March 21, 1933. J. A. LOWE 1,902,713

MACHINE FOR PASTING WEBS OF PAPER TOGETHER

Filed June 21, 1930 3 Sheets-Sheet 1

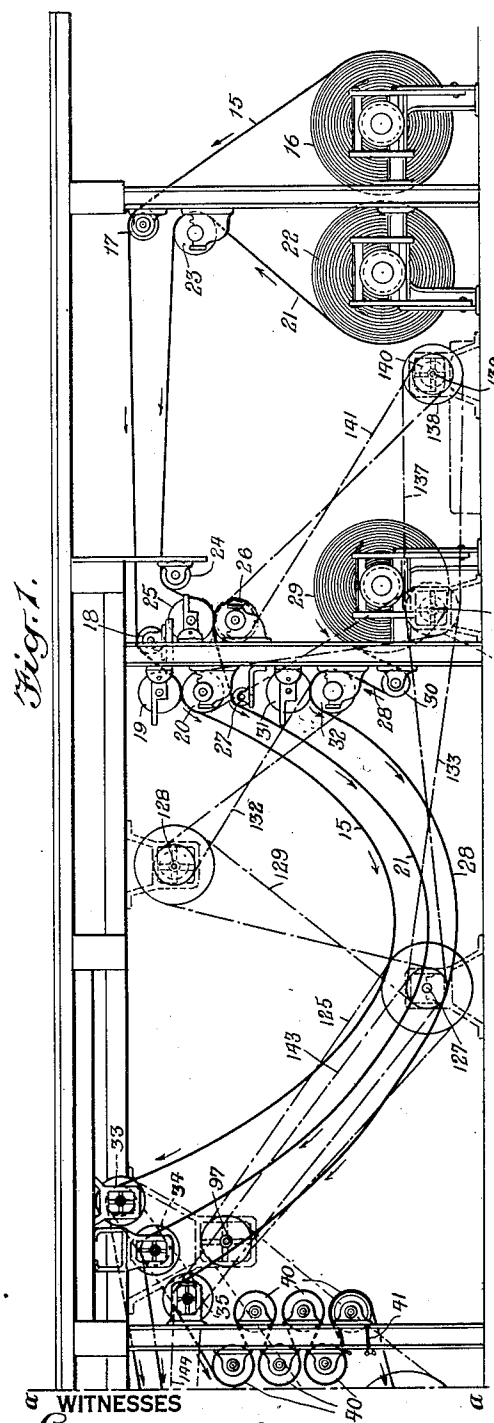


Fig. 1.

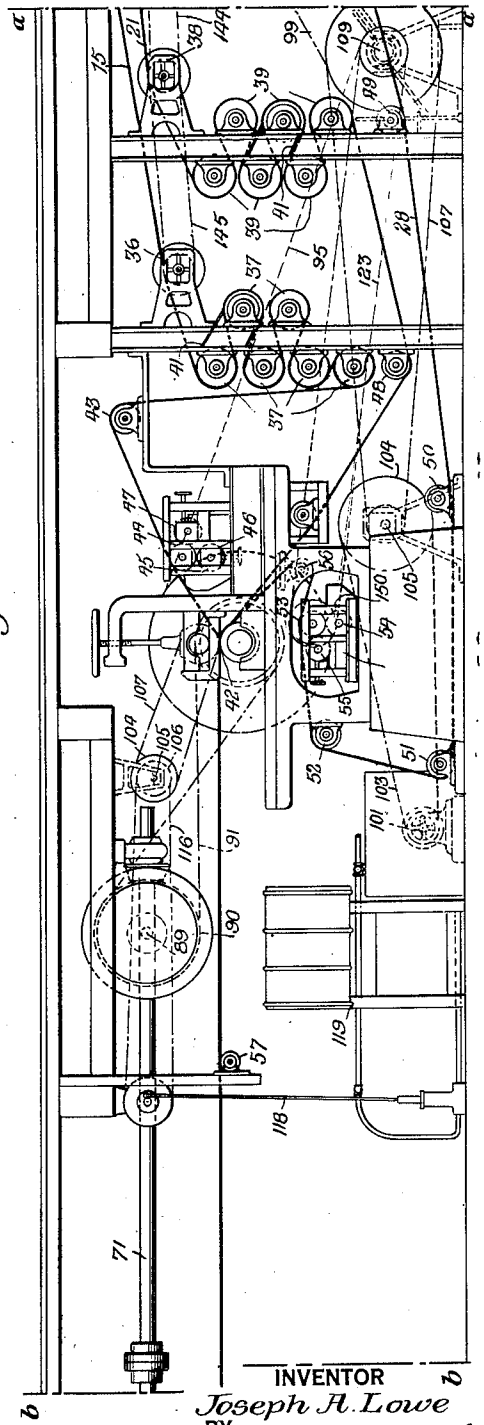


Fig. 2.

