

No. 701,734.

Patented June 3, 1902.

C. C. JENKS.
PAPER OF VARIABLE THICKNESS.

(Application filed June 20, 1901.)

(No Model.)

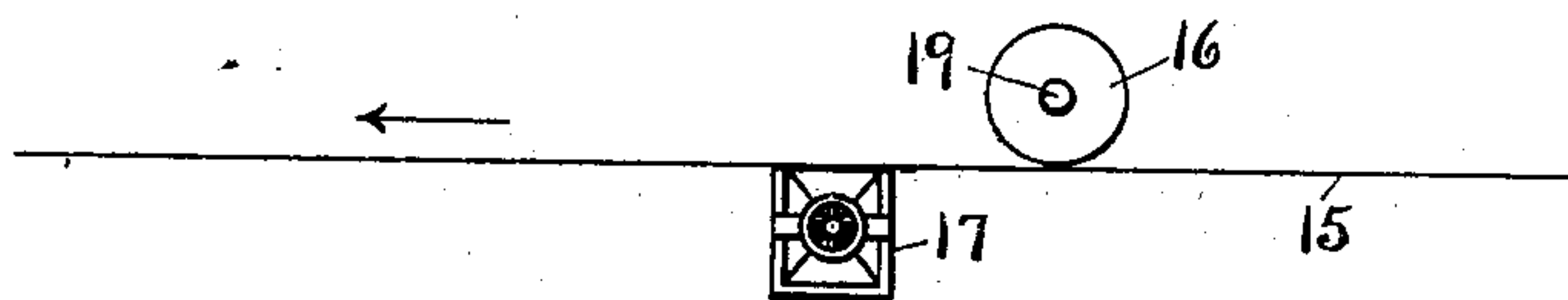


FIG. 1.

