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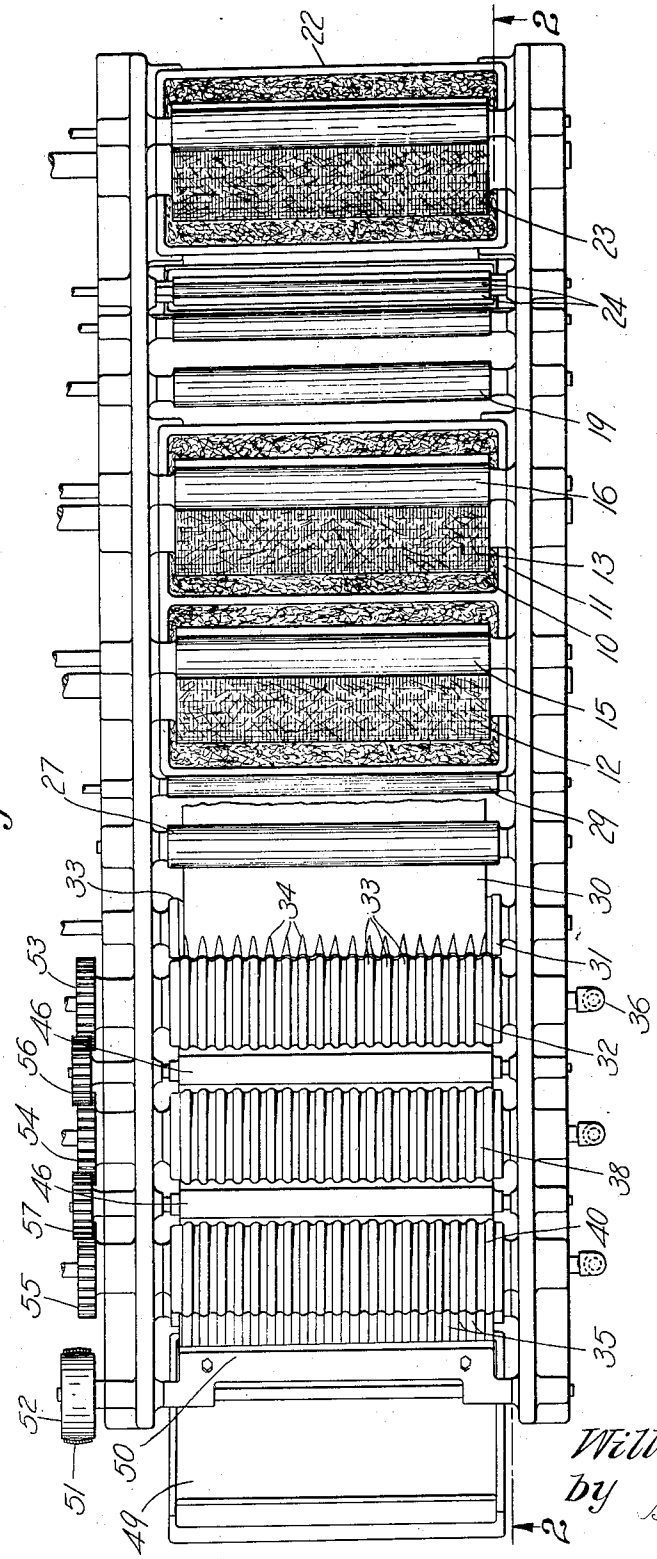
April 27, 1926. 1,582,841