WITNESSES

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MACHINE FOR PASTING WEBS OF PAPER TOGETHER

Filed June 21, 1930 3 Sheets-Sheet 2

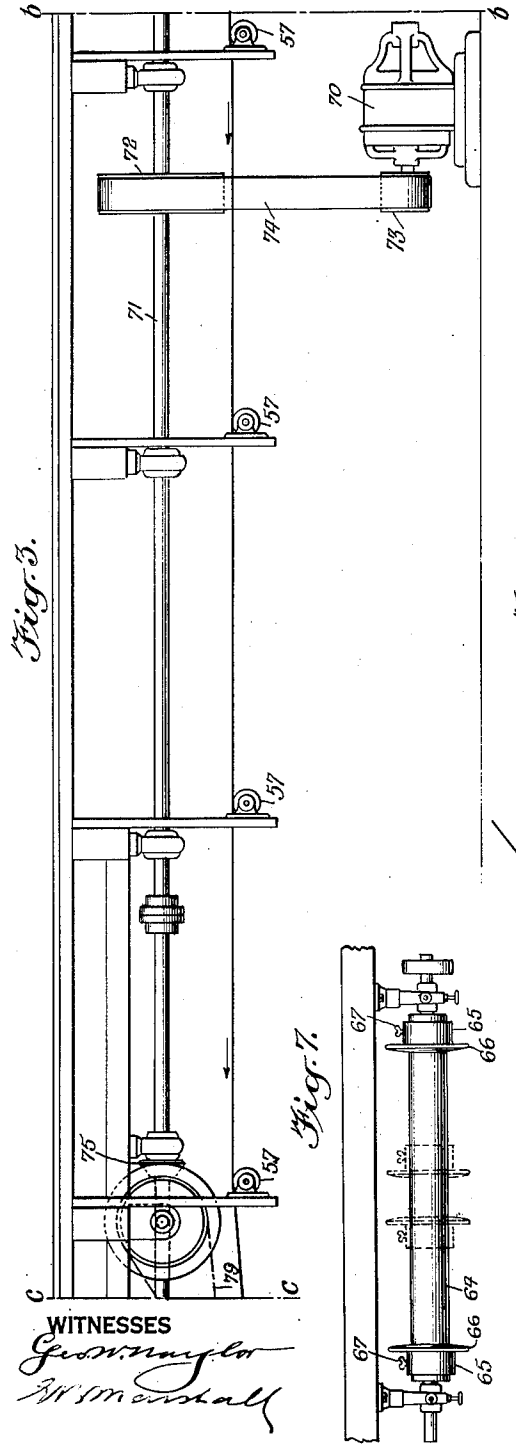


Fig. 5.

Fig. 7.

