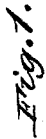
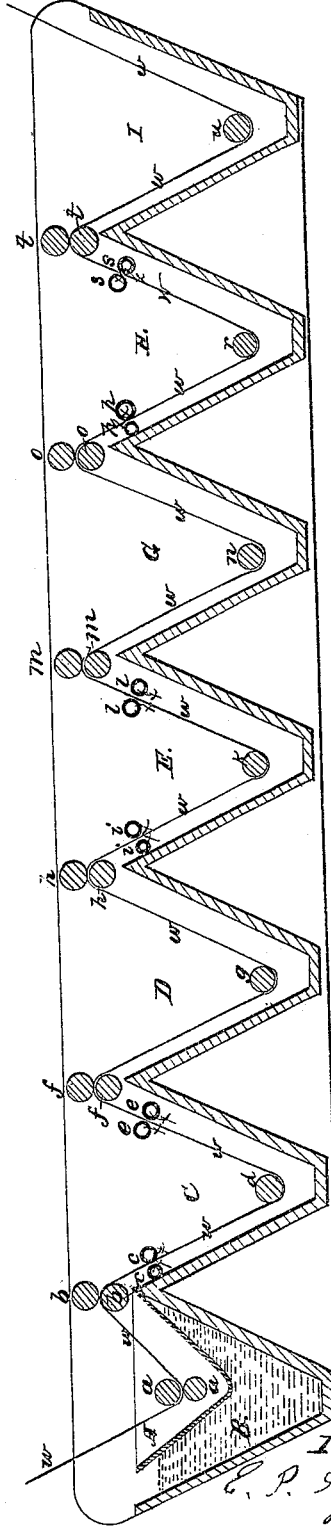


Patented Sept. 27, 1870.



R. L. Turner
J. C. Bar



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United States Patent Office.

E. P. HUDSON, OF NEW YORK, N. Y., ASSIGNOR TO NEW YORK WATER-PROOF PAPER COMPANY, OF NEW YORK CITY.

Letters Patent No. 107,686, dated September 27, 1870.

IMPROVEMENT IN APPARATUS FOR PREPARING PARCHMENT OR WATER-PROOF PAPER.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, E. P. HUDSON, of the city, county, and State of New York, have invented an Improvement in Apparatus for Preparing an Improved Water-Proof Material from Paper; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawing making part of this specification—

Figure 1 being a plan of the principal part of the apparatus to which my improvement belongs, sufficient to show its operation.

Figure 2, a longitudinal vertical section thereof.

Like letters designate corresponding parts in both figures.

I will first describe the general features of the whole apparatus.

The body of this apparatus may be of any suitable and convenient form, as represented, or otherwise, and of a width sufficient to operate upon the widest rolls of paper required. It consists of a series of compartments or troughs, B C D E G H I, for containing the various solutions and baths to which the paper is subjected in the process.

Over the partitions between the several compartments, respectively, are pairs of squeezing-rollers *b b*, *f f*, *h h*, *m m*, *o o*, and *t t*, between which the roll, *w*, of paper successively passes, and is subjected to the required pressure.

The lower roller of each pair is revolved by any suitable means, at the proper speed, and in the required direction, to pass the paper through the apparatus at the desired rate of movement. The motions of all the rollers should be uniform. The upper rollers are pressed down upon the lower rollers by springs of proper strength, or other means. The location of each pair of rollers is not directly over the partition below, but always a little to one side, as represented, toward the direction from which the paper moves, in order that the liquid of each bath, from which the paper rises as it is expressed, may fall back into the same bath, and not be carried over into the next bath, and be mixed therewith.

Near the bottom of each compartment is located a friction-roller, *d*, *g*, *k*, *n*, *r*, or *u*, down around which the paper-roll passes, as indicated, in order to immerse it in the baths.

The other parts of the apparatus are special to successive steps of the process, and will be best described in connection therewith.

The roll *w*, of paper, first comes from a roller or reel, and passes down into the bath of two volumes of sulphuric acid and one of water, and runs under a friction-roller in the bath, or preferably, (for some purposes,) between a pair of squeezing-rollers, *a a*, as shown.

Since the acid-bath is required to be kept at a temperature of 60° Fahrenheit, or closely approximating thereto, and since the passage of the paper through it continually raises its temperature, I provide for regulating the temperature accordingly, and the nature of my invention consists in surrounding the acid-bath with a cooling bath, provided with ice or other cooling material.

I hold the acid in a leaden trough or vessel, A, which rests a bath of ice-water, or its equivalent, in the compartment B, underneath. By gradually adding ice in the compartment B the temperature, with proper care, can be kept at the degree required. A thermometer may be permanently situated in the bath, to indicate the temperature at all times.

The roll *w*, from the acid-bath, passes upward between the squeezing-rollers *b b*, by which much of the acid is separated therefrom and returned to the bath. It then descends into a bath of clear water in the compartment C, the water properly circulating through it, so as not to become gradually charged with the acid in the paper; and, in order that the washing may be as complete and effectual as possible, I here add the shower-bath to the immersing-bath.

To effect this, the roll, as it descends into the compartment, passes between two (or more) water-pipes *c c*, having numerous fine perforations, *x x*, in the side toward the paper, through which numerous small jets of water are thrown against the paper with force produced by pressure on the water in the pipes.

Then, as the paper ascends from the water-bath, it may pass again between perforated water-pipes, *e e*, and receive another washing therefrom.

The roll of paper then passes between the squeezing-rollers *f f*, (or over a single roller would answer in this case,) and descends into the compartment D, where it is immersed in a bath of dilute aqua ammonia.

Again, the roll ascends and passes between the squeezing-rollers *h h*, and is there deprived of much of the ammonia-water.

Thence it descends into another water-bath in the compartment E, passing between shower-pipes *i i* and *l l*, as in the compartment C, to wash out the ammonia.

Thence, after passing between the rollers *m m*, (or over a single friction-roller,) it descends into the compartment G, to be immersed in a bath of dilute lime-water, which completes the neutralization of the acid in the paper.

After this the roll passes between the squeezing-rollers *o o* to express the lime-water, and then descends into the compartment H, where it is washed, as in compartments C and E, passing between sprinkling-pipes, *p p* and *s s*, as before.

Finally, after passing between the rollers *t t*, (or over a friction-roller,) the roll descends into the compartment I, in which it receives a bath of glycerine, according to the process described in a previous application for Letters Patent made by me. Thence the roll ascends, to be wound on a reel or spread out to dry, and be finished for market.

By this apparatus the process of preparing the paper is continuous and expeditious, and it is sure and uniform in result.

I disclaim the separate troughs and the sprinkling-

pipes, as set forth in Letters Patent granted to Stuart Gwynn, March 23, 1869.

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

The cooling-bath B, around the acid-bath A, for the purpose herein specified.

E. P. HUDSON.

Witnesses:

JOS. BROWN,

EDM. F. BROWN.