2 Sheets--Sheet 1.

G. W. RUSSELL.

Manufacture of Pasteboard.

No. 168,186. Patented Sept. 28, 1875.

Fig. 3.

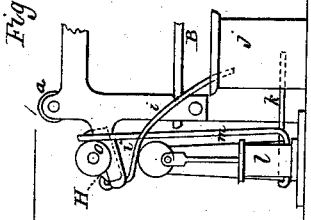


Fig. 2.

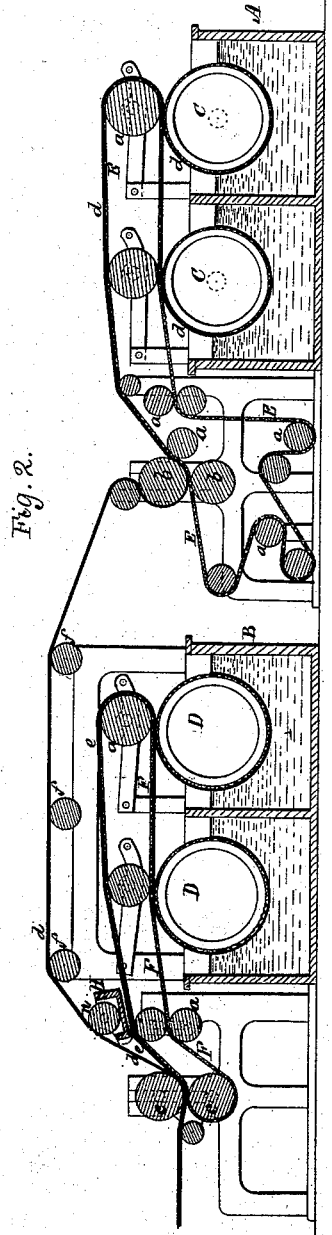
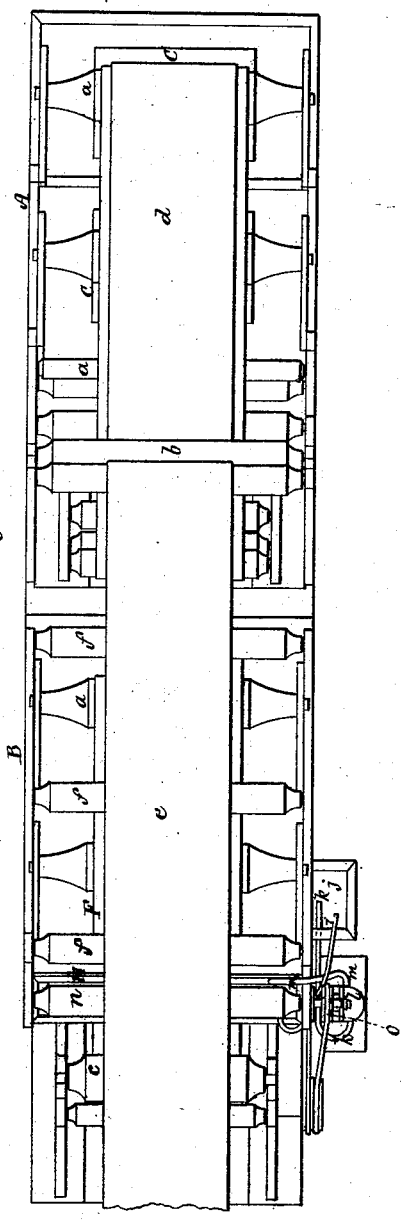


Fig. 1.



WITNESSES.

Wm. Eastman

H. E. Boardman

Geo. W. Russell.