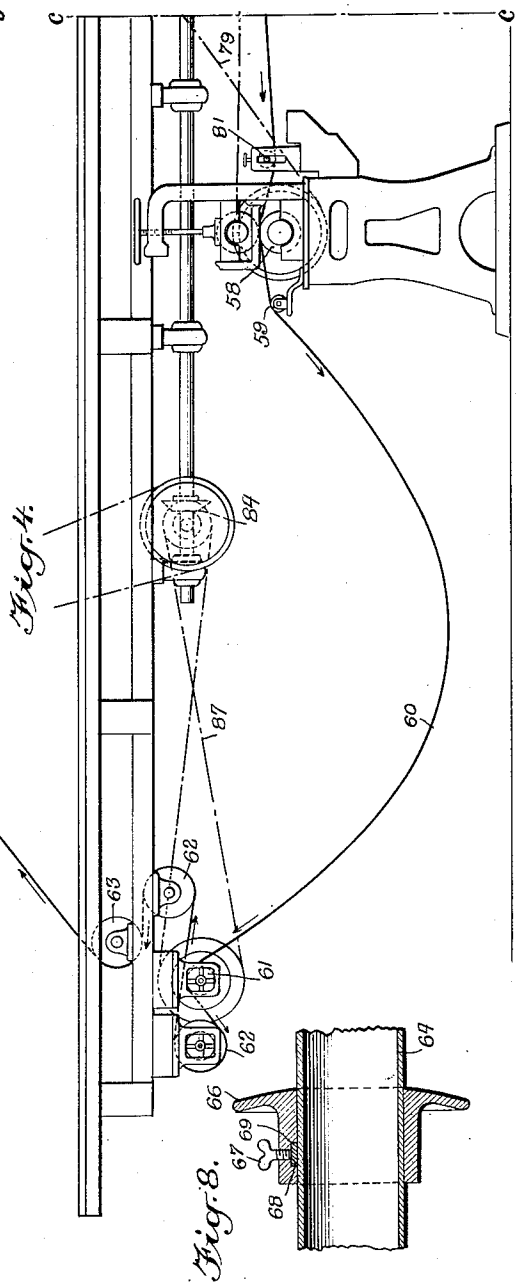


Fig. 4.

Fig. 8.

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MACHINE FOR PASTING WEBS OF PAPER TOGETHER

Filed June 21, 1930 3 Sheets-Sheet 3

Fig. 5.

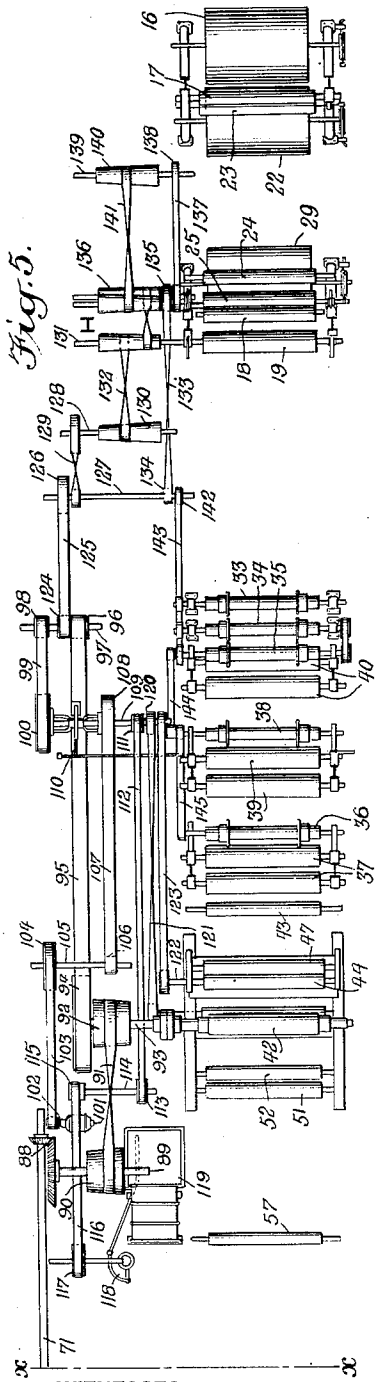


Fig. 6.

