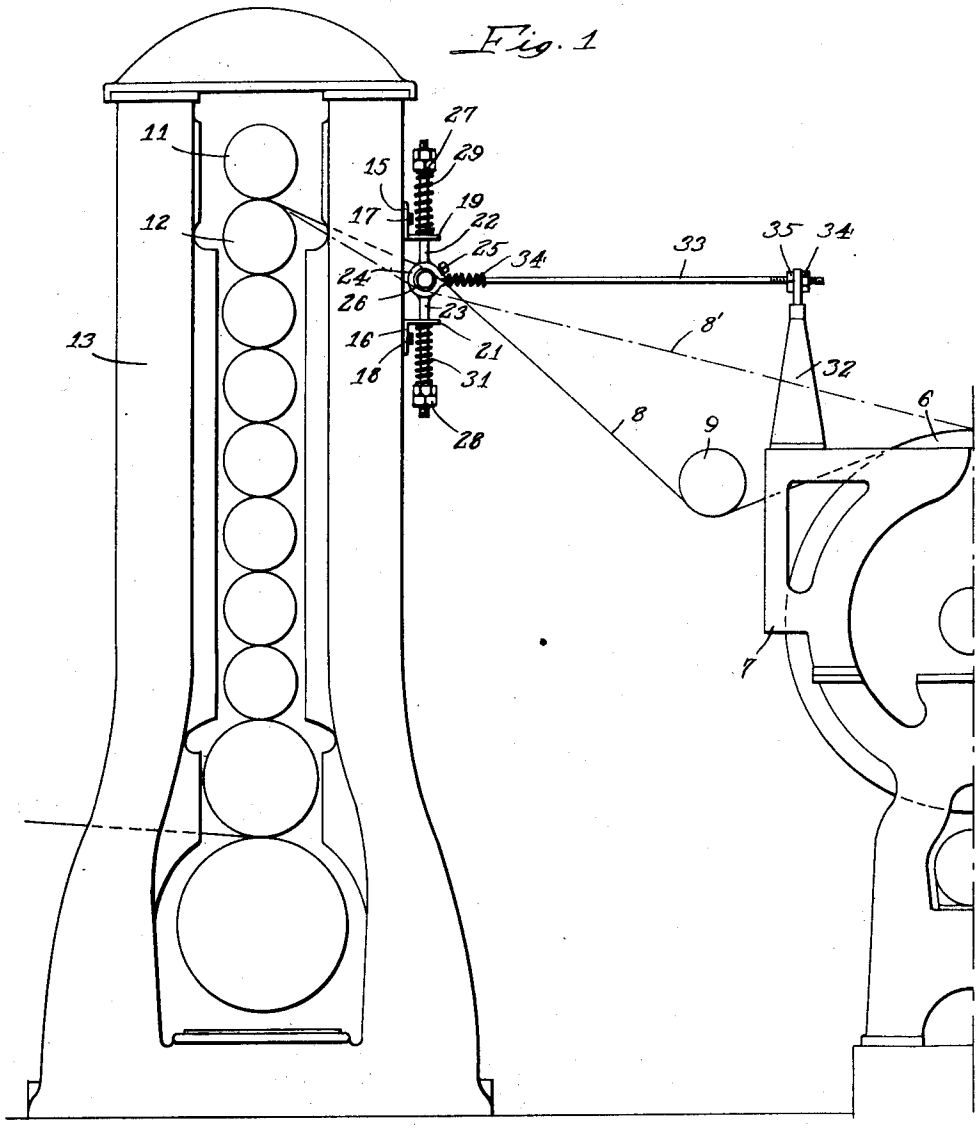
Feb. 7, 1933. J. R. SIMPSON 1,896,205

SPREADER

Filed June 8, 1931 2 Sheets-Sheet 1

Fig. 1



Inventor:
James R. Simpson
By
Wilson, Dowell, McCanna & Rehm
Attys.

