July 10, 1928. 1,676,655

W. A. LORENZ

PAPER MAKING MACHINE

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Fig. 1.

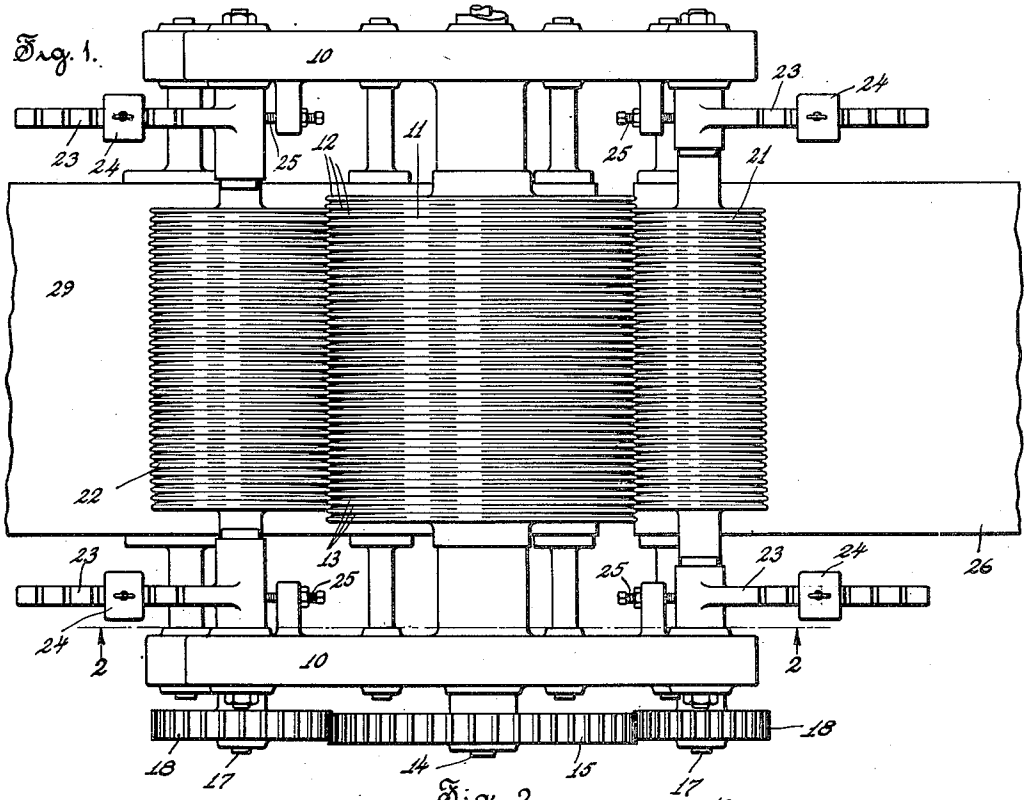
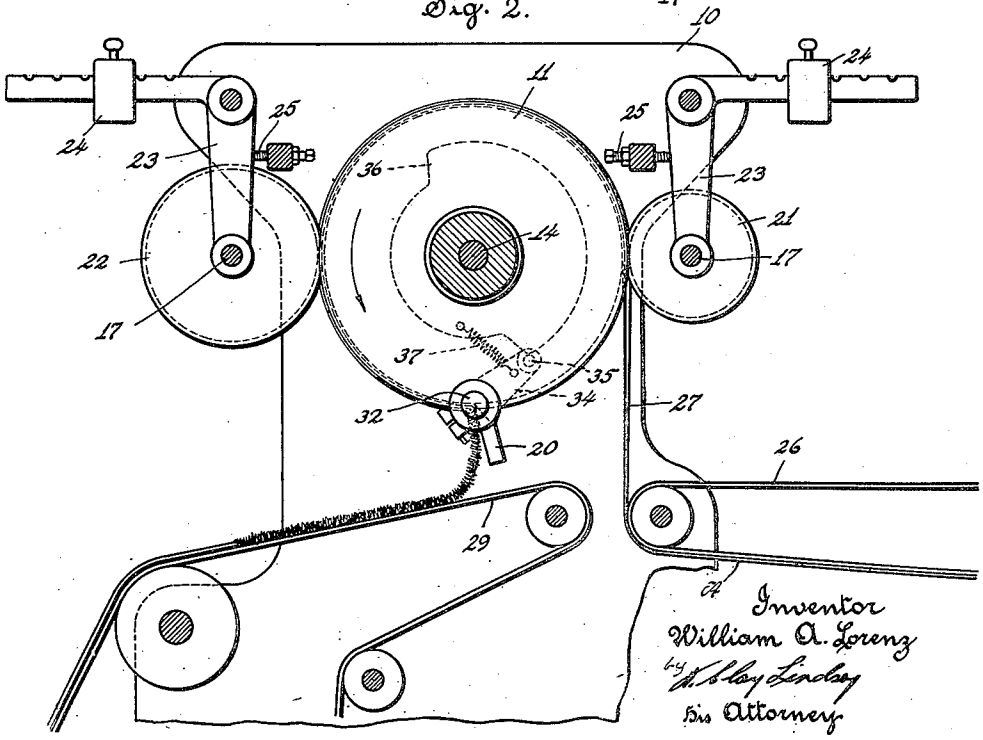