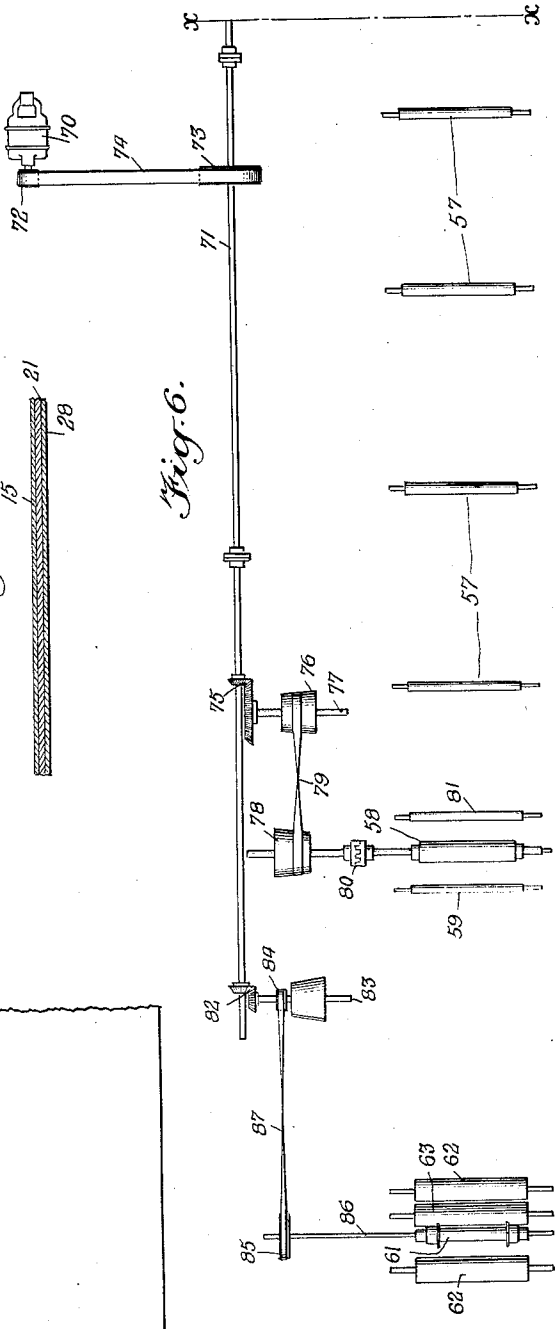


Fig. 10.

Fig. 9.

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UNITED STATES PATENT OFFICE

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MACHINE FOR PASTING WEBS OF PAPER TOGETHER

Application filed June 21, 1930. Serial No. 462,847.

The invention comprehends a method of making a pasted blank by pasting a plurality of webs of paper together, any one or all of which have been previously coated and calendered, the completed blank being cut into sheets.

The invention further comprehends a method of manufacturing a pasted blank in which the webs of paper are merely run over rolls a distance between the pasting means and the cutting means and without the employment of hot driers.

The invention further comprehends a method of manufacturing a pasted blank in which the webs of paper are lined up by festooning and guiding, in which adjustable drum guides are employed, the webs of paper being held in line and under tension by a series of wrap rolls, some of which are connected with friction drums.

The invention furthermore comprehends a machine which may be used in connection with the manufacture of pasted blanks in accordance with the method described.

The invention furthermore comprehends an adjustable drum guide for lining up the paper.

Another object of the invention is the provision of means to operate the machine and separate means for operating the pasting means which may be operated by or independently of the means for operating the machine.

Additional objects of the invention will appear in the following specification in which the preferred form of the invention is described.

In the drawings similar reference characters refer to similar parts in all the views, of which

Figure 1 is a side elevation showing the machine from the right to the left on the line *a—a*,

Figure 2 is a side elevation of the machine from the line *a—a* to the line *b—b*,

Figure 3 is a side elevation of the machine from the line *b—b* to the line *c—c*,

Figure 4 is a side elevation of the machine from the line *c—c* to the line *d—d*,

Figures 5 and 6 are plan views showing the means for driving the machine,

Figure 7 is an enlarged elevation showing one of the guide rolls,

Figure 8 is an enlarged fragmentary view showing the guide means on the guide roll illustrated in Figure 7,

Figure 9 is a plan view showing the sheet of paper formed by three webs, and

Figure 10 is a sectional view of the sheet of paper illustrated in Figure 9.

In the manufacture of paper from pasted stock it has been customary to paste webs of paper together, dry the sheets of paper formed thereby and subsequently finish the completed sheets, either by running the sheets through rolls or super-calenders, or by finishing the sheets in so called plate calenders, the sheets being interposed between zinc plates and being run between steel rolls. In the present invention one or more, and preferably the outer webs of paper are super-calendered before the webs of paper are pasted together and after the webs of paper are pasted together to form the sheets the manufacture is completed and the sheets may be cut as desired. A new machine is illustrated in the drawings for carrying out the new method of manufacture.

In the drawings there are shown three webs of paper which are manufactured into a single sheet, but it will be understood that two, three or more webs of paper may be used to complete the finished sheets.

