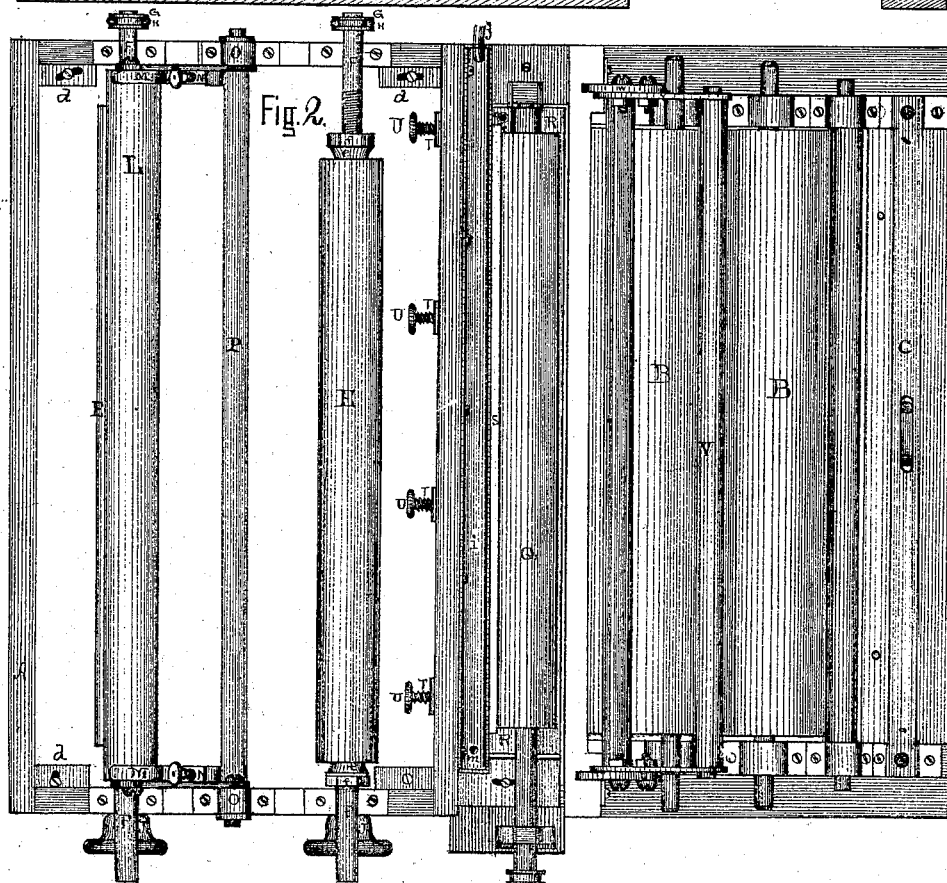
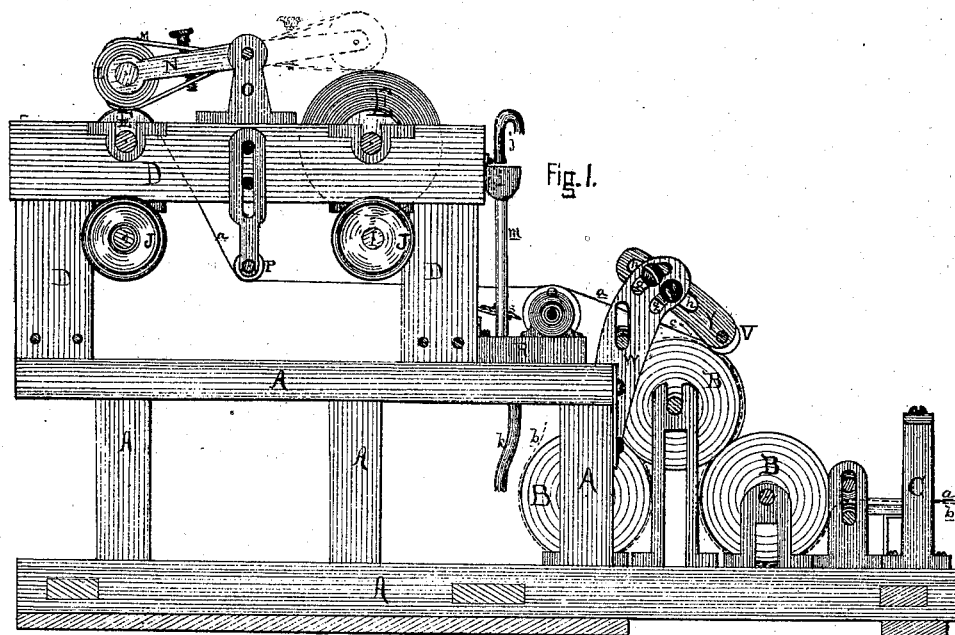