Fig. 2.



Inventor
William A. Lorenz
by H. Clay Lindsay
his Attorney

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Fig. 3.

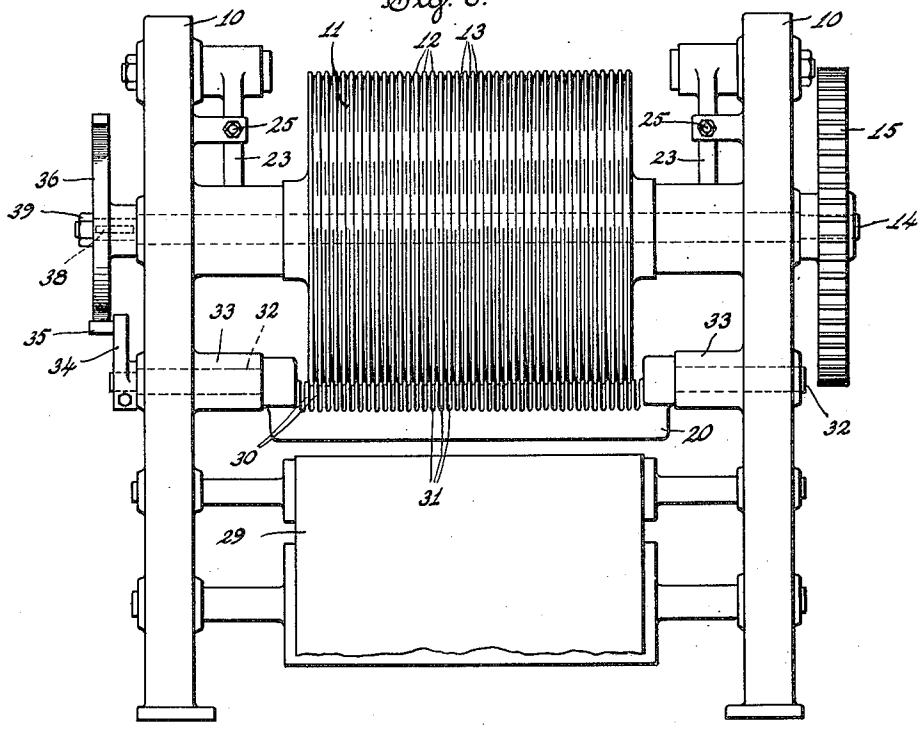


Fig. 4.

