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PAPER WINDING AND SMOOTHING DEVICE

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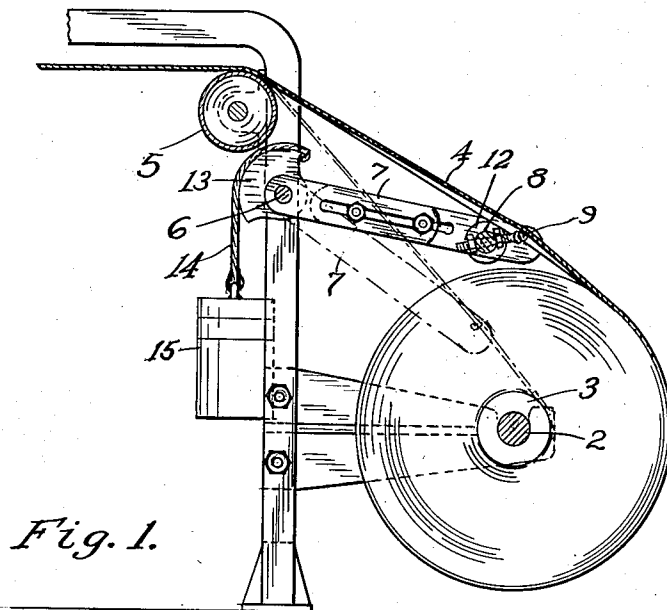


Fig. 1.

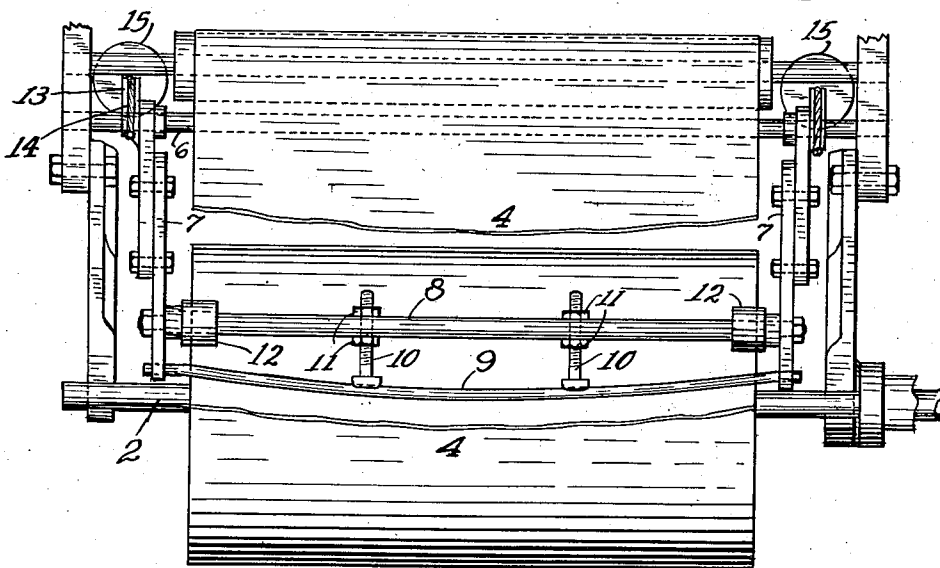


Fig. 2.

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UNITED STATES PATENT OFFICE

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PAPER WINDING AND SMOOTHING DEVICE

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3 Claims. (Cl. 242-76)

1

This invention relates to the winding of thin webs of material such as paper and is particularly applicable to the winding of a web of paper or like flexible material after the passage through a continuous web type printing press, in which the paper is wound back onto a roll or reel after it has gone through the printing press. The invention is, however, applicable to other uses where a web which tends to wrinkle is being wound upon a roll or take-up reel.

After a web of paper has been printed upon in a continuous web type of printing press, it is guided to a power driven roll upon which it is wound until the roll has reached a predetermined diameter, after which the roll is removed and another roll is started.

As the paper winds onto the take-up roll, it frequently wrinkles, and substantial amounts of printed paper have to be thrown away because of such wrinkles.

The object of the present invention is to provide a simple way of eliminating the tendency of the paper to wrinkle, whereby substantial saving of paper may be effected.

According to the present invention a means is provided for crowning the traveling web of paper just as it goes into the roll. This means is arranged to adjust itself automatically as the diameter of the roll increases. By so crowning the paper and exerting a slight pressure against it, the tendency to wrinkle to any substantial extent is eliminated. I have found that this crowning effect may be secured by the provision of a spreader bar which is arched to a slight extent, and which is pivotally supported in such manner that counterweights or the like may be utilized to yieldably hold it in operative engagement with the traveling web of the paper.

My invention may be more fully understood by reference to the accompanying drawings, in which:

Fig. 1 is a longitudinal section through a paper winding mechanism embodying one form of my invention; and

Fig. 2 is a plan view of the mechanism shown in Fig. 1 with a portion of the web of paper broken away to disclose the mechanism.