By referring to the drawings it will be seen that a web of paper 15 is unwound from the roll 16 and passes over idle rolls 17 and 18 and between nip rolls 19 and 20, the nip roll 20 being driven as indicated in the drawings. A web of paper 21 is unwound from the roll 22 and passes over idle rolls 23 and 24 and between nip rolls 25 and 26, the nip roll 26 being driven as indicated in the drawings, the web of paper then passing over an idle roll 27. A web of paper 28 is unwound from the roll 29, passes under the idle roll 30 and between nip rolls 31 and 32, the nip roll 32 being driven as indicated in the drawings. The three webs of paper 15, 21 and

28 form a festooning arrangement from the nip rolls, which have been described, to guide rolls, the web of paper 15 passing over a guide roll 33, the web of paper 21 passing over a guide roll 34 and the web of paper 28 passing over a guide roll 35. The web of paper 15 passes over another guide roll 36 and around wrap rolls 37. The web of paper 21 passes over another guide roll 38 and around wrap rolls 39. The web of paper 28 passes around wrap rolls 40. These wrap rolls 37, 39 and 40 are preferably covered with felt, one or more of the wrap rolls 37, one or more of the wrap rolls 39 and one or more of the wrap rolls 40 being provided with friction bands 41 so that the webs of paper will be held under tension as they are drawn by the calender rolls 42.

The web of paper 15 from the wrap rolls 37 passes over an idle roll 43 and over a paste roll 44 to the calender rolls 42. This paste roll 44 is fed with paste by the paste feeding roll 45 which is rotated in the paste trough 46, the paste being kept evenly distributed on the paste roll 45 by means of an additional roll 47, the periphery of which engages the paste roll 45. The web of paper 21 passing from the wrap rolls 39 travels under an idle roll 48 and direct to the calender rolls 42. The web of paper 28 passes from the wrap rolls 40 under idle rolls 49, 50 and 51, around an idle roll 52 and over a paste roll 53 which is fed with paste by a paste feeding roll 54 in the paste trough 150, the paste roll 53 engaging another roll 55 which serves to keep the paste evenly distributed on the paste roll 53. The web of paper 28 then passes around an idle roll 56 to the calender rolls 42. It will be seen that the faces of the webs of paper lie freely against the paste rolls and without any member or members engaging the other faces of the webs of paper at the paste rolls which, with the accumulation of paste on the said member or members, would soil the said other faces of the webs of paper.

The calender rolls 42 press the three webs of paper 15, 21 and 28 together and inasmuch as the web of paper 15 has had paste distributed on its lower side and inasmuch as the web of paper 28 has had paste distributed on its side which is uppermost at the calender rolls 42, the three webs of paper 15, 21 and 28 will be pasted together. The pasted sheet of paper will then pass over carrier rolls 57 to calender rolls 58, then over an idle roll 59 where the sheet of paper forms a festooning arrangement 60 before going over a guide roll 61, and then around wrap rolls 62 and 63, passing from the wrap rolls 63 direct to the standard slitter and cutter.

It will be seen from the above that the completed sheet of paper need not be finished or calendered and that the upper surface of the web of paper 15 is, therefore, calendered before passing through the machine, and that the face of the web of paper 28, which is lowermost at the calender rolls 42, is also finished and calendered before passing through the machine. Therefore, in the process of manufacture from the unwinding to the standard slitter and cutter it is unnecessary to finish, heat or calender the paper in any way, the calender rolls 42 and 58 merely serving to press the webs of paper together.

In Figures 7 and 8 of the drawings there is shown one of the guide rolls 33, 34 and 35 which are employed in lining up the paper, each of these guide rolls having a drum 64 with two sleeves 65 thereon, each of the sleeves 65 having on its inner side a guide disc 66, each of the guide discs 66 diverging relatively to each other from the axis of the drum 65. Each of the sleeves 65 has a threaded orifice in which screws 67 are disposed, the screws 67 serving to hold the sleeves with the guide discs 66 in adjusted position on the drums 64. As illustrated in Figure 8 of the drawings the screws 67 may press against curved flat washers 68 which are disposed in recesses 69 in the sleeves 65, these washers 68 pressing against the drum 64. The use of these washers 68 serves to prevent the marking of the drums 64 which might interfere with the guiding of the webs and sheets of paper.

By referring to Figures 5 and 6 of the drawings it will be seen that the driving means for the machine consists of a motor 70 which drives a shaft 71 by means of pulleys 72 and 73 and a belt 74. By means of a gearing 75 a cone-pulley 76 is rotated with its shaft 77, this cone-pulley 76 being connected with another cone-pulley 78 by a belt 79 which rotates the lower of the calender rolls 58. A clutch 80 may be disposed between the cone-pulley 78 and the lower of the calender rolls 58 so that the rotation of the calender rolls 58 may be stopped when desired. It will be noted that a spring roll 81 is disposed in advance of the calender rolls 58 to keep the proper tension in the strip of paper between the calender rolls 58 and the calender rolls 42.