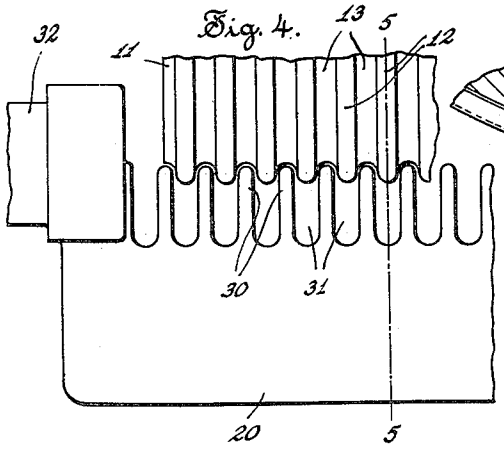
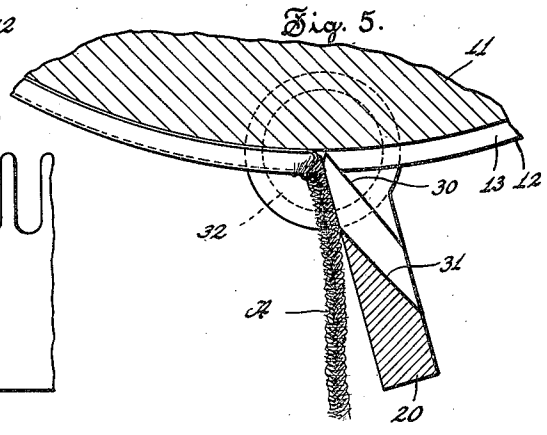


Fig. 5.



Inventor
William A. Lorenz.
by H. Clay Lindsey
His Attorney

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W. A. LORENZ

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Fig. 6.

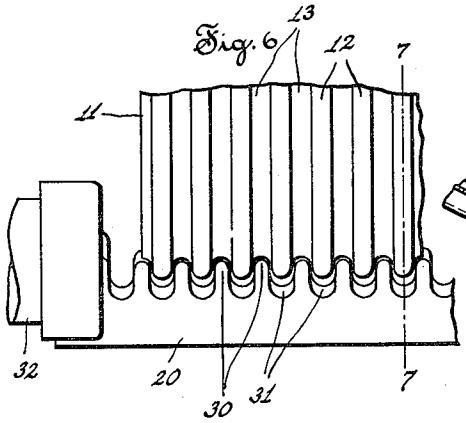


Fig. 7.

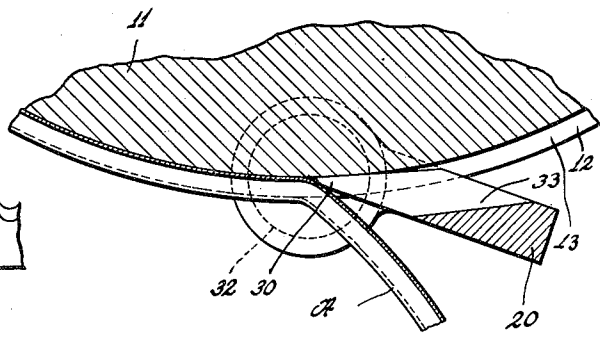
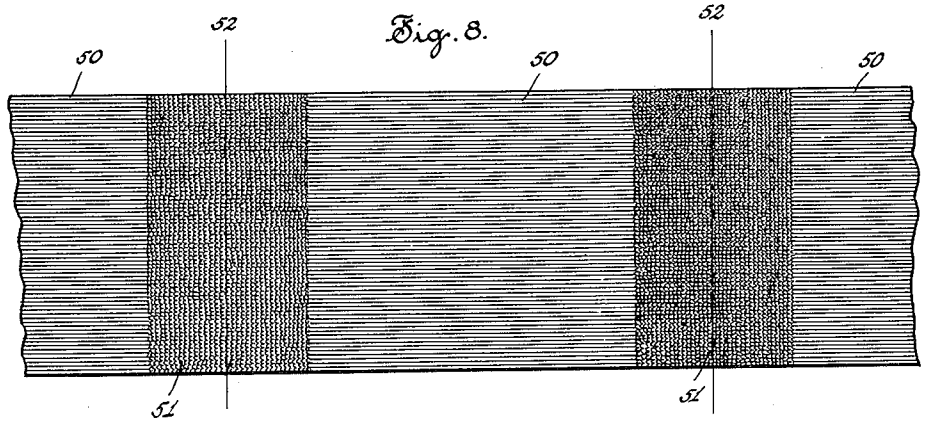


Fig. 8.



Inventor
William A. Lorenz
by H. Clay Lindsey
His Attorney

Patented July 10, 1928. 1,676,655

UNITED STATES PATENT OFFICE.

