J. E. KIEFFER.

MACHINE FOR MAKING CORRUGATED PAPER.

APPLICATION FILED JAN. 13, 1915.

1,166,992. Patented Jan. 4, 1916.

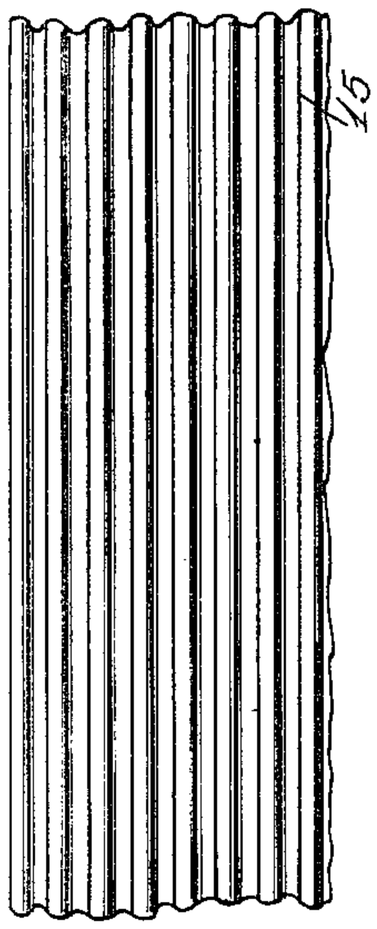

Fig. 3.

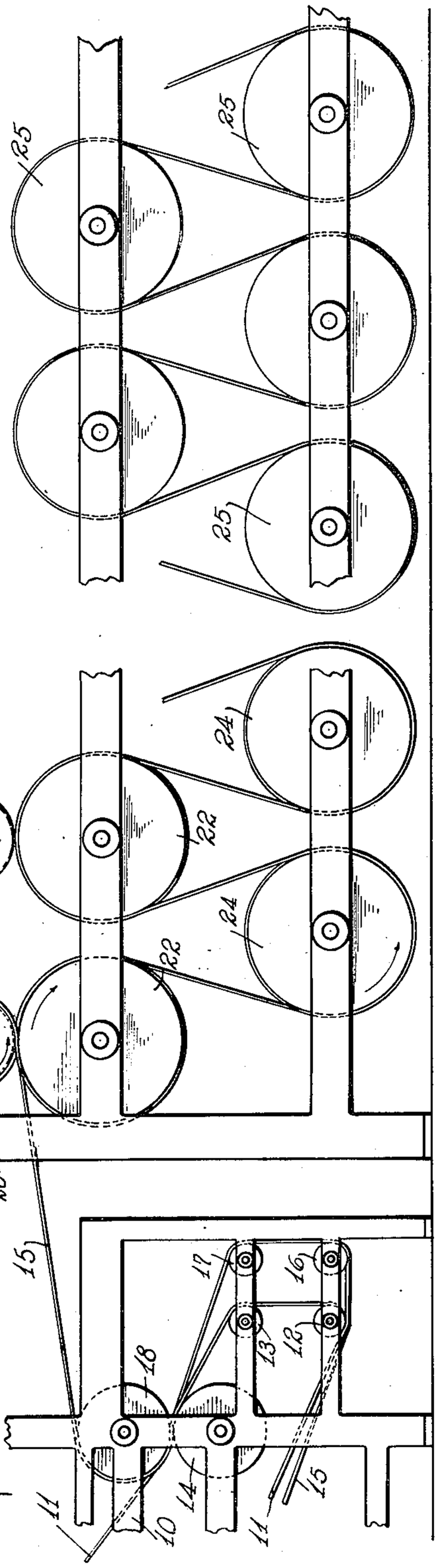

Fig. 1.

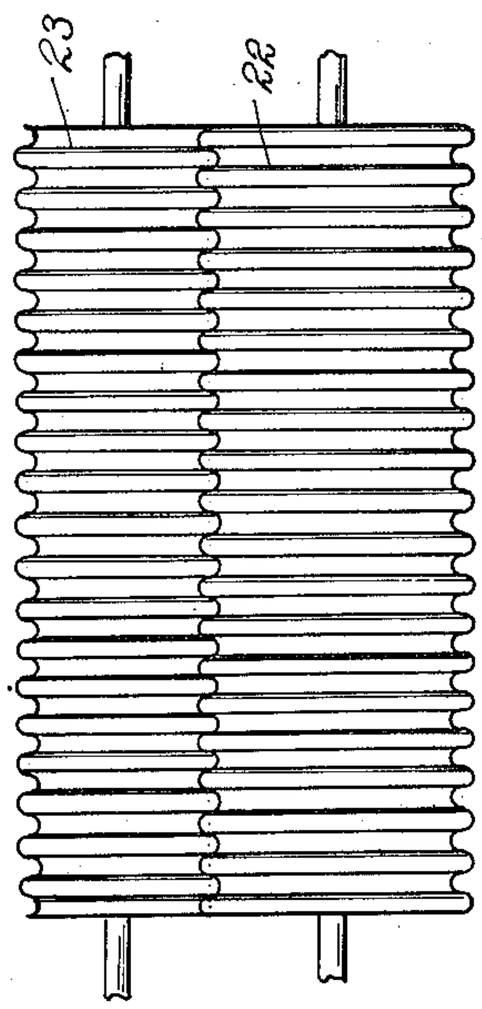

Fig. 2.

