

No. 654,884.

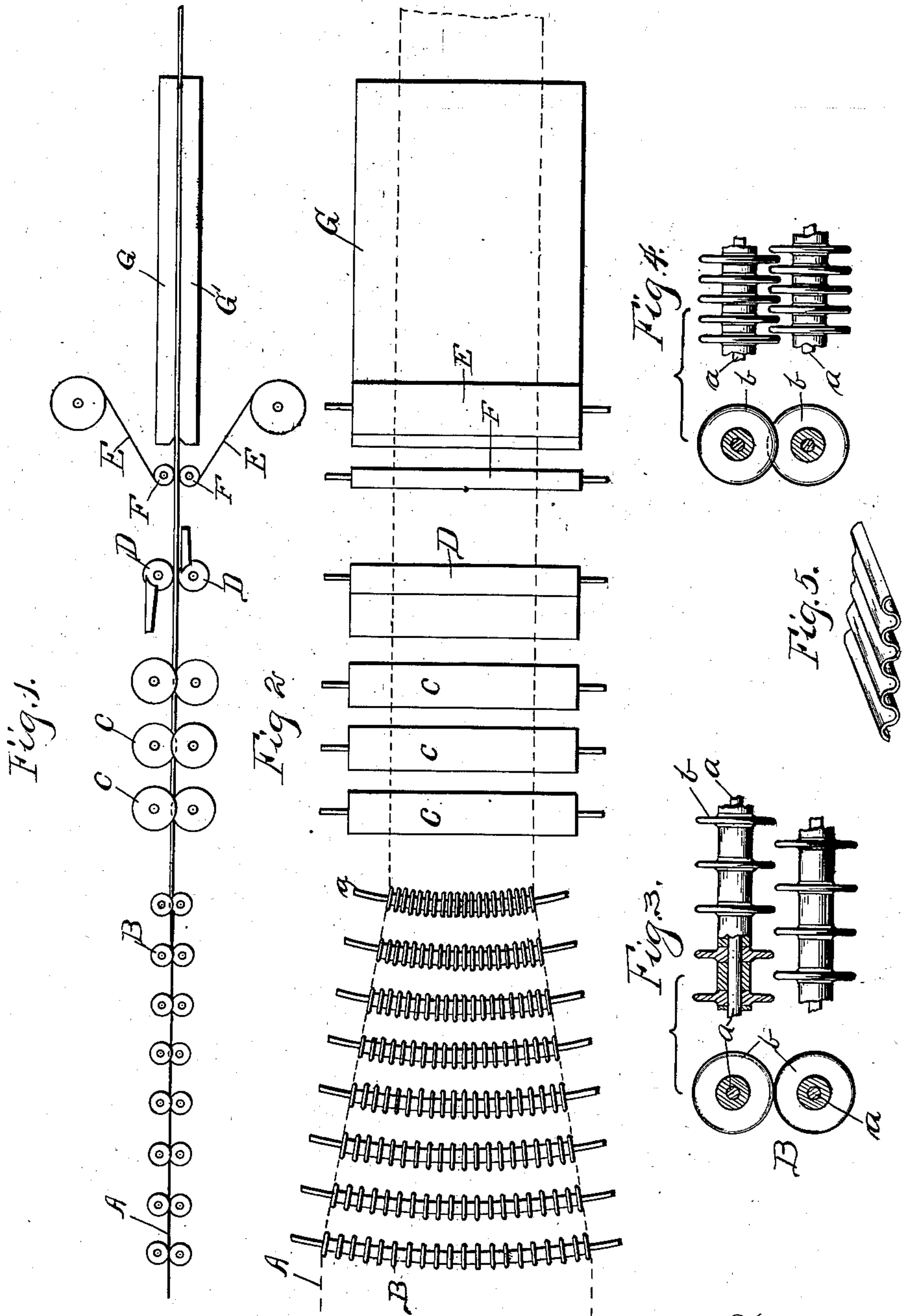
Patented July 31, 1900.