*B.F. Field,
Lining Paper.*

3 Sheets, Sheet 1

No. 111,048.

Patented Jan. 17, 1871.



B. F. Field,
Lining Paper.

3 Sheets, Sheet 2.

No. 111,048.

Patented Jan. 17, 1871.

Fig. 8.

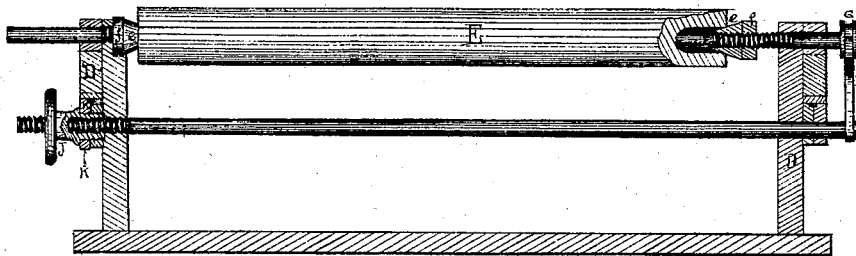


Fig. 4.

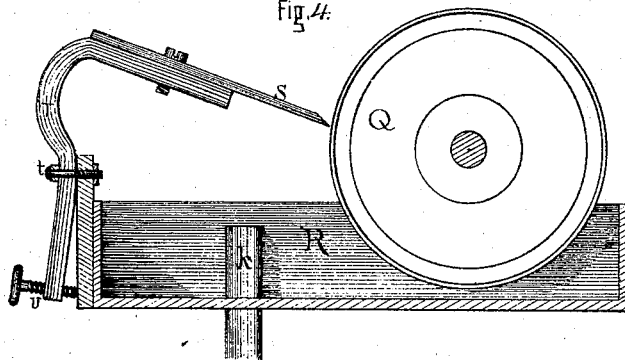
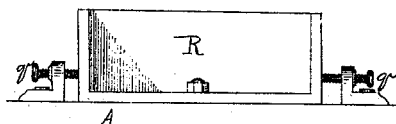


Fig. 5.



Witnesses.