W. A. LORENZ

PAPER CORRUGATING

Filed Jan. 4, 1921 2 Sheets-Sheet 1

Fig. 1



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April 27, 1926. 1,582,841

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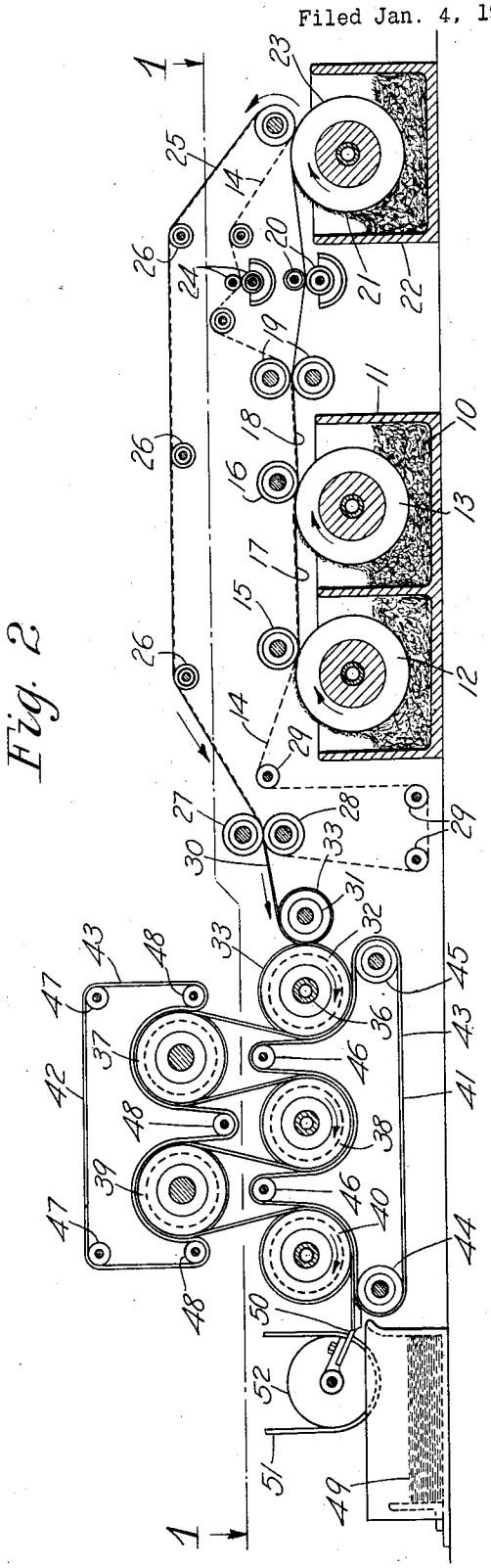


Fig. 2

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Patented Apr. 27, 1926. 1,582,841

UNITED STATES PATENT OFFICE.

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

PAPER CORRUGATING.

Application filed January 4, 1921. Serial No. 434,943.

To all whom it may concern:

Be it known that I, WILLIAM A. LORENZ, a citizen of the United States, residing in Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Paper Corrugating, of which the following is a specification.

This invention relates to means for producing a paper-web which is longitudinally corrugated or fluted for various purposes.

In practicing the present invention, the initial steps are taken which are usually employed in making paper, but after the paper pulp has reached the web form, but before it is finally converted into paper, it is introduced between suitable corrugating devices, whereby longitudinal corrugations or flutes are formed therein. The pulp-working stages correspond with those usually employed on one portion of a so-called cylinder paper making machine; and after the pulp has been changed to web form by the cylinders, and after the water has been pressed out from the pulp web by rolls, the web, still wet, is passed through the corrugating devices, and when it reaches the condition of finished paper it is in corrugated web form.

The web may be either gathered into flutes, thereby reducing its width, or it may be passed directly between corrugated rolls which form corrugations in the web without reducing its width; the pulpy web material being still in plastic condition and hence capable of such flowing or stretching as is required in forming the corrugations therein, while the width of the web remains substantially unchanged.

In the cylinder type of machine, a layer of pulp may be formed on one cylinder, and it may be reinforced by a layer that is formed on another cylinder, and still another layer may be made upon another cylinder or series of cylinders. These two reinforced webs may be superposed and joined together or lapped, thereby increasing the weight of the web; and this combined web may be delivered to the rolls which press out the water.

The corrugated web is then passed upon heating devices, such as drums, and gradually dried thereby. These drums have peripheral grooves or corrugations, and deliver the product in the form of a continuous web, which may be severed into sheets.

There may be provided as many heating drums as required for rapidly and efficiently drying the corrugated web; and the web may be guided around these drums by means of endless belts. The drums may be divided into upper and lower sets, the web passing around a lower drum and then around an upper one, and so on; and separate belts may be provided for the upper and lower sets of drums.

Other features and advantages will hereinafter appear.

