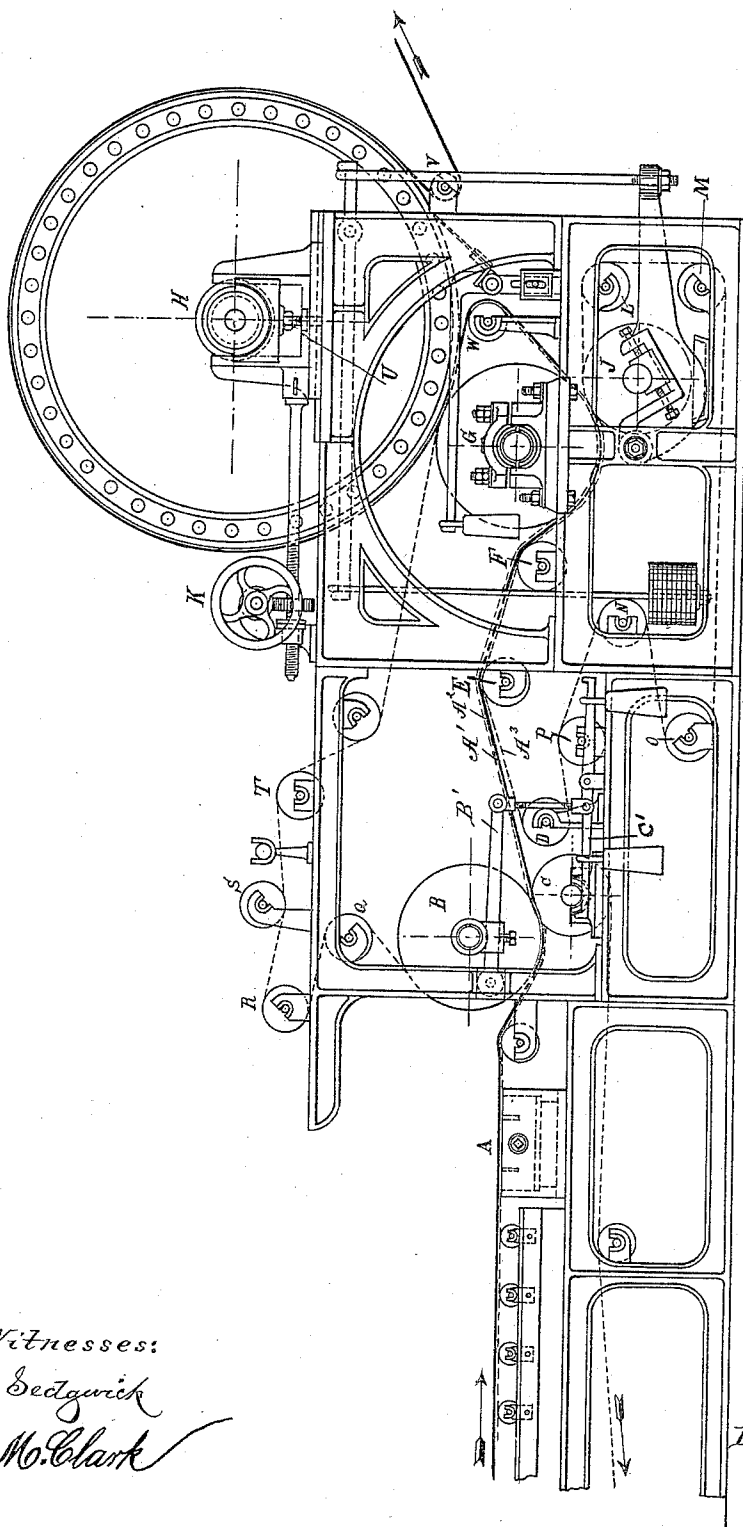


(No Model.)

H. HOEBORN.
PAPER MAKING MACHINE.

No. 445,003.

Patented Jan. 20, 1891.



Witnesses:
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UNITED STATES PATENT OFFICE.

HEINRICH HOEBORN, OF HEMER, GERMANY.

PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 445,003, dated January 20, 1891.

Application filed February 12, 1889. Serial No. 299,610. (No model.) Patented in Germany December 9, 1887, No. 46,422; in England January 13, 1888, No. 585; in France January 30, 1888, No. 188,433, and in Belgium January 30, 1888, No. 80,461.

To all whom it may concern:

Be it known that I, HEINRICH HOEBORN, a subject of the King of Prussia, residing at Hemer, Westphalia, in the Kingdom of Prussia, Germany, have invented new and useful Improvements in Paper-Making Machines, (for which I have obtained Letters Patent in Germany, No. 46,422, dated December 9, 1887; in Great Britain, No. 585, dated January 13, 1888; in France, No. 188,433, dated January 30, 1888, and in Belgium, No. 80,461, dated January 30, 1888,) of which the following is a specification.