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SPREADER

Filed June 8, 1931 2 Sheets-Sheet 2

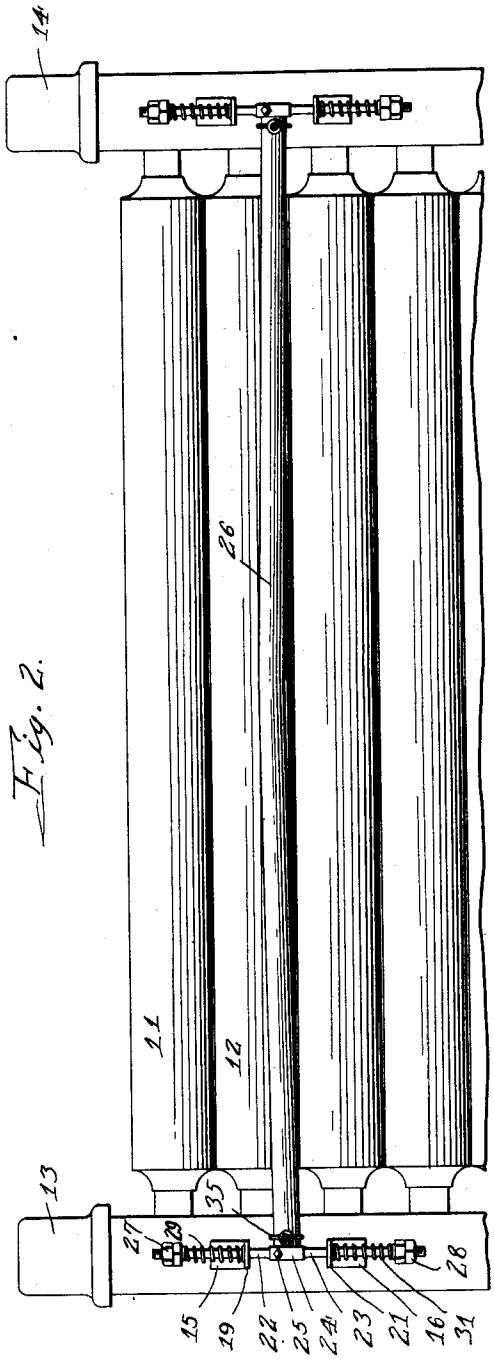


Fig. 2.

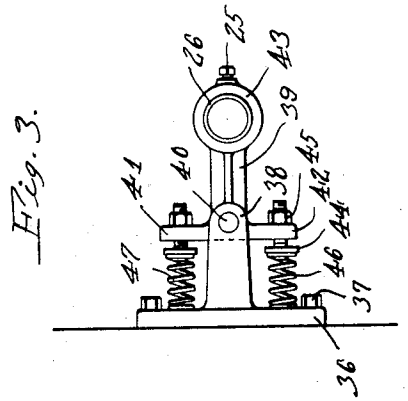


Fig. 3.

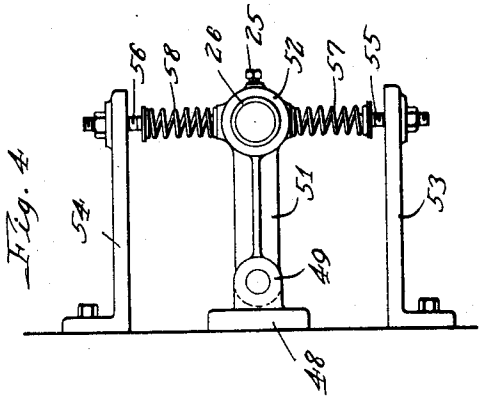


Fig. 4.

Inventor:
James R. Simpson

By
Wilson, Dowell, McCanna & Rehm
Attys.

Patented Feb. 7, 1933 1,896,205

UNITED STATES PATENT OFFICE

JAMES R. SIMPSON, OF WISCONSIN RAPIDS, WISCONSIN

SPREADER

Application filed June 8, 1931. Serial No. 542,873.

This invention relates to paper making machines and has particular reference to a spreader for guiding the paper sheet from the drier rolls into the calender rolls.