In the accompanying drawings,

Figure 1 is a plan of a machine for making a corrugated paper-web from pulp, omitting the upper drying rolls.

Figure 2 is a longitudinal sectional elevation thereof taken at about the line 2—2.

The paper pulp 10 is contained in vats 11, in which are arranged power-rotated cylinders 12, 13 respectively; the pulp being lifted upon the surface of each cylinder by the use of a vacuum in the usual manner, and being delivered upon an endless blanket 14, which is pressed against the cylinders by rolls 15, 16. The film of paper 17 which is delivered by cylinder 12 upon blanket 14 is augumented by means of the pulp which is delivered by the succeeding cylinder 13, thus making a heavier web 18. This passes between feed-rolls 19 and then between pressure-rolls 20, which squeeze out water. This web is then reinforced by means of a layer of pulp 21 carried up from a vat 22 by means of a third vacuum cylinder 23. The reinforced web is then delivered upon blanket 14, which in the meantime has been deprived of some moisture by passing between pressure-rolls 24.

The triple-ply full width web 25 is now carried by said blanket over guide-rolls 26 and to and between rolls 27, 28; the web from this point passing on independently of the blanket, which returns to the starting point over guide-rolls 29. The web of moist pulp 30 is now led between a pair of power-driven pressure-rolls 31, 32, each of which is peripherally corrugated at 33 throughout its length, whereby longitudinal corrugations are rolled into the pulp web under pressure; these corrugations being shown as starting at 34 and being also shown fully at 35.

The drum 32 may be heated by a steam pipe 36. From this drum the web is led over an upper corrugated drum 37, and then over the second corrugated drum 38 in the lower set, and then up to the second corrugated drum 39 in the upper set, and finally to the delivery corrugated drum 40 in the lower set. All of the drums in the lower set may be steam heated, as shown; and those in the upper set may also be steam heated if desired. The pulp is thus maintained in its corrugated condition while drying; and preferably at the same time it is subjected to substantial additional pressure by endless wide belts 41, 42 which may have on their working surface longitudinal ribs 43, to mesh into the peripheral grooves in the drums, so as to press the paper firmly into the grooves. Thus the pulp is heated and quickly dried, these final steps serving to complete the manufacture of the paper, which, when it reaches the paper stage, is in corrugated condition, thus vastly reducing the cost of manufacturing corrugated paper, which heretofore has been made from dry webs of paper.

The lower belt runs over lower guide-pulleys 44, 45 and upper guide-pulleys 46; while the uper belt runs over upper pulleys 47 and lower pulleys 48. It will be seen that the lower drums may heat the pulp upon one side, while the upper drums may heat it upon the other side. Each belt preferably extends around its associated drum for a considerable distance, and to this end the pulleys 46, 48 are placed respectively, at high and low points; the pulleys 46 being about on a level with the tops of the lower drums, and the pulleys 48 being about on a level with the bottoms of the upper drums; and the belts being therefore formed into loops between the drums.

As many of these corrugated drying cylinders may be employed as desired, according to the thickness and quality of the fabric, and to the speed at which it is desired to manufacture the product.

As the fluted paper leaves the machine it may be cut off into sheets 49 by means of a rotary shear 50, driven by a belt 51 and pulley 52; or the corrugated web may be wound upon a roll or otherwise handled.

Suitable driving gears may be provided, for example the gears 53, 54, 55, on the drums 32, 38 and 40, and connecting pinions 56, 57.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In combination, a series of circumferentially corrugated and heated drums over which a web is adapted to be successively passed, and an endless belt cooperating with said drums and having ribs to press the web into the grooves on said drums.

2. In combination, a series of heating drums around which a web runs in opposite directions so that its opposite faces contact with said drums, and a plurality of endless belts for holding the web to said drums, means for heating said drums, said belts being longitudinally corrugated to hold the web in the grooves in the drums.

3. In combination, a set of heated drums around which a web runs with one face contacting with the drums, a second set of drums around which the web runs with its other face contacting with the drums, said drums being circumferentially grooved, and an endless belt for each set of drums, said belts having ribs to press the web into the grooves in the drums.

WILLIAM A. LORENZ.