

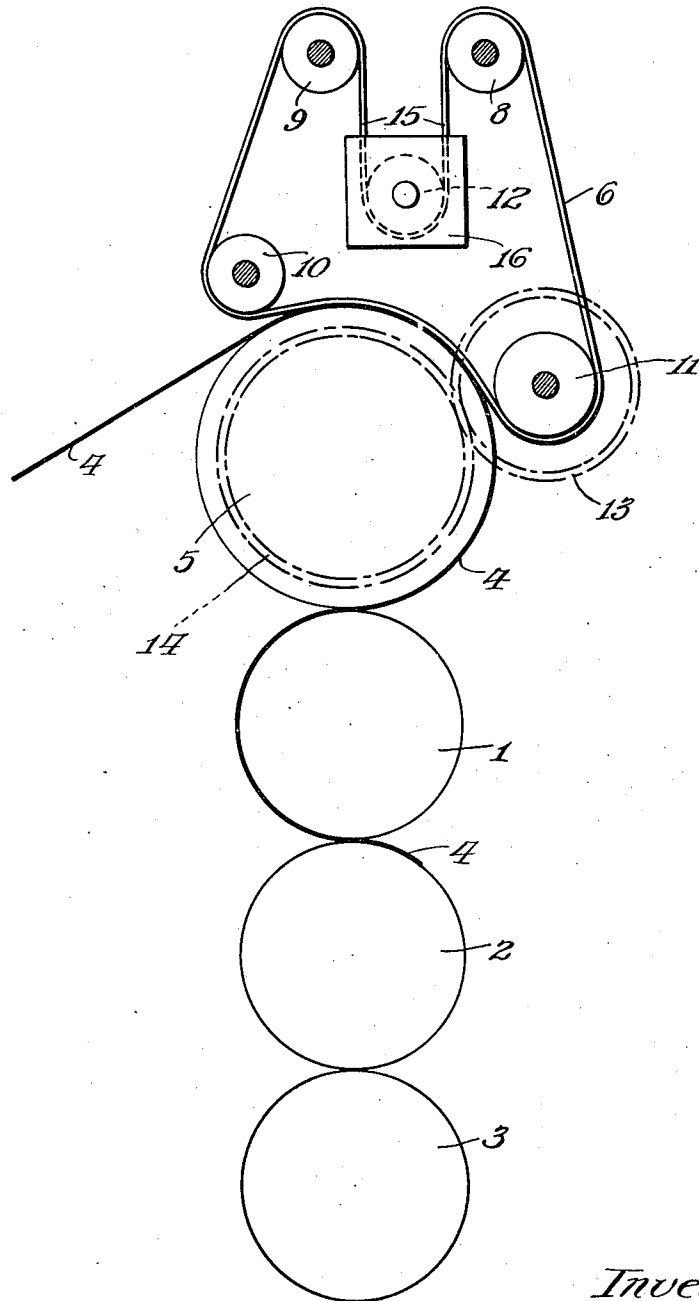
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WEB PROCESSING MACHINE

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WEB PROCESSING MACHINE

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3 Claims. (Cl. 271—2.3)

This invention relates to web processing machines and has for its object to provide a new and improved machine of this description. The invention has as a further object to provide means for securing a uniform tension on the web of the roll being operated on. The invention has other objects which are more particularly pointed out in the accompanying description.

Referring now to the drawing, the figure is a view showing one form of device embodying the invention.

Like numerals refer to like parts throughout the specification and drawing.

In web processing machines the paper is wound from one roll on to another and the paper web must be under tension, and this tension should be uniform. In apparatus heretofore used, for example, it has been attempted to secure the proper tension on the web by applying a brake or friction device to the shaft of the roll from which the web is being unwound. This braking device does not produce a uniform tension on the web because, as the roll decreases in diameter, the speed of the shaft of the roll on which the brake acts increases, and this causes a non-uniform tension on the web. A uniform tension on the web is necessary so that there will be no wrinkles in the paper as it is wound. It is further found that the minimum amount of tension necessary to eliminate wrinkles varies with the characteristics of the paper material, and also with the same paper material the farther the web holding device is away from the processing machine rolls. The speed of the web is also a factor in governing the amount of tension. It is also undesirable to have any tension above the minimum tension required to prevent wrinkles. A varying tension also causes a slight side movement of the web which is undesirable. It is important to keep the tension on the web as small as possible so that there will be a minimum tendency to break the web. This also uses less power.

The device here illustrated does produce a uniform tension on the web of the roll and also the minimum tension, and can secure furthermore the desired adjustment required. In this device I have shown the rolls 1, 2, and 3, for example, of the processing machine which process the paper. These rolls are rotatably supported. The web 4 running to the process rolls passes around a roll 5 which is in proximity to the roll 1 and which does not change in diameter. This roll may be formed in any desired manner to secure this result.

