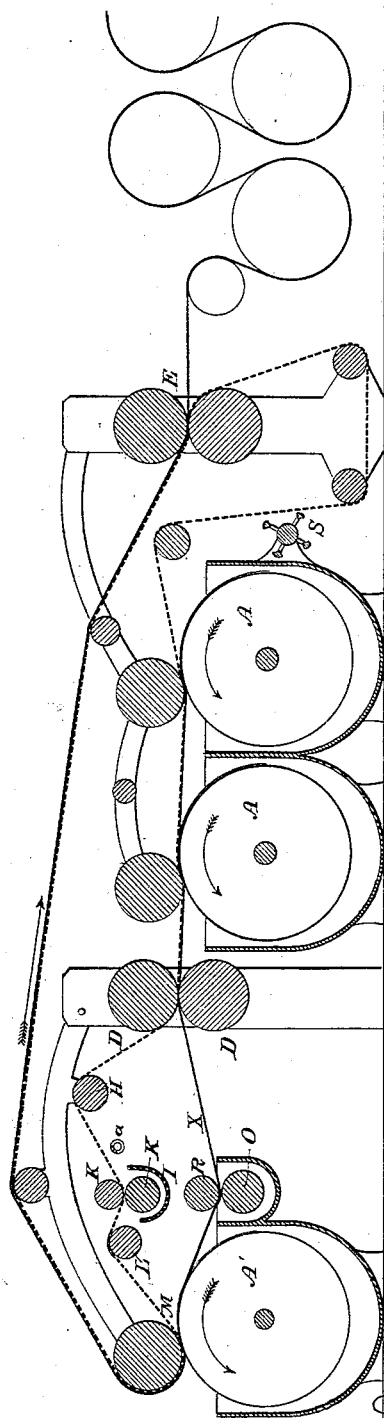


J. O. GREGG.  
Manufacture of Paper.

No. 211,991.

Patented Feb. 4, 1879



Attest:  
Clarence Poole  
L. M. July

Inventor:  
Joseph O. Gregg  
by Ellis Spear  
Atty.

# UNITED STATES PATENT OFFICE.

JOSEPH O. GREGG, OF ELKHART, INDIANA.

## IMPROVEMENT IN MANUFACTURE OF PAPER.

Specification forming part of Letters Patent No. **211,991**, dated February 4, 1879; application filed January 4, 1879.

*To all whom it may concern:*

Be it known that I, JOSEPH O. GREGG, of Elkhart, Indiana, have invented an Improvement in the Manufacture of Paper, of which the following is a specification:

My invention relates to the manufacture of paper of that class which is formed of darker or coarser material with a facing of a finer or whiter.

It consists, first, in applying directly to the dry or partially dry sheet of paper, as it comes from the making-cylinder, the finishing-surface, formed also directly from the pulp.

It consists, also, in an apparatus for applying this process.

Heretofore, in the manufacture of paper of this class, it has been customary either to apply the finishing-pulp directly to the coarser or board pulp upon the wet felt, or to form the board or paper of the coarser material and afterward paste the finishing-paper thereto.

The latter process is expensive, and in the former the direct application of the pulp to form the finishing to the wet paper upon the felt caused the finishing-sheet to be soiled by the dark and dirty water absorbed from the dark paper and the felt that carried it.

In carrying out my process I use but one felt. This takes up the dark coarse pulp from the vats, in the usual way. Before, however, it is carried to the making-cylinder by which the finishing-pulp is applied, the felt is cleaned, and the paper or board formed from the dark pulp is dried, or partially dried, by any means suitable for the purpose. After this has been done, no water remains, either in the newly-formed sheet or in the felt, by which the white or finishing pulp could be soiled. The latter pulp is then applied directly by the making-cylinder to the board or paper.

In order to facilitate the cleaning and drying of the felt and the dark sheet they are separated after leaving the making-cylinder, and, preferably, passing through wet-presses, the wet felt being carried over guide-rolls and between squeezing-rolls, and either washed and pressed, or simply pressed. Thence it is returned to the cylinder which applies the finishing-pulp. It there meets the paper or board brought directly from the wet-press.