Chas. A. Harkness

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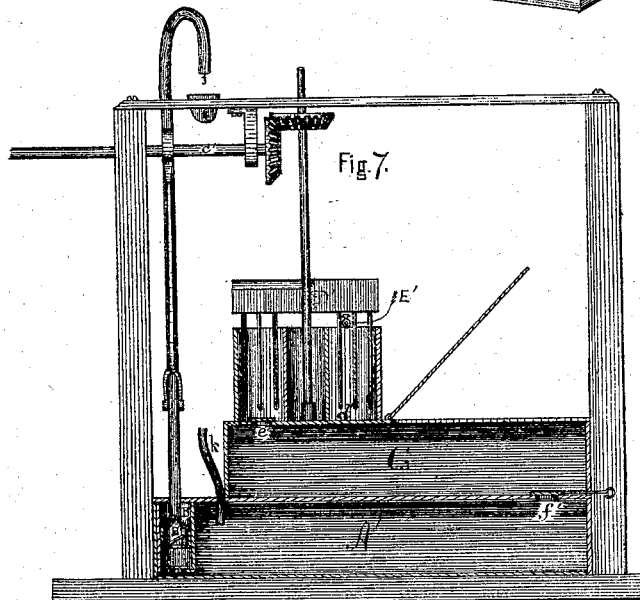
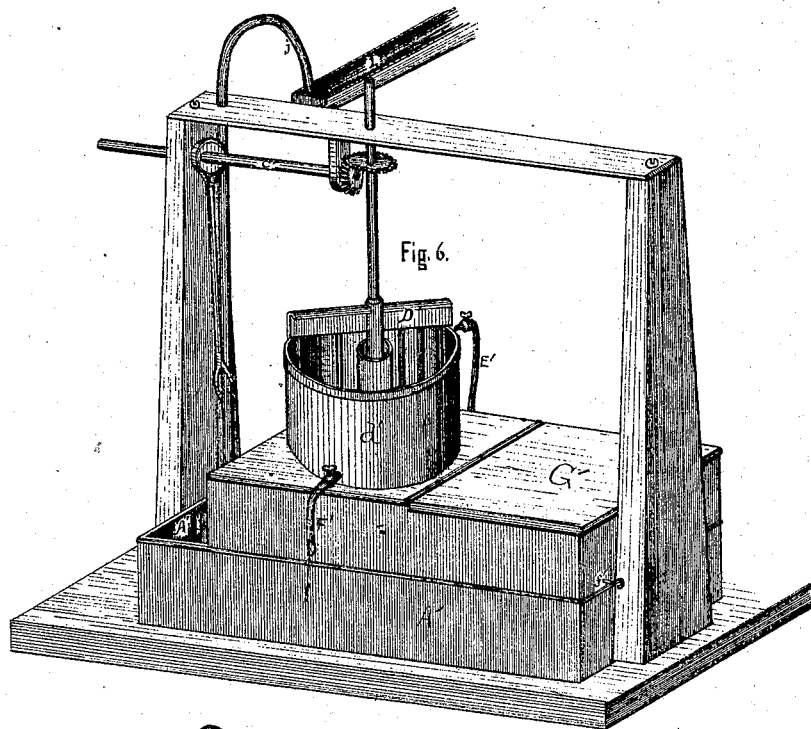
Inventor.

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2 Sheets, Sheet 3.

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No. 111,048. Patented Jan. 17, 1871.



Witnesses.

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UNITED STATES PATENT OFFICE.

BENJAMIN F. FIELD, OF BELOIT, WISCONSIN.

IMPROVEMENT IN MACHINES FOR LINING STRAW-BOARD, &c.

Specification forming part of Letters Patent No. 111,048, dated January 17, 1871.

To all whom it may concern:

Be it known that I, BENJAMIN F. FIELD, of Beloit, in the county of Rock and State of Wisconsin, have invented a new and useful Improvement in Machines for Lining Straw-Board, &c., and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of my machine. Fig. 2 is a plan view of the same. Fig. 3 is an elevation, partly in section, showing the method of lateral adjustment of the thin paper-reel. Fig. 4 is a transverse section of pasting apparatus. Fig. 5 is an elevation of one end of the paste-box with adjusting-screws. Fig. 6 is a perspective view of my paste-making machine, pump, &c. Fig. 7 is a longitudinal vertical section of the same.

My invention relates to the lining of straw-board or other thick paper, during the course of manufacture, with a web of thin white or colored paper, for which Letters Patent were issued to me July 26, 1870; and it consists, first, in an improved manner of producing a lateral adjustment of the thin paper-reels, and in the manner of making the same adjustable upon their shafts. Second, in the reversible brake-roller to regulate the tension-feed of the thin paper. Third, in the mode of adjusting the gage which regulates the quantity of paste delivered at each revolution of the paste-roll. Fourth, in the means for adjusting the pressure-roll at the junction of the web and lining. Fifth, in the apparatus for making and delivering the paste.