WILLIAM A. LORENZ, OF WEST HARTFORD, CONNECTICUT, ASSIGNOR TO THE OTAKA FABRIC COMPANY, OF WEST HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

PAPER-MAKING MACHINE.

Application filed February 2, 1927. Serial No. 165,432.

This invention relates to apparatus for producing paper which is longitudinally corrugated and transversely crinkled at intervals.

The aim of the invention is to provide an improved and simple apparatus by means of which paper longitudinally corrugated and transversely crinkled at intervals may be economically produced.

A further aim of the invention is to provide an improved machine whereby paper of this sort may be produced without interrupting the operation of the machine and wherein the intervals at which the cross crinkling is done may be varied at will.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the appended claims.

In the accompanying drawings, wherein I have shown, for illustrative purposes, one embodiment which the present invention may take:

Figure 1 is a plan view of the apparatus;

Fig. 2 is a sectional view taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a front elevation, one of the corrugating rolls being removed;

Fig. 4 is an enlarged view with a portion of the doctor blade and associated corrugated cylinder;

Fig. 5 is a sectional view taken on line 5—5 of Fig. 4;

Fig. 6 is a view similar to Fig. 4, but showing the doctor blade at a different angle with respect to the cylinder;

Fig. 7 is a sectional view taken substantially on line 7—7 of Fig. 6; and

Fig. 8 is a view of a strip of paper which has been corrugated and crinkled by this machine.

Referring to the drawings in detail, the frame of the machine may be of any suitable form or shape, but is here shown as having two side frames 10, 10 tied together in any appropriate manner. 11 designates the main cylinder which is circumferentially corrugated so as to provide alternate circumferential ribs 12 and grooves 13. This cylinder is fixed to a shaft 14 on one end of which is a gear 15 driven in any suitable manner, the driving means not being shown in the present instance. Associated with the main cylinder 11 is a doctor blade 20, the construction of which will be described hereinafter more in detail. Associated with the main cylinder 11 are a pair of corrugated rolls, one of these rolls 21 being preferably positioned behind the cylinder, and the other one 22 in front of the cylinder. Each of these rolls is corrugated as illustrated so as to mesh, so to speak, with the corrugations of the main cylinder, whereby the paper which passes between the main cylinder and the rolls is corrugated. The rolls 21 and 22 are similarly mounted in pivoted levers 23, the horizontal arms of which are provided with adjustable weights 24. These weights cause the rolls to press against the main cylinder. Movement of the rolls towards the cylinder may be adjustably limited by the screws 25.

In carrying out the present invention, either finished paper that is wetted or a wet web of pulp which is delivered from a web forming machine may be operated upon. In the present instance, I have shown the web operated upon as designated by the letter A. This web may be laid onto the under side of an endless belt 26 and passes upwardly, as at 27, from the belt to the cylinder 11. It is first pressed against the cylinder by the roll 21, whereby the web is longitudinally corrugated. The web passes to the top of the cylinder and is pressed against the cylinder at the front portion thereof by the rolls 22. The cylinder then carries the web down to the doctor blade which strips the paper from the cylinder and lays it onto a belt 29. The rolls 21 and 22 are fixed on shafts 17 which carry gears 18 meshing with the gear 15.

The present invention relates more specifically to the arrangement of the doctor blade 20. This doctor blade, as shown most clearly in Figs. 4 to 7, has a serrated edge so as to form teeth 30, so to speak, which project into the grooves 13 of the crinkling cylinder. The spaces 31 between the teeth or projections 30 are relatively long and, preferably, the teeth are inclined rearwardly away from the cylinder, as indicated in Fig. 5 so that the doctor blade may be rocked or adjusted

through a relatively large angle with respect to the crinkling cylinder. The doctor blade 20 is supported by trunnions 32 journalled in bearings 33 provided on the side frames. On the outer end of one of the trunnions 32 is fixed an arm 34 carrying a pin or roller 35 adapted to ride against the periphery of a cam 36. This cam is secured to one end of the shaft 14 and on which shaft the main cylinder 11 is fixed. The arm 34 is urged by a spring 37 in a direction to maintain the pin 35 against the periphery of the cam 36. The cam 36 is secured in place by a key 38 and a nut 39.