By means of a gearing 82 a shaft 83 is rotated by the shaft 71 and a pulley 84 on the shaft 83 is connected with a pulley 85 on a shaft 86 by means of a belt 87. The guide roll 61 is on this shaft 86 so that this guide roll is positively driven, as well as the lower of the calender rolls 58.

By means of a gearing 88, shown in Figure 5 of the drawings, the shaft 71 serves to rotate a shaft 89 on which there is a cone-pulley 90, this cone-pulley 90 being connected by a belt 91 with a cone-pulley 92 mounted on a shaft 93 which rotates the lower of the calender rolls 42. There is also mounted on this shaft 93 a pulley 94 which is connected by means of a belt 95 with a pulley 96 mounted on a shaft 97. There is also another pulley 98 on

the shaft 97 and this pulley 98 is connected by means of a belt 99 with a pulley 100. There is another slow speed motor 101 which has a pulley 102 connected by a belt 103 with a pulley 104 on a shaft 105. There is another pulley 106 on this shaft 105, and this pulley 106 is connected by a belt 107 with a pulley 108. A shaft 109 may be rotated by means of the pulley 100 or the pulley 108, its control being regulated by a clutch 110. During the ordinary operation of the machine the shaft 109 is rotated by the pulley 100 and this shaft 109 by means of a pulley 111 and a belt 112 is connected with a pulley 113 on a shaft 114 which serves to rotate the said shaft 114 on which is mounted a pulley 115, this pulley 115 being connected by a belt 116 with a pulley 117, the pulley 117 operating pumping means 118 which serves to feed the paste, which is preferably silicate of soda, from a source of supply 119 to the paste troughs. The pulley 120 on the shaft 109 is connected by means of a belt 121 with a pulley on which the paste feed roll 54 is mounted, the paste fed roll 46 being mounted on a shaft 122 which is connected by means of the pulleys and a belt 123 with the shaft 109. It will, therefore, be seen that where the shaft 109 is rotated by means of the pulley 108, or by means of the pulley 100, it will serve to pump the paste to the paste troughs and will operate the paste rolls 54 and 46. However, the motor 101 will not rotate the shaft 109 as fast as will the motor 70 and, therefore, when the machine is not in operation the motor 101 will nevertheless operate the pasting means, but at a slower speed.

The shaft 97 has mounted thereon a pulley 124 which is connected by a belt 125 with a pulley 126 on a shaft 127, the shaft 127 serving to operate a shaft 128 by means of the pulleys and a belt 129, there being a cone-pulley 130 on the shaft 128 which is connected with a cone-pulley 131 by means of a belt 132, this cone-pulley 101 rotating the nip roll 32. The shaft 127 is connected by means of a belt 133 and a pulley 134 with a pulley 135, this pulley 135 serving to rotate a cone pulley 136 which is connected with the nip roll 20. The pulley 135 rotates a shaft which is connected by means of a pulley and a belt 137 with a pulley 138 on a shaft 139, there being a cone-pulley 140 on the shaft 139 which by means of a belt 141 rotates the nip roll 26. The shaft 127 has a pulley 142 thereon which by means of belts 143, 144 and 145 and the pulleys provided serves to rotate the guide rolls 33, 34 and 35, the guide roll 38 and the guide roll 36. It will be seen from the above and by referring to the drawings that the guide rolls 33, 34 and 35 will be rotated faster than the nip rolls 32, 20 and 26. It will also be seen by referring to the drawings that the diameters of the guide rolls 33, 34 and 35 are not as great as the diameters of the nip rolls 32, 20 and 26, and that the outer surfaces of the guide rolls will move faster than would be the case if they were of the same diameters as the nip rolls. This gives the surfaces of the guide rolls with which the webs of paper contact a speed different from the speed of the webs of paper through the machine which assists in positioning the webs of paper on the guide rolls at the festooning arrangement.

What is claimed is:

1. In a machine for pasting webs of paper together to form a sheet, nip rolls disposed adjacent each other for drawing webs of paper from unwinding rolls, guide rolls disposed adjacent each other and spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls with the webs of paper disposed face to face and approximately parallel, wrap rolls for holding the webs of paper under tension, means for drawing the webs of paper from the wrap rolls and pressing the webs of paper together, and a pasting means between the wrap rolls and the first mentioned means for coating surfaces of one or more webs of paper with paste.