Considerable difficulty has been experienced in the past in feeding the paper sheet from the drier rolls into the calender rolls. One of the major difficulties is due to the fact that as the sheet passes into the calender rolls there is a tendency for the paper to fold over upon itself and form small folds, thus producing what is termed calender cuts. This, of course, produces a defective sheet and is to be avoided, if possible. Another difficulty is the fact that ordinarily a certain amount of back-lash exists in the drier roll gears, as a result of which there are sudden fluctuations in the tension and the rate of speed of the sheet emerging from these rolls. Because of these variations a certain amount of slack will periodically develop in the sheet between the last drier roll and the first calender, thereby further complicating the problem of satisfactorily guiding the sheet into the calender rolls. In some instances, a resiliently supported roll has been provided at the end of the drier, for the purpose of maintaining the sheet taut between the drier and the calender. However, the operation of this roll has been far from satisfactory, principally because of its necessary weight and inertia. The operation of the roll has not been sufficiently sensitive to respond to sudden variations in the speed of the sheet as a result of which the sheet has frequently been snapped off when these changes in speed occur.

Therefore, I have aimed to provide a spreader which tends to automatically hold the proper tension in the paper sheet as it passes into the calender rolls.

Another object of the invention is the provision of spreader mechanisms having automatic means for compensating for the change in the tension of the sheet.

A still further object of the invention is the provision of spreader mechanism provided with means for adjustment to accommodate sheets of different weight.

I have also aimed to provide an automatic spreader having an adjustable spreader bar of light weight material for guiding the sheet into the calender rolls and resilient means for supporting said bar to compensate for back-lash in the drier gears.

Other objects and attendant advantages will become apparent to those skilled in the art from the following description and the accompanying drawings in which—

Figure 1 is a side elevation of the end of a dried and cooperating calender stack showing one form of my invention;

Fig. 2 is a fragmentary front view of a calender stack showing one form of my invention secured to the stack frame;

Fig. 3 is an end view of a second form of my invention showing an alternative method for supporting the spreader bar; and

Fig. 4 is an end view showing a still further method of supporting the spreader bar.

In a general way, the present invention involves the provision of a spreader bar, preferably in the form of a light weight metal pipe, bent through a small angle equi-distant between its ends, and supported at its ends for yieldable vertical movement. Means are provided for permitting axial adjustment of the position of the bar in its support to accommodate sheets of different weight. Referring first to Fig. 1, the numeral 6 designates a conventional drier roll supported upon a frame 7, the portion shown in the drawing being one end of a conventional drier. In one practice of the invention the sheet of paper 8 being treated passes from the drier roll 6 under a small fixedly positioned roll 9 and between the upper two rolls 11 and 12 of a conventional calender stack, the calender rolls being rotatably supported in frames 13 and 14. The use of a roll 9 is not, however, necessary, and in some machines it may be desired to omit this roll and to pass the sheet of paper directly from the drier roll 6 to the calender rolls in the manner shown by the dot and dash line 8′. At a suitable position intermediate the drier and the calender rolls the sheet of paper engages a spreader bar of my invention, as will be presently more fully described.

Resilient spreader bar supporting means

are provided on each of the frames 13 and 14, each consisting of brackets 15 and 16, which are secured to the frames by means of cap screws 17 and 18, the brackets being positioned with the flanges 19 and 21 thereof in vertically spaced relation. The flanges 19 and 21 are provided with coaxial openings to receive rods 22 and 23 connected together between the flanges 19 and 21 to form a collar 24, the rods 22 and 23 and the collar 24 being preferably formed in a unitary structure. A cap screw 25 passes through the collar 24 and is adapted to engage a spreader bar 26.

Nuts 27 and 28 are threaded on the outer ends of the rods 22 and 23 and springs 29 and 31 are positioned on the rods 22 and 23 between the flanges 19 and 21 and the nuts 27 and 28, respectively. It will be seen that the collar 24 is free to move upward or downward against the pressure of the springs 29 and 31 when sufficient force is exerted thereon to overcome the pressure of these springs. This provides a resilient or yieldable mounting for the spreader bar 26.