J. T. & A. W. FERRES.
APPARATUS FOR MAKING CORRUGATED PAPER.

(No Model.)

(Application filed July 20, 1899.)

2 Sheets—Sheet 1.



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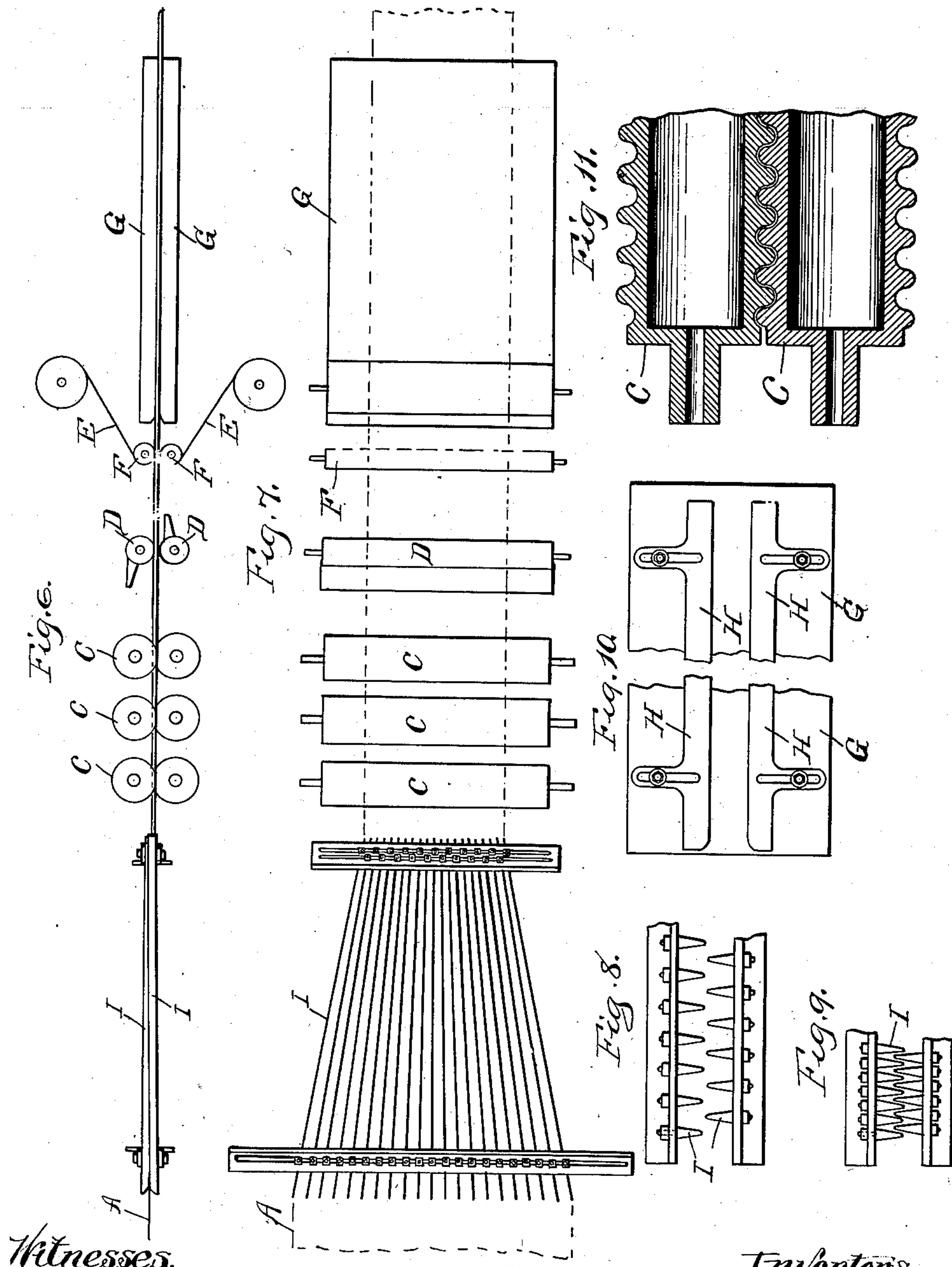
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MAKING CORRUGATED PAPER.