2. In a machine for pasting webs of paper together to form a sheet, nip rolls disposed adjacent each other for drawing webs of paper from unwinding rolls, guide rolls disposed adjacent each other and spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls with the webs of paper disposed face to face and approximately parallel, wrap rolls for holding the webs of paper under tension, calender rolls for drawing the webs of paper from the wrap rolls and pressing the webs of paper together, a pasting means between the wrap rolls and the calender rolls for coating surfaces of one or more of the webs of paper with paste, additional calender rolls spaced from the first mentioned calender rolls, a guide roll spaced from the additional calender rolls to provide a festooning arrangement and means to lead the sheet of paper formed by the webs of paper from the last mentioned guide roll to a slitter and cutter.

3. In a machine for pasting webs of paper together to form a sheet, nip rolls disposed adjacent each other for drawing webs of paper from unwinding rolls, guide rolls disposed adjacent each other and spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls with the webs of paper disposed face to face and approximately parallel, wrap rolls for holding the webs of paper under tension, calender rolls for drawing the webs of paper from the wrap rolls, and a pasting means between the wrap rolls and the calender rolls for coating surfaces of one or more webs of paper with paste.

4. In a machine for pasting webs of paper together to form a sheet, nip rolls disposed adjacent each other for drawing webs of paper from unwinding rolls, guide rolls disposed adjacent each other and spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls with the webs of paper disposed face to face and approximately parallel, wrap rolls for holding the webs of paper under tension, calender rolls for drawing the webs of paper from the wrap rolls, pasting means between the wrap rolls and the calender rolls for coating surfaces of one or more webs of paper with paste, and means to operate the nip rolls, the guide rolls, the calender rolls and the pasting means.

5. In a machine for pasting webs of paper together to form a sheet, nip rolls disposed adjacent each other for drawing webs of paper from unwinding rolls, guide rolls disposed adjacent each other and spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls with the webs of paper disposed face to face and approximately parallel, wrap rolls for holding the webs of paper under tension, calender rolls for drawing the webs of paper from the wrap rolls, and a pasting means between the wrap rolls and the calender rolls for coating surfaces of one or more webs of paper with paste, additional calender rolls spaced from the first mentioned calender rolls, and an additional guide roll beyond the additional calender rolls.

6. In a machine for pasting webs of paper together to form a sheet, nip rolls disposed adjacent each other for drawing webs of paper from unwinding rolls, guide rolls disposed adjacent each other and spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls with the webs of paper disposed face to face and approximately parallel, wrap rolls for holding the webs of paper under tension, calender rolls for drawing the webs of paper from the wrap rolls, and a pasting means between the wrap rolls and the calender rolls for coating surfaces of one or more webs of paper with paste, additional calender rolls spaced from the first mentioned calender rolls, an additional guide roll beyond the additional calender rolls, and means to operate the nip rolls, the guide rolls, the calender rolls and the pasting means.

7. In a machine for pasting webs of paper together to form a sheet, nip rolls for drawing webs of paper from unwinding rolls, guide rolls spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls, wrap rolls for holding the webs of paper under tension, calender rolls for drawing the webs of paper from the wrap rolls, and a pasting means between the wrap rolls and the calender rolls for coating surfaces of one or more webs of paper with paste, means to operate the nip rolls, the guide rolls and the calender rolls, means operated by the second mentioned means for operating the pasting means, and independent means for operating the third mentioned means.

8. In a machine for pasting webs of paper together to form a sheet, nip rolls for drawing webs of paper from unwinding rolls, guide rolls spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls, wrap rolls for holding the webs of paper under tension, calender rolls for drawing the webs of paper from the wrap rolls, a paste trough between the wrap rolls and the calender rolls, a paste feeding roll for rotating in the paste trough, and a pasting roll spaced from the calender rolls engaged by the paste feeding roll for coating a web of paper with paste.

