roll when the ratchet wheel is turned in either direction by the pawl, so that the wire has a positive reciprocating movement on the roll through the medium of the transverse rod, and any abnormal movement of the wire on the roll being corrected by increasing or diminishing the skewing of the roll.

5. The combination in a guide roll; an endless wire on the guide roll; an arm having a pad bearing against the wire; a movable bearing for one end of the roll; means for shifting the bearing to one side or the other from its normal center, said means being connected to the pad arm; a reciprocating transverse bar also pivotally connected to the pad arm; a head on one end of the rod, said head having a vertical slot therein; a shaft having an eccentric pin extending into the slot; and means for driving the shaft from the roll, so that the guide roll will be skewed to one side or the other of its normal center line by the continuous reciprocation of the transverse bar.

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