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C. E. ARCHBALD

WEB TREATING MACHINE

Filed July 9, 1923

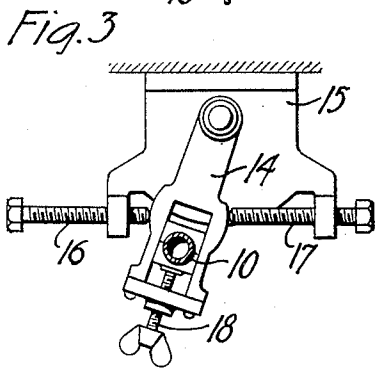
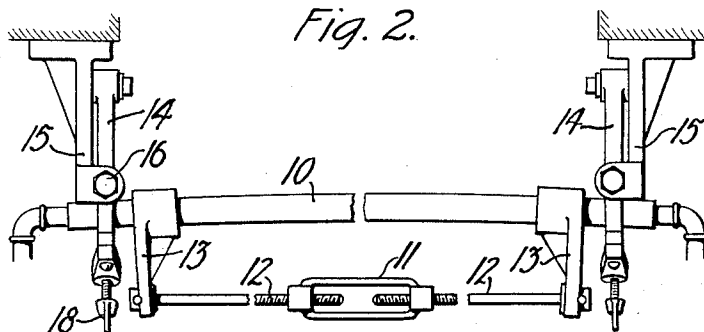
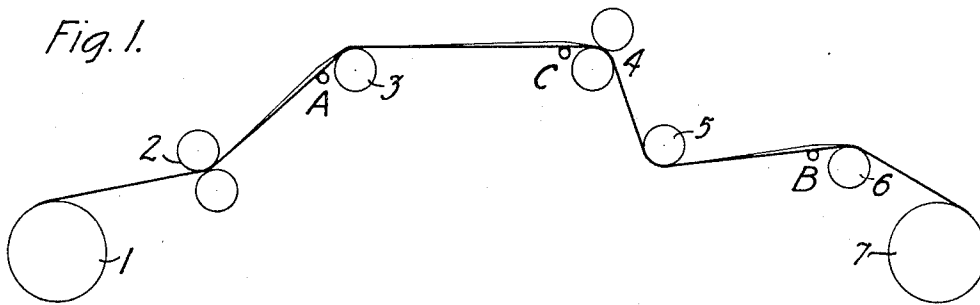
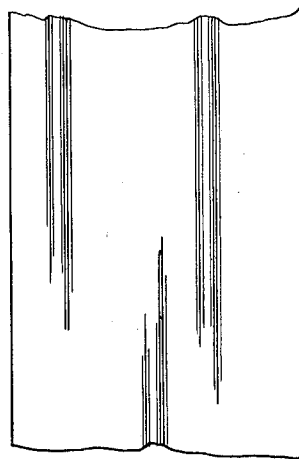


Fig. 4.



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UNITED STATES PATENT OFFICE.

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WEB-TREATING MACHINE.

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To all whom it may concern:

Be it known that I, CHARLES E. ARCHBALD, a citizen of the United States, and resident of New Brunswick, New Jersey, have invented certain new and useful Improvements in Web-Treating Machines; and I do hereby declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and to the reference numerals marked thereon.

My present invention relates to that class of machines in which webs of material, such as cloth or paper, are treated or processed, and it has for its object to provide a device that will obviate the loss due to the formation of wrinkles or overlaps occurring in the web on the feed rolls.

In web-treating machines, especially those in which the web is heavily printed, or coated in such a way that there is a tendency to absorb an excessive amount of moisture, and on those machines operating on thin and delicate fabrics, or on the thinner grades of papers, even when such tissue are merely being re-wound, it is necessary to control the movement of the various feed rolls so as to avoid tensioning the web itself between the various processing rolls, or between the various feed rolls, as such tensioning causes the formation of longitudinal waves due to the stretching of the web, and as these will vary throughout the length of a web, it frequently happens that in spite of the watchfulness of the operator these waves or ripples will mount or roll and cause an overlap of the material or create streaks, resulting in an imperfection in a pattern that may be printed or in a surface coating that is being applied. Such imperfections are a source of loss and in order to reduce this possibility to a minimum it is customary, as before mentioned, to design the machines to avoid, so far as possible, the placing of the web under tension between two points and to govern the speed at such a rate that the web will not flap or wave between two adjacent processing rollers or pairs of feed rolls. To obviate this, it is sometimes necessary to arrange such rolls closer together than is really desirable, or to supply extra pairs of feed rolls. These difficulties I am able to over-

come by the provision of means for stretching the web transversely, proportionally to the amount it may be stretched lengthwise, or the amount the web may expand due to the absorption of moisture, at a point in front of the point where the web engages a roll, thereby causing the web to pass into contact with the roll without any puckers or transverse waves.

Another feature of my invention is to provide certain features of adjustability to the transverse stretching device whereby it may be shifted at one or both ends relatively to the path of the web and to the line of contact of the web with a roll to facilitate the more even feeding of webs, and whereby the extent of the curve or bow imparted to the stretcher itself may be varied to meet different conditions peculiar to different rolls of web material.