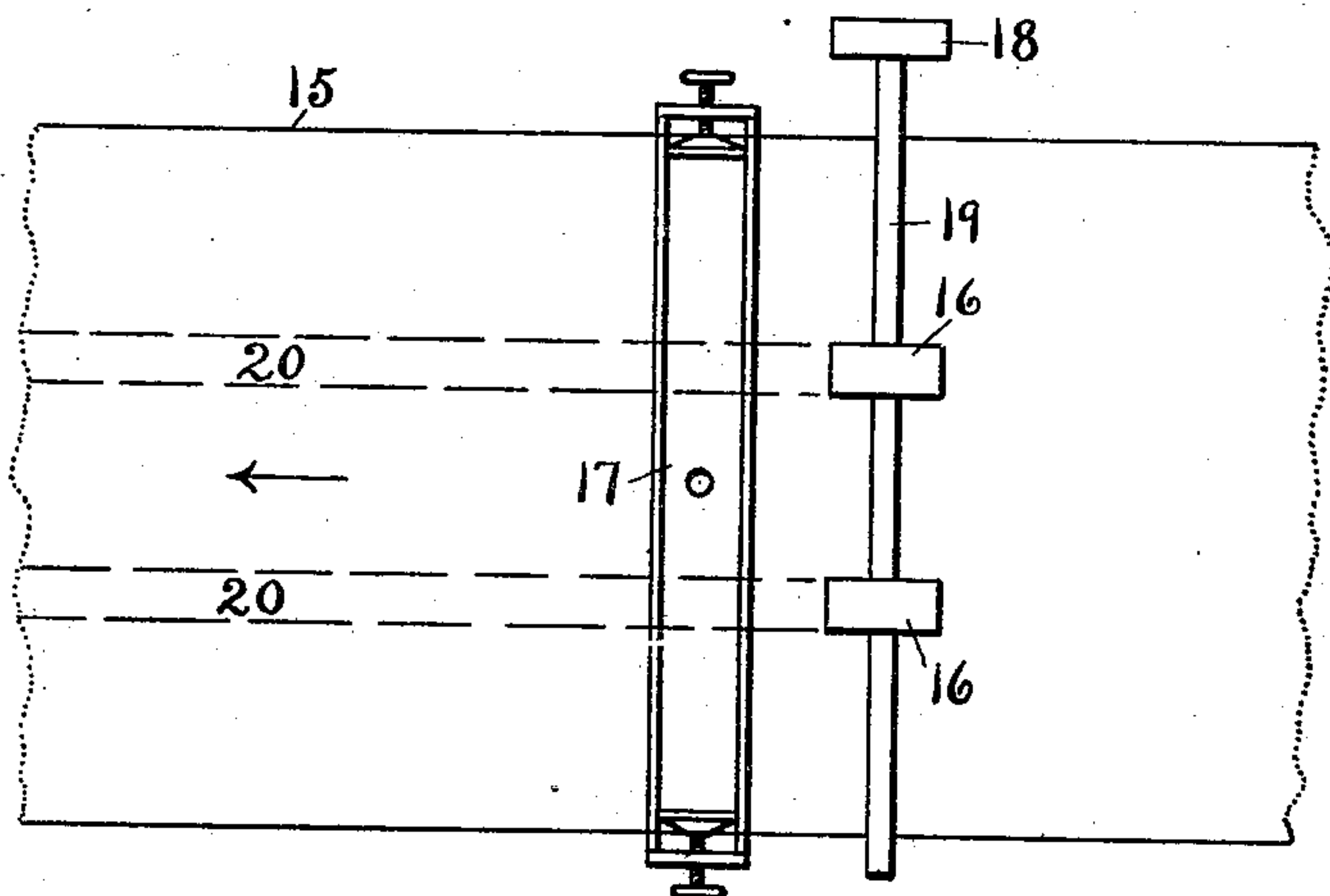


FIG. 2.



FIG. 3.

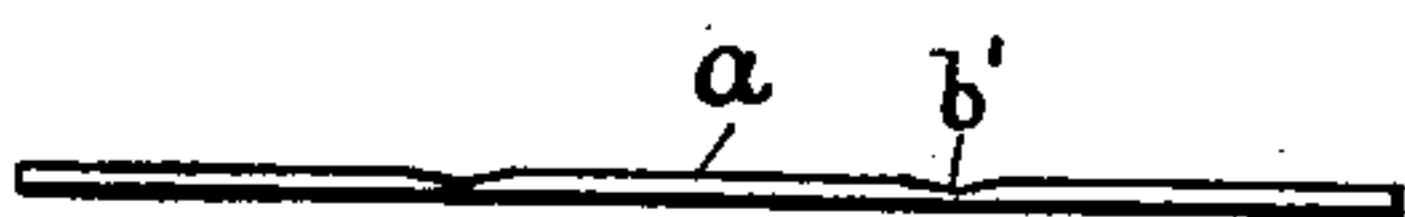


FIG. 4.



FIG. 5.

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CHARLES C. JENKS, OF HOLYOKE, MASSACHUSETTS.

PAPER OF VARIABLE THICKNESS.

SPECIFICATION forming part of Letters Patent No. 701,734, dated June 3, 1902.

Original application filed March 5, 1901, Serial No. 49,670. Divided and this application filed June 20, 1901. Serial No. 65,266. (No specimens.)

To all whom it may concern:

Be it known that I, CHARLES C. JENKS, a citizen of the United States, residing at Holyoke, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Methods of Manufacturing Paper of Variable Thickness and in the Paper Itself, of which the following is a specification.

This is a part of my application as originally filed March 5, 1901, Serial No. 49,670.

My invention relates to the method of making or producing paper of variable thickness and to the product of this method.

The method consists in displacing part of the pulpy mass of paper material at a time when it is sufficiently soft for the fibers, &c., comprising the same to be advantageously acted upon to bring about the desired result of forming a channel therein and in extracting moisture from the channeled portion thereof, the whole operation taking place during the ordinary process of manufacture. The part of the finished paper so treated is of less thickness than the balance of the web or sheet, and this web or sheet constitutes the new product.

The objects of my invention are to produce paper of variable thickness in a practical and economical manner with like sections thereof substantially uniform or similar to each other in every essential particular. Such paper is adapted to be used largely in the manufacture of various kinds of blank books and for other purposes where it is desired to attach independent sheets or leaves to the book or to each other, so as to obtain a uniform thickness or flush surfaces when the parts are so united. Heretofore attempts have been made to produce paper of this kind by skiving or grinding down a portion of the sheet in its finished state or after it has been made of uniform thickness throughout, a method that is generally impracticable and specifically expensive and unsatisfactory. It is practically impossible to produce in this way a sheet that varies in thickness and at the same time has like sections uniform throughout, to say nothing of obtaining a plurality of sheets corresponding in all respects with each other. With my method I am able to produce a web of paper possessing the required qualifications, whether adapted to be cut into sheets in one

direction only or in two directions—that is to say, the web may be half-channeled at one edge to be cut transversely into sheets, or it may be half-channeled at both edges or channeled intermediate of the edges to be cut both transversely and longitudinally.

To carry out my method in a practical manner for the purpose of producing paper of variable thickness, I prefer to use mechanism similar to that illustrated in the first two figures of the accompanying drawings, in which—

Figure 1 is a side view of the aforesaid mechanism; Fig. 2, a plan view of the same, and Figs. 3, 4, and 5 transverse edge views of the product of my method.