The operation of the machine is briefly as follows: The web passes upwardly, as at 27, from the belt or blanket 26 and onto the crinkling cylinder 11. Owing to the corrugations on the rolls 21 and 22 and the crinkling cylinder 11, the paper is corrugated in the direction of its length and the rolls cause the web to adhere to the crinkling cylinder. By adjusting the weights 24, the desired degree of pressure may be maintained against the web on the cylinder. The cylinder carries the web against the doctor blade 20 which strips the web from the cylinder and lays it onto the receiving belt 29. The cam 36 changes the angularity of the doctor blade with respect to the crinkling cylinder at predetermined times so that, for certain length, the web is stripped from the cylinder without crinkling those lengths and, at intervening lengths, the paper is cross crinkled. More particularly, when the pin 35 engages the portion of larger radius of the cam 36, the doctor blade is at the angle shown in Figs. 2 4 and 5, with the result that the paper is crushed against the doctor blade and crinkled. When the pin 35 engages the portion of smaller radius of the cam 36, the doctor blade is more tangentially arranged with respect to the cylinder, as shown in Figs. 6 and 7, with the result that the paper is stripped from the cylinder but is not crinkled. Obviously, a number of interchangeable cams may be provided so as to vary the lengths of crinkled and uncrinkled portions of the paper and also to vary the degree to which the crinkled portions are creped.

The resulting paper is shown most clearly in Fig. 8. The corrugated and uncrinkled portions are designated by the numeral 50, and the corrugated and cross crinkled portions are designated by the numeral 51. The spacing of the crinkled portions may be varied, of course, to suit requirements. This paper may be used to advantage in forming barrel linings of the type illustrated in my application Serial No. 38,701, filed June 22, 1925, and wherein is disclosed a barrel lining having a longitudinally corrugated body portion and corrugated and crinkled end portions. A barrel lining of this type has a relatively stiff body portion so that it will not collapse when placed in the barrel while, at the same time, the body portion may expand radially when the contents are poured thereinto. The end portions, being corrugated and cross crinkled, are flexible in all directions so that they may be readily folded over to constitute the bottom and the mouth of the lining. To form a lining of this sort, it is merely necessary to cut the paper along the lines 52 and then fold the paper so as to bring the side edges thereof into engagement and paste these side edges together.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. In a paper crinkling machine and in combination, a cylinder, a doctor blade supported for angular movement from one position to another, said blade in one position being adapted to crinkle the paper and strip the same from said cylinder, said doctor blade in its other position being adapted to strip the paper from said cylinder without crinkling it and means for moving said doctor blade at intervals from one position to another whereby said paper is crinkled at intervals.

2. In a paper crinkling machine and in combination, a cylinder, a doctor blade supported for angular movement from one position to another, said blade in one position being adapted to crinkle the paper and strip the same from said cylinder, said doctor blade in its other position being adapted to strip the paper from said cylinder without crinkling it, and a cam for moving said doctor blade at intervals from one position to another whereby said paper is crinkled at intervals.

3. In a paper crinkling machine and in combination, a cylinder, a roll for pressing the paper against the cylinder, a doctor blade provided with trunnions, bearings in which said trunnions are mounted, and a cam connected to said cylinder and adapted to rock said blade from one position to another whereby the paper is crinkled at intervals.

4. In a paper crinkling machine and in

combination, a crinkling cylinder having circumferential corrugations, a doctor blade having a serrated edge cooperating with the periphery of said cylinder, said blade being mounted for movement from one position to another with respect to said cylinder, and means for moving said doctor blade at intervals.

5. In a paper crinkling machine and in combination, a crinkling cylinder provided with circumferential corrugations, means for pressing the paper against said cylinder and thereby corrugating the same, a serrated doctor blade cooperating with said cylinder, said blade being mounted for rocking movement from one position to another, said blade in one position crinkling said paper and in the other position stripping the paper from the cylinder without crinkling the same, and a cam for rocking said blade at intervals.

WILLIAM A. LORENZ.