SPECIFICATION forming part of Letters Patent No. 654,884, dated July 31, 1900.

Application filed July 20, 1899. Serial No. 724,510. (No model.)

To all whom it may concern:

Be it known that we, JEFFREY T. FERRES and AINSLIE W. FERRES, residing at Anderson, in the county of Madison, in the State of Indiana, have invented a certain new and useful Improvement in Apparatus for Making Corrugated Paper, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

Our invention has for its object the provision of an efficient means for corrugating continuous strips of paper longitudinally instead of transversely, as usual, such longitudinally-corrugated paper possessing advantages over the common transversely-corrugated paper for certain purposes not necessary to be described.

The novelty of our invention will be hereinafter set forth, and particularly pointed out in our claims.

In the accompanying drawings, Figure 1 is a diagrammatic view, in side elevation, of one form of our novel apparatus; Fig. 2, a top plan view of the same; Figs. 3 and 4, detail views of the gathering-rollers; Fig. 5, a detail of the finished corrugated strip; Fig. 6, a view corresponding to Fig. 1, showing the substitution of gathering-fingers for the gathering-rollers of Fig. 1; Fig. 7, a top plan view of Fig. 6; Figs. 8 and 9, detail views of the gathering-fingers; Fig. 10, a detail view of the guides between the heater-plates, and Fig. 11 an enlarged sectional detail of two of the intermeshing corrugating-rollers.

We produce the longitudinally-corrugated strips of paper in our novel apparatus by gradually gathering or folding the strip of plain paper into corrugated form as it advances, this operation having the effect of gradually contracting the width of the strip of paper from the full width of the plain paper to the width of the corrugated strip, and then passing such gathered or folded strip between intermeshing heated corrugating-rolls, by which the longitudinal corrugations in the strip become firmly set. If the corrugated strip is to be faced, then the strip or strips of facing-paper will be applied with suitable paste to the strip of corrugated paper after the latter has passed through the corrugating-rolls and the corrugated strip, with the applied facing strip

or strips, be then drawn between suitable heaters to dry the same.

Our novel apparatus consists of suitable means for gathering or folding the plain strip of paper into corrugated form, as above described, suitable intermeshing pairs of heated corrugating-rolls for drying the corrugated strip and giving the corrugations a set, and, if faced paper is to be produced, suitable means for applying the paste and facing-strips and drying the same, all as hereinafter described.

Referring to the first four figures of the drawings, A represents the strip of plain paper drawn in a partially-dried condition from the supply-roll. (Not shown.)

B represents a series of gathering-rollers, each consisting of a curved spindle or axle *a*, having mounted to turn upon it a series of equidistant disks *b*. These rollers B are arranged in pairs one above the other, and the disks *b* of the rollers of the succeeding pairs are arranged at a gradually-decreasing distance from each other, as shown in Fig. 2. Likewise, as shown in Fig. 1, the spindles or axles of the rollers of the succeeding pairs are arranged at gradually-decreasing distances from each other to cause a gradual increase in the depth of mesh of the disks upon the rollers of the succeeding pairs. As shown in Fig. 1, and more particularly in Fig. 3, the two rollers of the first pair (at the left) are set at such distance from each other that their disks but slightly overlap or intermesh, so that as the strip of plain paper is drawn between the rollers of this pair it will be but slightly indented or creased. The rollers of the next pair are set a little closer together, so as to indent or crease the paper a little deeper, and their disks are likewise a little closer together upon each roller, so as to draw the paper inward slightly; and so on to the rollers of the last or right-hand pair, which, as shown in Figs. 2 and 4, are so set with relation to each other that their disks will intermesh to substantially the full depth of the corrugations to be formed, while their disks are also located so close together upon each roller as to bring the longitudinal corrugations of the strip immediately adjacent each other in position to enter between the heated corrugating-rolls C. There are in the present instance three pairs of these rolls of