This invention relates to improvements in paper-making machines, whereby one and the same machine is enabled to manufacture paper of all kinds of materials and of any desired thickness, varying from the thickest card-board to the thinnest tissue-paper.

I will describe my improvements with reference to the accompanying drawing, which shows a side elevation of so much of a paper-making machine as is necessary to explain my invention—namely, the part between the couch-er and the first drying-cylinder.

The couch-rolls and the entire sieve apparatus is driven by a felt forming the upper felt A'. Motion is imparted to this felt from the upper press-roll G, and by this motion a uniform speed of the entire sieve apparatus is effected. The principal advantage of the use of such an upper felt consists, however, in that the leading of the paper sheet from the couch-rolls, which is otherwise necessary, is obviated, as the sheet A², passing off from the sieve A, and which has passed through the couch-rolls, adheres momentarily to the upper felt. All previous constructions with a similar arrangement were subject to the great disadvantage that on passing from the couch-rolls and press-rolls the paper sheets separated from the upper felt, and the paper, becoming shifted, was consequently either torn or creased in the wet-press, particularly when making light tissue-papers.

My invention consists in means for preventing the paper sheet from becoming detached from the felt and for pressing out any air-bubbles that may form, so that the paper always arrives perfectly smooth under the

press-rolls, whereby no creasing or tearing thereof is possible even with the thinnest material. The couch-rolls B C are for this purpose carefully adjusted. The upper couch-roll B is not supported, as usually, by sliding bearings, but upon the horizontal arm of a right-angular lever B', the vertical arm of which is secured to a horizontal lever C', fulcrumed in a vertical standard on the frame of the machine below the upper couch-roll and carrying a weight at each end movable to and from the fulcrum of said lever, the lower couch-roll being journaled in fixed bearings on the support for said standard. By this means it is possible to regulate the pressure of the upper couch-roll according to the nature of the material, which may be made more or less than its own weight, and thus give the upper couch-roll exactly the pressure which is necessary for obtaining varying qualities of soft or hard material—a perfectly faultless sheet of paper. Between the couch-rolls B C and the wet-press G J there are two guide-rollers E F, so arranged that the sheet A², coming from the couch-rolls, rises and passes over the roller E at an obtuse angle to the wet-press. Over the rollers E and F also passes the under felt A², passing over the rollers D E F L M O N P, which heretofore served for leading the paper to the press-rolls. The front guide-roller D for the under felt is so arranged in relation to the couch-rolls that the sheet A², adhering to the upper felt, will also be carried by the under felt as soon as it leaves the couch-rolls, and as it passes in an obtuse angle over the roller E and roller F to the press-rolls it is pressed firmly between the two felts. Air-bubbles are by this means removed without danger, and any shifting of the paper in its further travel is prevented. The paper being led in this manner between the press-rolls, the action of the latter upon the former is the most favorable possible, and the paper then only carried by the upper felt is led up over guide-roller W to the drying-cylinder H, from which it is led away over roller V. This first drying-cylinder is also driven from the cylinder G or the upper cloth thereon, and it is provided with an adjusting-screw U for accurate adjust-

ment thereof and operated by worm and worm-wheel gear K. By this manner of guiding a more perfect smoothness of the sheet of paper on one side is obtained, owing to the 5 fast adherence of the paper to the hot cylinder, than could otherwise be produced. The manufacturer can glaze the paper, if desired, on both sides by leading the sheet of paper pressed out and taken in a half-dry state from 10 the drying-cylinder in the inverse direction to a second cylinder. The upper felt is led back to the coucher-cylinder B, over the guide-rollers Q R S T.

As to the capabilities of this improved machine, it may be stated it can produce with 15 perfect safety tissue-paper of sixteen grams to the square meter, while the best-known machines of this class with smaller producing power can only make such paper of the minimum weight of twenty-four grams without 20 the guarantee of the perfect condition of the product such as is afforded by the present improvement.

Having now particularly described and ascertained the nature of my said invention and 25 in what manner the same is to be performed, I declare that what I claim is—

In a paper-making machine, the combination of the couch-rolls B C, the press-rolls G J, the upper and lower felts, and guide-rollers 30 E F, arranged between the couch and press rolls, substantially as herein described, whereby the paper in its passage from the couch-rolls to the press-rolls is made to pass between two felts and is guided between the same in 35 a broken line forming an obtuse angle to the press-rolls, as set forth.

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

HEINRICH HOEBORN.

Witnesses:

CARL KRINGER,
EWALD HEIRSHOFF.