The board may have, if desired, paste ap-

plied to it after leaving the wet-press and before reaching the finishing-cylinder.

It is essential that the sheet, when it reaches the cylinder by which the finishing-pulp is applied, should be partially or entirely dry, so as to be free from any dirty water which would soil the facing. The steps which I have found to be most advantageous for securing this object are, first, that the felt, after it has taken up the coarse dark pulp which forms the body of the paper or board, should pass through the wet-press; next, that the felt should be separated from the sheet and passed through pressing or washing and pressing apparatus before it reaches the cylinder for the application of the finishing-pulp. It may return to the dark sheet at or before the point of its contact with the next cylinder.

The application of the paste to the dark sheet before it reaches the finishing-cylinder may be used with good effect; but it is not essential, as the wet finishing-pulp will adhere to the dark sheet, the latter being moist enough for the purpose without containing any superfluous water to discolor the white finish.

In the drawing hereunto attached I have shown in vertical longitudinal section an apparatus adapted to carry out my invention. In this drawing, A A represent ordinary making-cylinders, revolving in proper vats, in the usual manner. Over these is carried the felt, (shown in dotted lines.) The dark coarse sheet of ordinary straw pulp, or other dark coarse material, is formed on the cylinders, and taken up by the wet felt, in the usual manner. A wet-press at D D is located next in order after the making-cylinder A A. The felt passes through this press, and the dark sheet is pressed on the under side of the felt. At this point, and after leaving the press, the wet felt is separated from the dark sheet, and passes upward over a guide-roll, H. Between the guide-rolls H and L is shown a trough, I, in which are located the squeeze-rolls K K.

A perforated pipe (shown at a) may be used, if desired, to wash the felt before it passes through the squeeze-rolls K K. The felt, after being pressed to remove the dirty water, passes over the guide-rolls L, and returns to the dark sheet at M, at the point of contact with the next cylinder, or a little before. To this point

the dark sheet shown by the full line X is brought directly from the wet-press D D. A pasting-cylinder, O, may be located between the wet-press D D and the cylinder A', which applies the finishing-pulp. This paste-roll revolves in an ordinary paste-vat, and the sheet may be caused gently to touch the surface by the roll R.

From the making-cylinder A' the finished sheet may be carried upon the felt, over suitable guides, to a wet-press, E, after which the sheet is separated from the felt and carried over suitable steam-driers. The felt returns over proper guides, through suitable washing apparatus S, to the making-cylinder A.

The finishing-pulp is firmly united to the dark sheet by the action of the press E; but as the dirty water had been extracted from the felt and the dark sheet previous to the application of the finishing-pulp, there can be no stain upon the finished paper.

In forming the paper or board by my improved process, I use for the body of the paper, or for one side, ordinary straw-pulp, or other coarse dark material. For the other side, which constitutes the face of the paper, I use clear, or substantially clear, wood-pulp.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The described process in the manufacture of paper or board, consisting, first, in forming the dark coarse sheet, then drying, or partially

drying, the same and cleaning the felt, and subsequently applying the wet finishing-pulp, as set forth.

2. In the manufacture of paper of the described class, the process of first forming the dark sheet upon the felt, then passing it through a wet-press, and subsequently separating the felt from the sheet and cleaning the said felt, and returning it to the said sheet at or near the point of contact with the cylinder for application of the finishing-pulp, as set forth.

3. An apparatus for forming paper of the described class, consisting of an endless felt, of a making cylinder or cylinders for the dark pulp, of a making cylinder or cylinders for the finishing-pulp, and of intermediate mechanism for cleaning the felt, the parts being combined and operating as set forth.

4. An apparatus for making paper of the described class, consisting of an endless felt, of the making-cylinders A, wet-press rolls D D, guide-rolls, and intermediate squeezing-rolls, with or without a washing-pipe, and of a cylinder, A', the parts being adapted to operate in the manner set forth.

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

JOSEPH O. GREGG.

Witnesses:

JULIUS D. WOOD,

JOHN H. BRODRICK.