In the drawings, Fig. 1 is a diagrammatic view of a web-treating or processing machine illustrated for the purpose of showing several different locations in which stretching devices embodying my invention may be utilized. Fig. 2 is a side elevation of the stretching device. Fig. 3 is a side view showing one of the end-supporting brackets, and Fig. 4 is a fragmentary view of a short length of web material, illustrating the ripples which extend transversely thereof in the stretches between rolls during its passage through the machine.

The diagrammatic view, Fig. 1, shows a web-treating machine in which the web passes from the supply roll 1 between a pair of rolls 2, one or both of which may be a printing roll or a coating roll for applying sizing or any other substance, after which the web is led over a supporting roll 3; thence between a pair of feed or tension rolls 4 and around other rollers 5 and 6, and to the re-wind on the arbor 7. In machines of this character, it is customary to drive all of the various rolls, but as this is well understood, illustration of these details of the apparatus has been omitted. In a machine of this character, the web, be it fabric or paper, after it is treated by the processing rolls 2, absorbs moisture and the fibres thereof expand, adding slightly to the normal width of the web. The corresponding lengthwise expansion of the web may be

compensated for by the tension on the web caused by the action of the rolls of the machine over which it subsequently passes, but in all such machines with which I am familiar, it is customary to run the rolls slow enough to allow the web to take care of its lateral expansion by crowding itself outwardly at its edges when it comes in contact with the next roll. Besides this lateral expansion due to the absorption of moisture, another difficulty that may be mentioned in operating machines of this character is that due to tensioning even when there is no moisture applied to the web. There are many processes in which the webs must be held under tension and in so doing the pull imparted longitudinally causes ripples or transverse waves because no means is provided for applying an equal tension in a transverse direction. Due, I believe, to the fact that rolls of web material vary imperceptibly in texture, or composition, it frequently happens that this failure to laterally stretch the material commensurate with the pull, or, in the case where the material absorbs moisture commensurate with its lateral expansion, it has been my experience that with a single roll of material, especially the lighter weights of papers, such as tissues, the fullness immediately in front of a roll will cause it to wrinkle as it comes into contact therewith. This is particularly so where it is necessary to provide a sufficient length or stretch to enable the coating to dry or set before coming into contact with the roll.

The means I have provided for effecting this desired transverse stretching of the web material comprises a surface that engages the web and is so shaped that it displaces or bows it uniformly from one edge to the other. In order that the surface may be varied as occasion requires, to belly the web to a greater or less extent, I preferably use a bar 10 and flex it by means of a turnbuckle 11, the tension rods 12 of which are secured at their ends in the lower extremities of brackets 13 rigidly secured to the bar 10 near its opposite ends, as shown in Fig. 2. One of these devices may be located in front of any roll, for instance, in front of the single rolls 3 and 6 as indicated at A and B, and also in front of the pair of feed rolls 4, as indicated by C in Fig. 1.

In the use of a device of this character certain additional advantages may also be secured by mounting it in an adjustable manner whereby its angular position to the line of contact of the web on the roll may be varied. This is often desirable inasmuch as webs vary along their edges, and frequently one edge is longer than the other, or in the treating process one edge stretches more than the other. In carrying out this

feature of my invention, I support the ends of the bowed stretcher 10 in swinging arms 14 pivoted to brackets 15 that are attached rigidly to the framework of the machine, as will be understood. The arms 14 are swung to position the member 10 as desired with respect to its particular roll by means of opposing thumb-screws 16 and 17 carried on the bracket, and in order to provide a further angular adjustment of said member, I provide the arms 14 with slotted ends and thumb-screws 18, thus permitting the two ends of the member 10 to be adjusted independently in a vertical direction as occasion may require.

In machines having a plurality of processing rolls, or those in which a plurality of feed rolls are employed, I may utilize one of the devices embodying my invention in front of each of said rolls, as in so doing I am able to maintain a perfect tension on the web at all points and thus enable a given machine to be run at a higher rate of speed and to produce a greater output.

In certain web-treating processes it is advantageous to maintain the coating applied in a heated condition and in others to cause it to be chilled at certain stages in the operation, and to this end I have shown the rod 10 as being tubular and fitted with piping connections through which hot water, steam, or cold water may be passed.

I claim as my invention:

1. A web controlling device for web-treating machines comprising a flexible member, means for bowing it and means supporting the two ends of the member for independent universal adjustment.

2. A web controlling device for web-treating machines comprising a flexible member located to engage the web adjacent a web carrying roll of the machine, means for bowing said member, journals supporting the ends of the member and means for adjusting said journals independently toward and from and vertically relatively to the axis of the web carrying roll.

3. A web controlling device for web-treating machines comprising a flexible member located to engage the web adjacent a web carrying roll of the machine, journals supporting the ends of the member, pivoted arms on which the journals are adjustable, means for adjusting said arms toward and from the axis of the web carrying roll and tensioning devices operating on the member between the journals for bowing said member.

4. A web controlling device for web-treating machines comprising a flexible member located to engage the web adjacent a web carrying roll of the machine, journals supporting the ends of the member, pivoted arms on which the journals are adjustable, means for adjusting said arms independ-

ently toward and from the axis of the web carrying roll, arms carried by the member adjacent its ends and an adjustable tension device acting on the arms to bow said member. 5

flexible member, devices separately supporting each end of the member for universal adjustment, adjustable tension devices acting on the member adjacent its ends to bow it and piping connections attached to the ends of the member. 10

5. A web controlling device for web-treating machines comprising a hollow

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