The spreader bar 26 is secured at its opposite ends in the collars 24 in any desired axial position by means of the cap screws 25. The spreader bar may advantageously consist of a pipe of light weight material, such for example as aluminum or light weight aluminum alloys, and is bent through a small angle at a point substantially equidistant from its ends as shown in Fig. 2.

A pair of brackets 32 are fixed to the frame 7 of the drier opposite each end of the spreader bar 26 and serve to support rods 33 fixedly and adjustably secured thereto by means of nuts 34 ad 35 threaded on the end of the rods 33. Compression springs are supported on the free ends of the rods 33 and bear against rings 35 on the spreader bar 26, the springs resiliently maintaining the rods 22 and 23 against lateral movement in the brackets 15 and 16.

The spreader bar 26 and the mountings are positioned upon the frames 13 and 14 above the plane connecting the lower edge of the roll 9 and the contacting edges of the rolls 11 and 12 of the calender, so that the sheet 8 will be caused to pass through a small angle in passing over the spreader bar 26 thereby exerting a certain pressure on the spreader bar and slightly compressing the upper springs 29 of the spreader bar support. It will be seen that by adjusting the axial position of the spreader bar 26 in the collars 24 the paper sheet will be caused to exert a greater pressure on the center of the spreader bar, thereby giving the sheet a greater tension at its center than at its edges. By suitably adjusting the axial position of the spreader bar 26 this tension may be adjusted as desired depending upon the weight of the paper. This causes the center of the sheet to enter the calender rolls under a greater tension than the edges of the sheet whereby any irregularities in the sheet will be ironed toward the edge, preventing the formation of calender cuts. Because of the light weight of the spreader bar 26 and its yieldable support the bar serves not only to properly spread the paper for its passage between the calender rolls but also to compensate for the relatively rapid changes in speed of the paper sheet due to back-lash in the drier rolls. Because of its light weight and very resilient support, it responds very readily and rapidly to slight changes in the speed of the paper. Referring now to Fig. 3, I have shown alternative means for supporting the spreader bar 26 upon the flanges 13 and 14. Each of these mountings consists of a bracket 36 secured to the frame by means of cap screws 37 having spaced ears 38. An arm 39 is pivotally supported between the ears 38 on a bolt 40 and is provided with oppositely projecting upwardly and downwardly projecting portions 41 and 42 and a collar 43 adapted to support the spreader bar 26 which is adjustably secured therein by means of the cap screw 25. A foot 44 is adjustably secured in each of the portions 41 and 42 by means of a nut 45, the springs 46 and 47 acting between the bracket 26 and each of the feet 44 to resiliently maintain the arm 39 in substantially a horizontal position. It will be seen that downward pressure on the spreader bar 26 will cause the spring 46 to be compressed and the arm 39 rotated about its pivotal point 40.

Another alternative method for supporting the spreader bar 26 is shown in Fig. 4. each of the frames 13 and 14 is provided with a bracket 48 having spaced ears 49 adapted to pivotally support an arm 51 having a collar 52 which adjustably supports the spreader bar 26. Brackets 53 and 54 are secured to the frames above and below the bracket 48 and are provided with threaded feet 55 and 56 at the outer end thereof. Springs 57 and 58 act vertically between the brackets 53 and 54 and the arm 51, thereby resiliently supporting the arm 51 in substantially a horizontal position. However, changes in the forces acting on the spreader bar 26 permit movement thereof against the action of the springs 57 and 58, the spreader bar 26 being thus resiliently or yieldingly supported.

The many advantages of my improved construction will doubtless have become apparent to those skilled in the art. Because of the light weight of the spreader bar and the resilient manner in which it is mounted, it serves to compensate for back-lash in the drier rolls without danger of snapping off the sheet as it passes from the drier to the calender. The axial position of the spreader bar may be adjusted with facility to vary the manner in which the sheet enters the

calender rolls, to accommodate different weights of paper, the device serving to efficiently and economically guide the sheet between the driers and the calender of a paper machine.