the form shown more particularly in Fig. 11, but more or less of them can be used, and they serve to dry the paper and give the corrugations their true and final form and firmly set them. If the corrugated strip is not to be faced, it will be delivered in completed form from the roll C and can be cut into suitable length for the desired use or for convenient storage and shipment. If, however, the corrugated strip is to be faced, paste will be applied to one or both sides of it as it emerges from the rolls C by paste-rolls D and the facing-strips E be led from suitable supply-rolls over rollers F, between which the corrugated strip is drawn and by which the strips E are pressed against its opposite faces. From the rollers F the three strips are drawn forward between the heater-plates G, by which the facing-strips are maintained in firm contact with the corrugated strip while the paste is being dried. The heater-plates G may be of any suitable construction, and any suitable means in rear of the heaters may be employed for drawing the strips through the heaters. If single-faced paper is to be made, one of the paste-rolls D and one of the facing-strips E will be dispensed with. For the purpose of preventing the opposite edges of the strip being flattened out by the heater-plates G as the strips are drawn between said heaters, we have provided the adjustable guides H, (shown in Fig. 10,) by which the opposite edges of the strip will be confined and prevented from being pressed outward.

In Figs. 6 to 9 we have illustrated the employment of gathering fingers or guides I in place of the gathering-rollers B for forming the preliminary corrugations in the paper strip preparatory to its entrance between the corrugating-rolls C. As will be readily understood from the drawings, these fingers or guides I are relatively arranged similarly to the guide-rollers B and serve the same purpose in gradually contracting the width of the strip of paper and forming the preliminary corrugations in it. These guide-fingers may be satisfactorily employed in place of the guide-rollers B for corrugating comparatively-narrow strips of paper; but where wide strips are to be corrugated it is desirable to employ the rollers B on account of the decreased friction incurred.

Having thus fully described our invention, we claim—

1. The herein-described apparatus for making longitudinally-corrugated strips of paper, comprising gathering or folding means for indenting or creasing a plain strip of paper

along gradually contracting and deepening longitudinal lines, to form preliminary longitudinal corrugations, and corrugating-rolls to receive such strip of paper and finish and set the longitudinal corrugations therein.

2. The herein-described apparatus for forming longitudinally-corrugated faced paper, comprising gathering or folding means for indenting or creasing a plain strip of paper along gradually contracting and deepening longitudinal lines, to form preliminary longitudinal corrugations, corrugating-rolls to receive such strip of paper and finish and set the longitudinal corrugations therein, means for applying paste and a facing strip or strips to the corrugated strip as the latter emerges from the corrugating-rolls, and suitable heaters between which the several pasted strips are drawn to dry them and secure them together.

3. The herein-described apparatus for making longitudinally-corrugated strips of paper, comprising the gathering-rollers B arranged in pairs, the rolls of the succeeding pairs being set to intermesh with each other at gradually-increasing depth, and the disks upon the rollers of the succeeding pairs being arranged at gradually-decreasing distances from each other, for the purpose of gradually gathering or folding the plain strip of paper into corrugated form, and the corrugating-rolls C for receiving such strip of paper from the rollers B and finishing and setting the longitudinal corrugations therein.

4. The herein-described apparatus for making longitudinally-corrugated strips of paper, comprising the gathering-rollers B arranged in pairs, the rolls of the succeeding pairs being set to intermesh with each other at gradually-increasing depth, and the disks upon the rollers of the succeeding pairs being arranged at gradually-decreasing distances from each other, for the purpose of gradually gathering or folding the plain strip of paper into corrugated form, the corrugating-rolls C for receiving such strip of paper from the rollers B and finishing and setting the longitudinal corrugations therein, the paste-rollers D for applying paste to the corrugated strip, the guide-rollers F for directing the facing strip or strips upon the corrugated strip, and the heaters G G for drying the pasted strips and securing them together.

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