

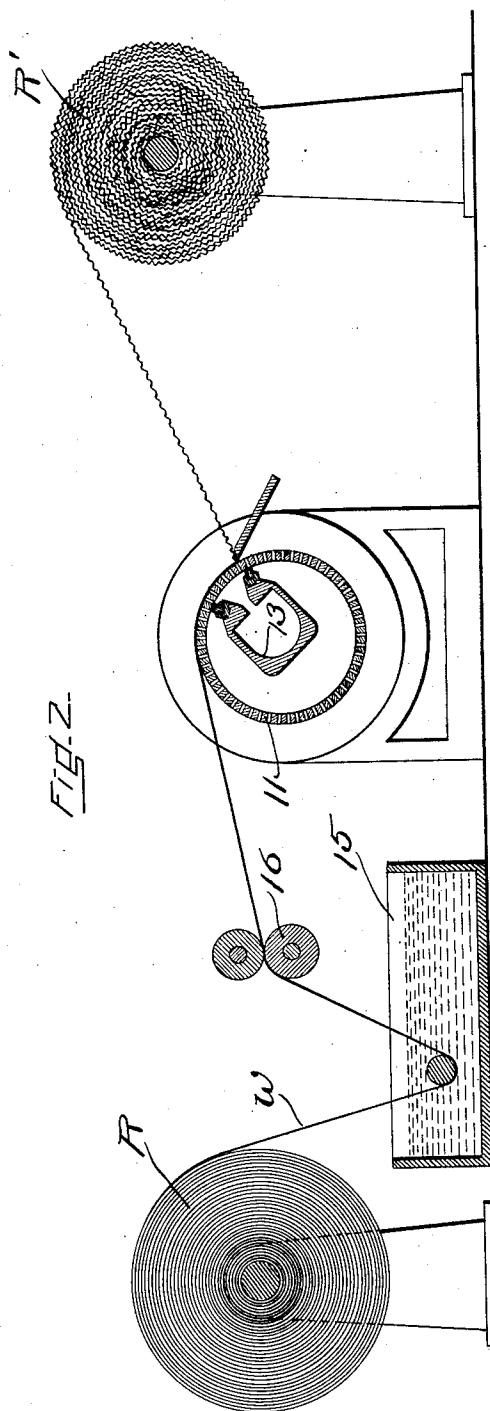
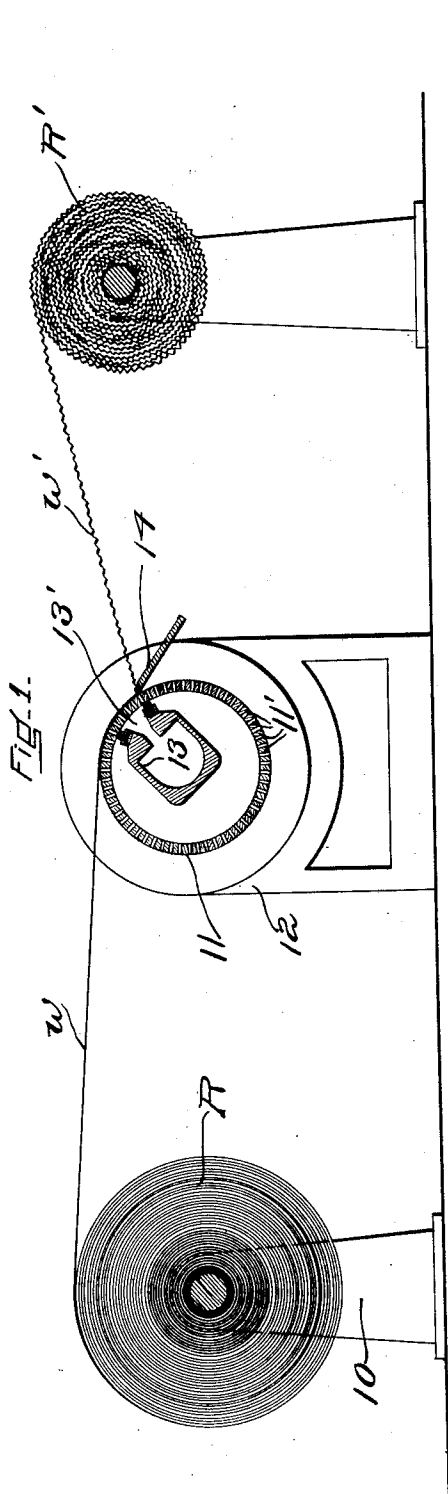
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K. WANDEL

METHOD OF DRY CRINKLING PAPER

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UNITED STATES PATENT OFFICE.

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METHOD OF DRY-CRINKLING PAPER.

Application filed March 6, 1920. Serial No. 363,712.

To all whom it may concern:

Be it known that I, KURT WANDEL, a citizen of Wurtemberg, who have declared my intention of becoming a citizen of the United States, and resident of New York city, county of New York, State of New York, have invented an Improvement in Methods of Dry-Crinkling Paper, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts in each of the several views.