While I have thus described and illustrated a specific embodiment of my invention I am aware that numerous alterations and changes may be made therein without materially departing from the spirit of the invention and the scope of the appended claims in which—

I claim:

1. In a paper making machine, a spreader between the drier and the calender adapted to guide the paper sheet between the calender rolls comprising a light weight spreader bar, means for adjustably supporting said bar, and resilient means for maintaining said bar against said paper sheet to hold said sheet taut and compensate for variation in the speed thereof.

2. In a paper making machine, a spreader between the drier and the calender adapted to guide the paper sheet between the calender rolls comprising, a spreader bar bent through an angle equidistant from its ends, means for holding said bar in any desired axial position, and spring means at least partially supporting said bar for maintaining said bar against said paper to hold said sheet taut.

3. In a paper making machine, a spreader between the drier and the calender adapted to guide the paper sheet between the calender rolls comprising, a spreader bar of light weight material bent through an angle equidistant from its ends, means for holding said bar in any desired axial position, and spring means at least partially supporting said bar for maintaining said bar against said paper to hold said sheet taut.

4. In a paper making machine, a spreader between the drier and the calender adapted to guide the paper sheet between the calender rolls comprising, a spreader bar adapted to be supported at its ends, and spring means at each end of said bar adapted to yieldably support said bar, whereby to hold said sheet taut and compensate for back-lash in the drier gears.

5. In a paper making machine, a spreader between the drier and the calender adapted to guide the paper sheet between the calender rolls comprising a spreader bar, supporting members secured to each end of said bar each having vertical upwardly and downwardly projecting rod portions, brackets secured to the calender frame adapted to slidably receive said rod portions, compression springs acting between each of said rod portions and said brackets for yieldably holding said supporting members, and spring means for preventing lateral movement of said bar, said springs permitting vertical movement of said spreader bar to maintain said paper sheet taut and compensate for back-lash in the drier gears.

6. In a paper making machine, a spreader between the drier and the calender adapted to direct the paper sheet between the calender rolls comprising, a spreader bar, means at each end of said bar for pivotally supporting the latter, means for adjusting the axial position of said bar in said last mentioned means and means for resiliently holding said bar against pivotal movement, whereby to maintain said sheet taut beneath said drier and said calender.

7. In a paper making machine, a spreader between the drier and the calender adapted to guide the paper sheet between the calender rolls comprising, a spreader bar, pivotally supported arms fixedly secured to each end of said spreader bar, means for adjusting the axial position of said bar in said arms, and compression springs acting against opposite sides of each of said arms for resiliently holding said bar against pivotal movement, whereby to maintain said sheet taut and compensate for back-lash in the drier gears.

8. In a paper making machine, a spreader between the drier and the calender adapted to guide the paper sheet between the calender rolls comprising, a spreader bar, arms fixedly secured to opposite ends of said bar, means for pivotally supporting said arms upon the frame of the calender, brackets secured to said frame above and below said arms, and compression springs acting between said brackets and said arms for yieldably supporting said arms in substantially horizontal position whereby to hold said sheet taut and compensate for back-lash in the drier gears.

9. In a paper making machine, a spreader between the drier and the calender adapted to guide the paper sheet between the calender rolls comprising, a spreader bar, arms secured to opposite ends of said bar each having upwardly and downwardly extending portions, means for pivotally supporting said arms, and spring means acting against the upwardly and downwardly projecting portions for resiliently holding said arms against pivotal movement, whereby to maintain said sheet taut and compensate for back-lash in the drier gears.

10. In a paper making machine, a spreader between the drier and the calender adapted to guide the paper sheet between the calender rolls comprising a spreader bar, arms secured to opposite ends of said bar each having upwardly and downwardly extending portions, and means for adjusting the axial position of said bar in said arms.

In witness of the foregoing I affix my signature.

JAMES R. SIMPSON.