9. In a machine for pasting webs of paper together to form a sheet, nip rolls for drawing webs of paper from unwinding rolls, guide rolls spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls, wrap rolls for holding the webs of paper under tension, calender rolls for drawing the webs of paper from the wrap rolls, a paste trough between the wrap rolls and the calender rolls, a paste feeding roll for rotating in the paste trough, a pasting roll spaced from the calender rolls engaged by the paste feeding roll for coating a web of paper with paste, a pump for supplying the paste trough with paste, and means to operate the nip rolls, the guide rolls, the calender rolls, the paste feeding roll and the pump.

10. In a machine for pasting webs of paper together to form a sheet, nip rolls for drawing webs of paper from unwinding rolls, guide rolls spaced from the nip rolls to provide a festooning arrangement between the nip rolls and the guide rolls, wrap rolls for holding the webs of paper under tension, calender rolls for drawing the webs of paper from the wrap rolls, a paste trough between the wrap rolls and the calender rolls, a paste feeding roll for rotating in the paste trough, a pasting roll engaged by the paste feeding roll for coating a web of paper with paste, a pump for supplying the paste trough with paste, means to operate the nip rolls, the guide rolls and the calender rolls, a second means operable by the first means for operating the paste feeding roll and the pump, and an independent means for operating the second mentioned means.

11. In a machine of the class described, nip rolls for drawing a web of paper from an unwinding roll, a guide roll, the nip rolls being spaced in advance of the guide roll to provide a festooning arrangement between the nip rolls and the guide roll, and means for ro-

tating the nip rolls and the guide roll with the speed of rotation of the guide roll different from the speed of rotation of the nip rolls.

12. In a machine of the class described, calender rolls, a paste trough disposed in advance of the calender rolls, a paste-feeding means for feeding paste from the trough, a pump for supplying the paste trough with paste, a shaft, means cooperating with the shaft for operating the pump, driving means for one of the calender rolls, a second driving means operating at a slower speed than the first mentioned driving means, and clutch means for selectively connecting either of the driving means with the shaft for rotating the latter.

13. In a machine of the class described, a guide roll, means for moving a web of paper through the machine spaced in advance of the said guide roll to provide a festooning arrangement between the said means and the guide roll and with the web of paper disposed freely on the guide roll, and means for rotating the guide roll with its surface, with which the web of paper contacts, moving at a different speed than the web of paper by the said means.

14. In a machine of the class described, a guide roll, means for moving a web of paper through the machine spaced in advance of the said guide roll to provide a festooning arrangement between the said means and the guide roll and with the web of paper disposed freely on the guide roll, guide discs adjustably spaced apart on the guide roll, and means for rotating the guide roll with its surface, with which the web of paper contacts, moving at a different speed than the web of paper by the said means.

15. In a machine of the class described, a guide roll, means for moving a web of paper through the machine spaced in advance of the said guide roll to provide a festooning arrangement between the said means and the guide roll and with the web of paper disposed freely on the guide roll, guide discs adjustably spaced apart on the guide roll, the guide discs diverging relatively to each other from the axis of the guide roll, and means for rotating the guide roll with its surface, with which the web of paper contacts, moving at a different speed than the web of paper by the said means.

16. In a machine of the class described, means to move a web of paper through the machine, a second means spaced from the first mentioned means for moving the web of paper through the machine, a guide roll disposed between the said two means and together with one of the said means forming a festooning arrangement with the web of paper disposed freely on the guide roll and means for rotating the guide roll with its surface with which the web of paper contacts, moving at a speed different than the web of paper by the said means.

17. In a machine of the class described, two or more sets of nip rolls, the sets of nip rolls being disposed adjacent each other for drawing two or more webs of paper from unwinding rolls, two or more guide rolls disposed adjacent each other, with the nip rolls spaced in advance of the guide rolls to provide two or more freely hanging festooning arrangements between the nip rolls and the guide rolls and with the two or more webs of paper disposed face to face between the nip rolls and the guide rolls, means for drawing the webs of paper and pressing the webs of paper together, and pasting means for coating surfaces of one or more webs of paper with paste before the webs of paper are acted on by the first mentioned means.

18. In a machine of the class described, calender rolls, a paste trough disposed in advance of the calender rolls, paste-feeding rolls, a pump for supplying the paste trough with paste, a shaft, means cooperating with the shaft for operating the pump and a paste-feeding roll, driving means for one of the calender rolls, a second driving means operating at a slower speed than the first mentioned driving means, and clutch means for selectively connecting either of the driving means with the shaft for rotating the latter.

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