F. Curtis. Atty.

2 Sheets--Sheet 2.

G. W. RUSSELL.

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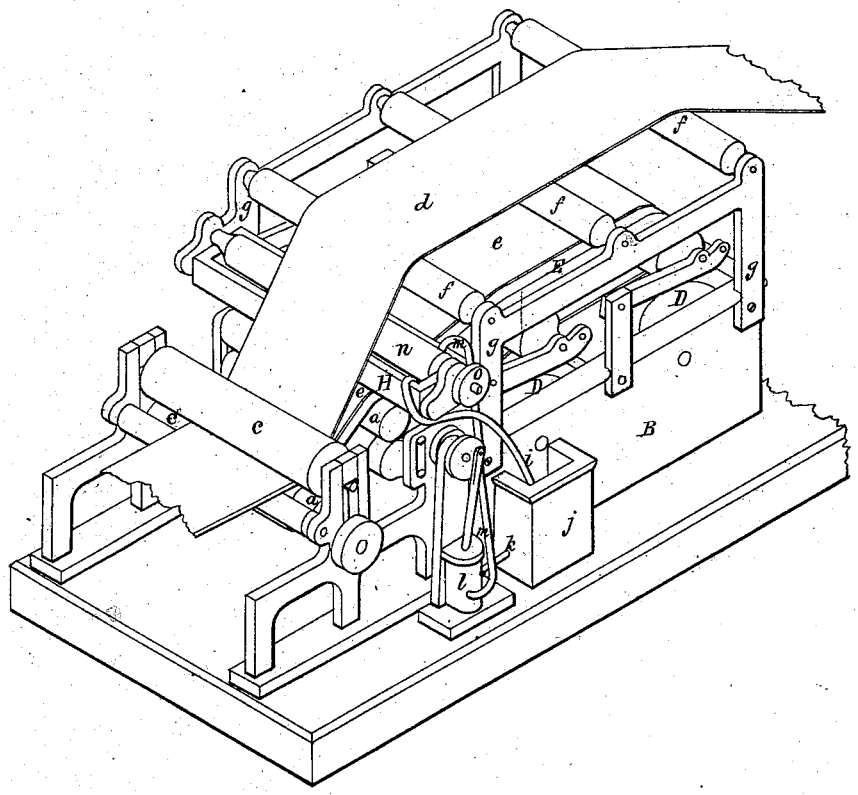
Fig. 4.



Witnesses.
Francis Curtis
H. E. Boardman.

George W. Russell.
F. Curtis. Atty.

UNITED STATES PATENT OFFICE.

GEORGE W. RUSSELL, OF LAWRENCE, MASSACHUSETTS.

IMPROVEMENT IN THE MANUFACTURE OF PASTEBOARD.

Specification forming part of Letters Patent No. **168,186**, dated September 28, 1875; application filed February 23, 1875.

To all whom it may concern:

Be it known that I, GEORGE W. RUSSELL, of Lawrence, Essex county, Massachusetts, have invented a Method of Manufacturing Thick Papers, of which the following is a specification:

This invention relates to means for producing thick papers for various purposes, which are obtained by the unison or joining together of several layers or sheets; and consists in the method, hereinafter explained, of pasting or cementing together two or more webs of partially-completed paper in the process of manufacture, directly from the vats, and previous to being dried.

The drawings accompanying this specification represent, in Figure 1, a plan, and in Fig. 2 a vertical and longitudinal section, of a cylinder paper-machine embodying my invention. Fig. 3 is a side elevation of a portion of one of the "stuff-vats," showing the application of my mechanism thereto. Fig. 4 of the said drawings represents a perspective of one of the stuff-vats, showing the application of the pasting trough and roll.

In these drawings, A and B represent two stuff-vats of a cylinder paper-machine, so called, the cylinder molds which wallow in the pulp contained in such vats, and upon which the film or web of pulp is formed, being shown at C C and D D, respectively, while the endless carrying-aprons for supporting the web as it leaves the mold are shown respectively at E F, and the various rollers about which such aprons travel at *a a a*, &c. The press-rolls nearest each vat are shown at *b b* and *c c*, respectively, and the web of pulp from each vat at *d* and *e*, respectively, the rolls for supporting the first web *d*, after the latter leaves its endless apron and before joining the second web, being shown at *f f*, &c.

The above elementary features are common to cylinder paper-machines now in general use, and contain in themselves nothing to which I lay claim.