WITNESSES:

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MACHINE FOR MAKING CORRUGATED PAPER.

1,166,992. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed January 13, 1915. Serial No. 1,920.

To all whom it may concern:

Be it known that I, JOHN E. KIEFFER, a citizen of the United States, and a resident of Ewing, county of Jackson, and State of Indiana, have invented a certain new and useful Machine for Making Corrugated Paper; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like letters refer to like parts.

The object of this invention is to improve the quality of the product and the mode of operation of machines for making corrugated paper as set forth at more length in my prior application Serial No. 1,378, filed January 9, 1915.

This invention is for the purpose of insuring the preservation of the corrugations in the web of paper, as large and sharply defined, when dry, as when first formed in the wet web as it comes from the web forming part of the paper making machine.

To that end instead of the wet web going to a pair of cold corrugated rolls and thence immediately to smooth hot drying rolls, in the construction herein set forth the wet web goes to a pair of corrugating rolls one of which is hot and a drying roll. That is a cold corrugating roll co-acts with a corrugated drying roll. Also in this machine the corrugated wet web passes over another corrugated drying roll and another pair of corrugated rolls one of which is hot and the other cold and then over still another corrugated drying roll before passing to the smooth drying rolls.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

In the drawings, Figure 1 is a side elevation of the wet end of a paper making machine and of the corrugating and drying mechanism with intermediate parts omitted. Fig. 2 is a front elevation of a pair of corrugating and drying rolls. Fig. 3 is a plan view of a portion of the sheet of paper after being corrugated.

In the drawings there is shown in Fig. 1 at the left-hand end, the wet portion of the web forming machine, of ordinary type, the remainder of the web paper forming machine being omitted. The web forming part of the machine has a frame 10 and there is mounted in the rear end of said frame a second felt 11 running over small rolls 12 and 13 and a large roll 14, and said felt carries a sheet of paper 15 which passes on over small rolls 16 and 17 and between rolls 14 and 18.

From the web forming machine, the sheet 15 passes to the combined corrugating and drying portion of the machine which is mounted in a frame 20. Hot or drying rolls 22 are situated, constructed and operated the same as ordinary drying rolls except that their surfaces are circumferentially corrugated, as shown in the lower part of Fig. 2. The corrugations therein mesh with similar circumferential corrugations in the cold corrugating rolls 23. There is one cold corrugating roll coöperating with each hot or drying corrugated roll 22. The corrugating rolls 23 are not drying rolls, but the drying rolls 22 are corrugating rolls.

The web which passes between the rolls 22 and 23 is corrugated by the two rollers and simultaneously dried to some extent, by the rolls 22. Hence, the web is simultaneously corrugated and dried. From the first drying roll 22, the sheet goes to a lower drying roll 24 which is also corrugated, so as to coöperate with the roll which form the corrugations in the first instance to maintain those corrugations. Only the first portion of the usual set of drying rolls coöperate with the cold corrugated rolls 23 and, thereafter, the web passes to the ordinary drying rolls 25 which have a smooth circumferential surface, for by the time the corrugated web reaches them, the corrugations are "set" and since the corrugations are longitudinal of the web, the drying rolls 25 do not injure the corrugations.

Since the corrugations are longitudinal of the web, there is no take-up in the width of the web during the corrugations of the rolls, because intermeshing corrugations of the pair of rolls prevents such result. The web 15 is wet from the web forming end of the machine when it enters the corrugating rolls and, therefore, the corrugations rearrange the fibers of the web to some extent, to adapt them to the corrugated form, and since the web is to some extent dried during the for-

mation of the corrugations and by the same roll which coöperates in corrugating the same, the fibers are "set" and thereafter all of the fibers tend to hold the corrugations in shape.

The invention claimed is:

1. A paper making machine having a section for forming the wet web, a series of drying rolls having smooth surfaces, and means between the web forming section and the smooth drying rolls for simultaneously and gradually corrugating and partially drying the wet web as it comes from the web forming section and before it reaches any smooth drying rolls.

2. A paper making machine having a section for forming the wet web, a series of smooth drying rolls, and a pair of corrugating rolls between the web forming section and the series of smooth drying rolls and through which the wet web passes from the web forming means to the smooth drying rolls, one of said corrugating rolls being a drying roll and the other being a cold roll.

3. A paper making machine having a section for forming the wet web, a series of smooth drying rolls, a pair of corrugating rolls between the web forming section and the series of smooth drying rolls and through which the wet web passes from the web forming means to the smooth drying rolls, one of said corrugating rolls being a drying roll and the other being a cold roll, and one or more additional corrugated drying rolls over which the corrugated web passes before reaching the smooth drying rolls.

In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named.

JOHN E. KIEFFER.

Witnesses:
J. H. Wells,
R. G. Lockwood