This invention relates to the manufacture of crinkled or créped paper adapted by reason of its stretchable qualities for wrapping, packing and lining uses and also in lighter weights and grades for other uses such as paper napkins and decorative paper effects. In the manufacture of this kind of paper hitherto so far as known to me it has been considered necessary to soak or thoroughly moisten the paper web usually with hot water prior to the crinkling thereof and so as to condition the paper for the crinkling operation. This has imposed a very great limitation on the speed at which the crinkled paper can be produced, since an appreciable time is required for paper particularly heavier grades of calendered paper to take up enough water to saturate the same. This preliminary soaking of the paper has also had the serious objection that it has destroyed the calendaring effect with its resultant toughening of the paper web, so that the paper after it is soaked and then crinkled is not nearly as strong as it was originally, though its capability of stretching makes it better adapted to withstand local strains and stresses. I have discovered that by the employment of air pressure to cause adherence of the paper web to the crinkling drum the paper may be crinkled entirely dry, i. e., in its normal commercial state and that the paper web may be led directly from a supply roll of paper on to the crinkling drum and against the crinkling doctor without any intermediate or interposed roll or other element and since the crinkled paper is dry it may be wound directly on to a take-on roll, thus very greatly simplifying the apparatus as compared with previous types of crinkling apparatus. In accordance with my invention the paper web does not require to be moistened with water to any extent, but it may be either plain dry

paper or it may be waxed or otherwise coated or saturated for waterproofing or other purposes previous to the crinkling and such waxing or other coating or impregnating of the paper may if desired be carried out as an adjunct of the crinkling operation and so that the freshly coated or impregnated paper is led directly to the crinkling drum. Various and different means may be employed within the contemplation of the invention for obtaining the requisite air pressure for causing adherence of the paper to the crinkling drum, but I preferably employ atmospheric pressure produced by suction, and for illustrative purposes herein I show this suction effect as produced by a suction box located within a crinkling drum in the form of a hollow shell and exerting its suction effect through multiple small perforations through such crinkling drum shell. The foregoing and other objects and advantages of the invention will more fully appear from the following detailed description, and the distinctive features of novelty will be thereafter pointed out in the appended claims.

Referring to the drawings:

Fig. 1 is a diagrammatic longitudinal vertical section showing the carrying out of the present method by one appropriate form of apparatus; and

Fig. 2 is a similar diagrammatic view showing the carrying out of the method including the step of coating or impregnating the paper just before the crinkling thereof.

R indicates a roll of paper to be crinkled mounted on a stand 10 and adapted to deliver a paper web W to the crinkling drum 11. This drum is mounted for rotation in a suitable housing support 12 and may be driven in any usual or suitable manner. In accordance with my invention this drum is formed as a hollow shell with multiple small perforations 11' therethrough. Within this shell is mounted a suction box 13 having a suction mouth 13' co-operative with a restricted angular extent of the drum 11. A doctor blade or plate 14 is mounted for co-operation with the drum 11 and with its operative edge in proximity to the front side of the suction mouth 13'. The crinkled paper web W' as it is cleared from the drum by the doctor may be led directly to a take-on roll R' or otherwise taken care of. With this method and organization for crinkling,

the paper web is wholly unimpeded in its movement from the paper supply roll to the crinkling drum and the crinkling may be carried out at a relatively high rate of speed, in practice at a rate of six hundred feet per minute or more. The dry paper web is held strongly and uniformly adherent to the crinkling drum as it is advanced to the crinkling point by the air suction which may be graduated as required for different grades and thicknesses of paper, and it is to be particularly noted that no press roll or moisture applying member being required to press the web against the crinkling drum, any minor percentage of back-slippage of the web with reference to the drum by reason of the resistance of the doctor, is immaterial, whereas were there a moisture applying roll or press roll pressing the paper against the drum before it reaches the crinkling doctor, such minor back-slipping even though it might not be of any great extent, would cause wrinkles and folds in the paper as it reached the doctor which since the suction would thereby be lost would interfere with the proper and uniform crinkling thereof. In accordance with my invention also, and as a further important feature thereof, the paper web may be drawn directly from the roll R by the adherence thereof to the rotating crinkling drum caused by the air pressure due to the suction box or equivalent device, thus further simplifying the apparatus as well as avoiding the need of any press roll co-operative with the crinkling drum. The form of the invention shown in Fig. 2 is similar to that already described except that the paper web from the roll R instead of being led directly on to the crinkling drum, is first guided through a tank or container 15 holding wax in fluid form or other substance adapted for coating or impregnating the paper. From this tank the web is led around guide rolls 16 to the crinkling drum and crinkled and taken care of as already explained. In this case while the paper web is not weakened as it would be by soaking with water, and while the speed of operation is not materially reduced, the paper web is to a considerable extent softened and rendered more pliable and thus in certain cases rendered better adapted for the crinkling operation. I am

aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The herein described method which consists in leading an unmoistened paper web upon a crinkling drum, causing adherence of the paper to the drum solely by air pressure, and clearing the paper from the drum by a doctor or abutment to produce a crinkled effect therein.

2. The herein described method which consists in drawing an unmoistened paper web from a supply roll by the adherence thereof to a crinkling drum, causing such adherence of the paper web to the crinkling drum by air suction, and clearing the unmoistened adherent paper from the crinkling drum by a doctor or abutment to produce a crinkled effect thereon.

3. The herein described method which consists in causing a paper web to adhere to a crinkling drum by air pressure sufficiently to draw the paper web from a supply roll, and clearing the adherent web from the drum by means of a doctor or abutment to produce a crinkled effect therein.

4. The herein described method which consists in causing adherence of an unmoistened paper web to a crinkling drum by air suction sufficient to draw the web from a supply roll, and clearing the unmoistened paper from the drum by engagement with a doctor to produce a crinkled effect therein.

5. The herein described method which consists in causing adherence of a paper web to a crinkling drum by air suction, drawing the paper thereby from a supply roll through a coating station, and clearing the adherent paper from the drum by a doctor to crinkle the same.

In testimony whereof, I have signed my name to this specification.

KURT WANDEL.