Similar figures and letters refer to similar parts throughout the several views.

Before explaining the method in connection with the illustrated mechanism a general description of the method alone will be given. The paper material while in a plastic condition on the moving wire of an ordinary Fourdrinier paper-making machine is brought into contact with a member or members, which displace and compress the portions of the material so brought into contact, producing a channel or channels therein the bottoms of which are thinner than the adjoining portions. Moisture is then extracted from the thin portions, preferably by suction, and the thicker portions are treated and finished in the usual manner. The method may be said to consist in subjecting the pulpy mass to the action of rotary members by which certain portions are displaced and compressed and in removing more of the moisture in proportion from the displaced and compressed portions than from the portions adjoining.

Essential mechanical parts adapted to carry out this method, as shown in Figs. 1 and 2, consist of the Fourdrinier wire 15, arranged to travel in the direction indicated by the arrows, the displacer and compressor roll or rolls 16, and a vacuum or suction box 17, the rolls being in front of the box. The rolls 16 may be driven by contact with the moving mass on the wire 15 or by independent means, as a belt on the pulley 18 at the end of the roll-shaft 19, the speed of the rolls being the same as that of the wire in any event. As

the mass on the wire passes beneath the rolls 16 channels will be formed therein, as indicated by the broken lines 20 in Fig. 2. The moisture in the compressed strips is next removed when the suction-box 17 is reached, or a greater amount of moisture in proportion than from the thicker portions, and the mass moves on to be acted upon by the other members of the machine in the customary manner. The channeled portions are practically finished after the box 17 is passed, and the completed web consists of the wide thick strips *a* and the narrow thin strips *b*, Fig. 3. The web may now be cut up into suitable lengths and again cut through the centers of the strips *b*, thus providing sheets having a thin edge, like parts being uniform throughout.

It will be understood that more or less than two rolls 16 may be employed on a single shaft or the rolls may be arranged on two or more shafts, one back of the other, singly or in series, or the rolls may be arranged one behind the other, singly or in series, and adapted to carry displacer and compressor bands of rubber or other suitable material, which perform the same work as the rolls 16. Different kinds of pulp require different arrangements of displacer and compressor members in order to bring about the best results. Any suitable material, as in the case of the above-mentioned bands, may be employed upon the peripheries of the rolls, this also depending upon the kind of pulp to be acted upon.

The face of the displacer and compressor member may vary from that shown to form a correspondingly-different channel. Thus a channel like *b'* in Fig. 4 may be produced or like *b''* in Fig. 5, and other forms will readily suggest themselves to those skilled in the art.

When sheets of paper made by my method are cut through the centers of the channels *b*, it will be seen that one of any two of the smaller sheets thus obtained may be turned over and joined to another, their thin edges coming together and forming a joint or connection of the same thickness as the other portions, and if the paper shown in Figs. 4 and 5 be cut through the centers of the channels *b'* and *b''* a sheet of the *b''* paper, for instance, may be turned over and joined to a sheet of the *b'* paper in the same manner and with the same result as before.

The displacer and compressor member might be placed adjacent to a deckle-strap,

and thus form what may be termed a "half-channel;" but this arrangement is not thought to be as practical as one by which said member is brought nearer the center. Wherever the terms "channel," "channels," "channeled," or "channeling" occur in the claims, however, it is intended that the same shall include within their scope the half-channel method and formation above described.

It is obvious that the moisture may be withdrawn from the channeled portions by means of a suction-box so constructed as to act only upon said portions; but this variation is not a departure from the nature of my invention.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The method of manufacturing paper of variable thickness designed to be used where it is desired to attach independent sheets or leaves thereof to a book or to each other, so as to obtain a substantially uniform thickness or flush surfaces when the sheets or leaves are so united, consisting in channeling the paper material before the same has been subjected to suction.

2. The method of manufacturing paper of variable thickness designed to be used where it is desired to attach independent sheets or leaves thereof to a book or to each other, so as to obtain a substantially uniform thickness or flush surfaces when the sheets or leaves are so united, consisting in channeling the paper material before the same is subjected to suction, and then extracting a greater proportion of moisture from the thinner portion than from the thicker portion.

3. The method of manufacturing paper of variable thickness designed to be used where it is desired to attach independent sheets or leaves thereof to a book or to each other, so as to obtain a substantially uniform thickness or flush surfaces when the sheets or leaves are so united, consisting in channeling the paper during the ordinary process of manufacture and before it is subjected to suction, and in extracting moisture from the channeled portion or portions.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES C. JENKS.

Witnesses:

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DEXTER E. TILLEY.