In carrying the principle of my invention into practice, I combine with the machine an apparatus for applying a coat of paste to the under side of the upper web, and to effect this result I proceed as follows: Between the housings or standards *g g*, which surmount the vat B and carry the rolls *f f* before named, I dispose a horizontal trough, H, which spans the area between the housings, and is capable of containing a small quantity of paste. An overflow-pipe, *i*, connects the interior of the trough with a cistern, *j*, arranged alongside of the vat B, and serves to carry back to such cistern any excess of paste, which would otherwise overflow the trough, while a second pipe, *k*, connects the interior of the cistern with a pump, *i*, arranged alongside of it, and a third pipe, *m*, connects the pump with the interior of the trough. A paste distributing or applying roll, *n*, is disposed within the trough, and wallows in the paste contained in the latter, and this roll is so situated that the first web of pulp travels in contact with it. A pulley, *o*, is affixed to one end of the roll *n* or its journal, and this pulley is belted to a driving-pulley affixed to the journal of the lower press-roll *c*, which rotates the roll *n* in the paste contained within the trough. The pump *l* is driven by a suitable power, and serves to force paste from the cistern *j* to the trough H, to supply the amount taken up and applied by the roll *n*, and the overflow-pipe leading back to the cistern enables me to keep the trough filled at all times without danger of overflowing it.

The result of this arrangement of the pasting mechanism will be seen at a glance.

The under side of the first web *d*, as it travels over the pasting-roll *n*, receives a coat of paste from such roll, and as the two webs meet and pass together through the press-rolls *c c* they are thoroughly united, and subsequently dried upon the drier of the machine.

The two webs *d* and *e*, as they reach the vicinity of the pasting-roll, are naturally in a somewhat porous and plastic or semi-pulpy condition, and in a state highly favorable to receive the paste to the best advantage, as the fibers are in practically a loose and open condition, and the paste permeates them to such an extent as to effect an almost homogeneous mass or web.

I am enabled to produce by my method a thick paper or board, composed of several sheets or layers, which will never split or become separated, and which is firm and hard in texture.

In the production of perfect board-papers it is a matter of the greatest importance that the sheets shall adhere firmly together. By my method, in which I take advantage of a certain stage in the completion of the webs, when they are in the best possible condition to receive, and be permeated to a certain extent with the paste, I obtain an important result, not attained in any other manner.

I am aware that thick papers and boards, for various purposes in the arts, have been produced by the union of several sheets or layers in different manners. For instance, in the manufacture of printers' press-boards or papers, two or more webs are completed in the machine, with the exception of drying, wound upon reels, and, while in a moist condition, united or run together, without means of securing them other than the natural adhesive properties which they possess or may have acquired while in a pulpy condition. I am also aware that thick papers have been manufactured by running together two webs in a semi-pulpy condition prior to their entrance to the press-rolls; but in this instance, as in the first, no means outside of the pulp, as it leaves the vat, are brought into use to secure the webs together.

I have found, during an extensive experience as a paper-manufacturer, that these modes of producing thick papers cannot be depended upon, as there is great tendency of the webs or sheets to separate; and I have found this objection especially applicable to the manufacture of bristol-board, so called, and paper for merchandise tags and labels, the two latter especially, owing to the hard usage they undergo.

I am furthermore aware that a material for paper collars has been produced by uniting sheets of paper and cloth by means of paste.

So far as my knowledge extends, however, it is original with myself to apply a coat of paste to one, or every alternate one, of two or more webs of paper in a transition state, as they pass from the vats, and while in a semi-plastic or porous state, and, preferably, immediately prior to their passage between the first press-rolls, and it is in this that I consider my invention to exist.

I claim—

1. The described improvement in the manufacture of thick paper from two or more webs of pulp, which consists in the application of paste to said webs at the time and in the manner set forth—that is to say, while said webs are yet in a plastic, semi-pulpy, and incomplete condition, and in transit to the press-rolls, by which the several pasted webs are united and joined in a single homogeneous sheet, as described.

2. The combination, with a paper-machine, of a trough for receiving a limited quantity of paste, a roll wallowing in such paste, and transmitting the latter to one or more webs of pulp, and finally of a cistern for containing a considerable quantity of paste, and a pump connected with such cistern, for delivering such paste to the trough, an overflow-pipe extending from the trough to the cistern, and the whole being substantially as and for the purposes stated.

GEORGE W. RUSSELL.

Witnesses:
J. M. WHEATON,
A. N. BURBANK.