In the drawings, 2 designates a power driven shaft having a core 3 thereon to be rotated therewith, onto which paper 4 is being wound. As above stated, this may be the wind-up roll of a continuous web printing machine, the balance of which machine is not shown. The shaft 2 and core 3 of course are so arranged as is well known in the art, so that at the proper time the core may

2

be removed from the shaft and replaced with another one, this all being a conventional arrangement and forming no part of the present invention.

5 In the particular installation shown, there is a guide roll 5 located above and to one side of the shaft 2. In the space below this guide roll is a rock shaft 6 having two arms 7 thereon which support a cross arm 8 at their outer ends. A spreader bar 9 has its ends slideably passed through the outer ends of the arms 7. Threaded posts 10 screwed through the shaft 8 and provided with jam nuts 11 bear against the spreader bar intermediate its ends providing means for adjustably arcing or curving the bar. The bar is conveniently made of about $\frac{5}{8}$ inch round metal stock. The threaded pins 10 and the bar lie in a plane which is at an angle to the arms 7. By moving the threaded posts 10 in or out, the curvature of the spreader bar may be changed.

20 The cross bar 8 may be provided near each end with ball bearing idler rollers 12 over which the web of paper 4 passes in non-contacting relationship, and which are adapted to ride on the surface of the roll of paper when the roll becomes excessively large, thereby preventing the cross arm 8, the ends of threaded pins or bolts 10 and possibly lower jam nuts 11 from contacting and marring the paper. This may be seen in the drawings where the roll is shown in small diameter in dotted lines, and large diameter in full lines. As indicated, the arms 7 may be adjustable.

35 The rock shaft 6 is provided at each end with segments 13 over the periphery of which pass cables 14 having counterweights 15 thereon. As viewed in the drawings, these counterweights are effective for rotating the shaft 6 in a counter-clockwise direction to urge the spreader bar against the surface of the paper which is under very substantial tension. This pressure must be sufficient to cause the curved spreader bar to form a crown in the web of paper, this crowning of the web extending from the spreader bar to the point where the sheet becomes tangent with the roll. At the same time the pressure exerted by the counterweights is yieldable so as not to over-strain the paper, and so as to accommodate for the change in the angularity of the sheets as the diameter of the roll increases.

50 In the operation of the device the spreader bar 9 is first adjusted to the proper degree of curvature. This may vary according to the type of paper, the tension in the machine, and other factors which in the first instance may require some

3

slight experimentation. The spreader is so positioned as to be as close as possible to the roll and still not interfere with the roll being built up to the maximum desired diameter. As above indicated, the crowning of the paper which it produces extends from the spreader bar to the roll, diminishing from the spreader bar toward the roll. Wrinkles which may be seen in the traveling web of paper before it reaches the spreader bar disappear as the crown is formed in the sheet, and the crowning prevents the wrinkles from re-forming.

Thus it will be seen that I have provided an extremely simple and highly efficient full floating and completely automatic winding device presenting outstanding advantages over devices that are not full floating, that I have provided a spreader bar that is automatically positioned against the web without adjustment of the length of the supporting arms or of the number of counter-weights or the necessity of any other adjustments and whereby automatic adjustment occurs at all roll diameters, from small to large, thereby saving time, promoting production and saving substantial amounts of paper and eliminating the annoyance of adjusting the length of the spreader bar supports when the roll is changed.

While I have illustrated and particularly described one specific embodiment of my invention, it will be understood that this is by way of illustration, and that the invention is not limited to the specific construction and arrangement of parts as herein illustrated, and that it may be constructed in various ways, and that other means than the weights 11 may be used for biasing the spreader bar or urging it upwardly.

I claim:

1. The combination with a reel on which a flexible web is being wound, of means under the web for generating a transverse crown in the web convex to the surface of the roll being formed, which crown extends from the reel to said means, and

4

means for yieldably urging said first means upwardly against the web and in a direction outwardly from the center of the reel.

2. An anti-wrinkling device for a web of paper being wound upon a reel comprising a rock shaft having a pair of arms extending therefrom, a cross shaft connectnig the arms, a spreader bar having its ends loosely engaged in said arms, posts on said cross bar engaging the spreader bar between its ends for holding it in an arched position, and an idler roll on said cross bar adapted to prevent the said arms from contacting the roll of paper.

3. An anti-wrinkling device for a web of paper being wound upon a reel comprising, a reel, an arched spreader bar mounted adjacent the reel, a pivoting frame on which the spreader bar is carried, a pair of counterweights disposed on opposite sides of the frame and connected to act on the side of the pivotal axis of the frame remote from the spreader bar mounted to urge the frame in a direction away from the center of the reel to press the spreader bar against the web of paper and crown it outwardly, and means supported by the frame for preventing the spreader bar frame from contacting a roll of paper being formed on the reel.

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