To secure the proper tension a series of belts are provided. These belts pass around pulleys 8, 9, 10, 11, and 12, all of which may be idler pulleys except one, which is a driven pulley. In the particular construction illustrated the pulley 11 is a driven pulley, and the pulleys are so located in position that the belts engage the web 4 of the paper as it passes around the roll 5. The pulley 11 is connected to the roll 5 by means of a gear 13 which engages a gear 14 on the roll 5.

The pulley 11 may be driven in any desired manner, but the mechanism is simplified by driving it from the constant diameter roll 5 through the gears 14 and 13. The belts are provided with means for securing the desired tension thereon so that the desired pressure will be applied to the web of paper passing over the roll 5. In the construction shown this is secured by providing the belts between the pulleys 8 and 9 with loops 15, the pulleys 12 being supported only by the loops of the belts, and then applying a weight 16 to these pulleys 12. It will be seen that these weights pull the belts taut and give them a uniform tension. The belts may be driven at desired speed but preferably at a speed somewhat slower than the speed of the web 4. These belts, therefore, rub on the web 4 as it passes over the constant diameter roll 5, applying at all times a uniform pressure and engaging at all times the same length of the web of paper. When so constructed there is no unsupported length of web between the tension device and the nip of the processing roll. The web is therefore drawn smoothly about the processing roll and enters the nip without wrinkles, and the friction required to produce this is therefore at a minimum. Breaks in the web are greatly reduced, because even if the tension were the same as it would be with a length of unsupported web, the fact that the web is supported reduces the possibility of breaks. Furthermore, since there are a plurality of belts to produce the tension if the web breaks between the back stand and processing machine, the belts prevent folding over of the web where it is broken as would be the case when these belts are not used. When the processing rolls are of a soft nature, this folding over of the web on a break, marks the soft rolls and these marks have to be removed before the processing machine can be used again.

This roll of constant diameter 5 may be used both as a processing roll and as the constant diameter roll to which the belts are applied in order that the distance between the tension device and the processing machine may be a minimum. The

constant diameter roll, however, may if desired be a roll in addition to the rolls of the processing machine.

If it is desired to have different speeds of the belts for different webs of paper, that is for webs of different quality or make up, it is only necessary to drive the pulley 11 at a different speed, that is at the speed required, and then maintain this speed uniform while this web is passing beneath the belts.

It has been found that this device has certain advantages, among which may be enumerated the fact that it decreases liability of breaks in the web, due to the fact that the tension is less, and that it prevents damage to soft processing rolls in case there is a break between the back stand and the rolls. It sometimes happens that the rolls are imperfect in that the web is weakened by being thinned or for other reasons and it permits the use of web rolls which are imperfect which if used with a device requiring tension in the unsupported web would require sufficient tension to break the web where it is unsupported. That is to say, by means of applicant's device web rolls which are imperfect may still be properly wound, because the web is supported at the point where the pressure is applied. If it were not thus supported as in the present device the web would break. It also maintains a substantially uniform tension, regardless of the diameter of the web roll, and therefore no adjustments are necessary as the web roll unwinds.

In minimizing the breaks in the web the productions of the processing machines are materially increased, both through reducing the time required for the web to pass through the machine, and also by enabling the use of higher speeds.

I claim:

1. A web processing machine comprising processing rolls, one of said processing rolls being of

a constant diameter and over which the web of paper passes, a plurality of belts engaging the web as it passes over said constant diameter roll, said belt being continuous and each passing over a plurality of pulleys, a driving connection between said roll of uniform diameter and one of the pulleys of said belts for driving said belts at a speed lower than the speed of the web which the belts engage, and means for applying a uniform pressure of said belts upon said web at the point where it contacts with the belts, whereby a constant tension is applied to said web.

2. A web processing machine comprising a roll of constant diameter over which the web being processed passes, a plurality of belts engaging the web as it passes over said roll of constant diameter, means for driving said belts at a speed slightly lower than the speed of the web which the belts engage, and means for applying a constant pressure between the belts and the web of paper, whereby a constant tension is applied to said web.

3. A web processing machine comprising processing rolls, one of said processing rolls being of a constant diameter and over which the web of paper passes, a plurality of belts engaging the web as it passes over said constant diameter roll, to each of said belts being continuous and each passing over a plurality of pulleys, driving means for said belts for driving said belts at a speed lower than the speed of the web which the belts engage so that the belts move at a lower speed than the speed of the web, the belts being looped between two of the pulleys, the loops being located above the roll of constant diameter, pulleys in said loops about which the belts pass, and weights applied to said pulleys by means of which a constant pull is applied to the web passing over the roll of constant diameter and to a constant link of said web, whereby a constant tension is applied to said web.

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