In the drawings, the frame A A represents the frame of a machine for making straw-board, or other thick paper. B B are the driers with the necessary calenders; and C is the cutting-machine, by means of which the finished web is divided into sheets, if it is desired to place it in the market in that form. The cutting-engine, however, forms no part of the paper-machine, and is only placed at the end of said machine as an economical arrangement, and may be employed or not, according as the demand may be for the product of the mill in sheets or rolls. The cutting-machine may be any one of the various kinds known and used. Power may be transmitted to actuate the various parts of the ma-

chine by pulleys and bands, or otherwise, as is usual or convenient.

At some convenient point near the last driers, the frame D is mounted upon the frame A to support the reels of lining-paper. It is necessary that the frame D and the pasting apparatus shall be arranged with perfect accuracy, as to parallelism of the paper-reels and paste-roller with the driers and calenders; because, if not so adjusted, the lining-paper will lead off in a direction slightly oblique, and will, therefore, be more or less wrinkled, according to the relative obliquity of said roller. I therefore secure the frame D in position by means of screws passing through the slotted feet *d d*, which permits the adjustment of the frame D in the manner specified with the utmost exactness.

It is necessary that the reels of thin paper shall be placed accurately above the web of board or paper to be lined; otherwise the edges of the lining-paper and board will not coincide. Some means of lateral adjustment is therefore required.

In the drawing, E represents one of the rollers upon which the web of thin paper is wound, to be delivered to the pasting-machine. Said roller is in the form of a hollow cylinder. It is to be placed upon the shaft F when being made ready for the machine, and is secured thereon with firmness and truly centered by means of the conical plugs *e e*, the smaller ends of which enter the cavity of the cylinder and support it clear of the shaft. The plugs *e e* are driven up by the nuts *f f*. The cylinder E is also adjustable laterally upon the shaft F by moving the nuts *f f* and plugs *e e* toward one or the other end of said shaft, as the case may require.

The thin paper will not always be wound upon the roller E with accuracy, and it is therefore necessary to adjust it laterally after it has been placed upon the machine. I therefore put a grooved collar, G, upon one end of the shaft F, and fit a clutch, H, to said groove. This clutch is attached to, and operated by, a clutch-rod, I, which runs across the frame D, below the roller E, and is moved by means of a screw-nut, J, which rests in a bracket, K, secured to the frame D. When the clutch-rod is moved the roller E is correspondingly moved, and it may in that way be adjusted.

with the utmost precision. The frame D has bearings for two paper-reels, E, so that while the paper is being removed from one another previously exhausted may be replaced by a full one, and thus no time will be lost when a roll is exhausted.

It is important that the lining-paper should pass from its roll E with uniform tension, and after mature consideration it has been decided to apply the tension directly to the roll from which the paper is running, rather than at any other point. I have therefore placed the roller L above the paper-roll E, so that it will press upon the paper with its weight. Then, in order to produce the desired tension, I apply a friction-brake to said roller, by means of adjustable springs M, or an equivalent device, which press upon said roller and retard its revolution more or less; consequently it acts, to a greater or less degree, as a retarding force upon the paper-roll E. Practically, the resistance is uniform, because the weight of the roller L is not sufficient to produce any sensible variation in the friction at the journal-bearings of the shaft F during the discharge of all the paper upon the roller E.

The roller L is mounted at the ends of reversing-arms N, which are pivoted to the standards O, midway between the bearings of the two paper-rollers E E, so that when one roll of paper is exhausted the brake-roll L may be instantly applied to the full paper-roll by simply reversing the arms N, as shown in dotted lines, Fig. 1.

From the paper-roll E the thin paper (represented by the line *a*) passes under the adjustable guide-roll P, and thus moves in a uniform direction to the paste-roll Q. The guide-roller P is made adjustable in a vertical direction, so as to regulate, as may be required, the direction of the lining-paper *a* toward the paste-roll, and thereby regulate the distribution of the paste and the time of contact with paste-roller.

The paste-roller Q is mounted so as to revolve partially within the paste-trough R, and, therefore, at each revolution it makes, it takes up a quantity of paste and distributes it upon the lining-paper as it passes over the surface of said roller. The quantity of paste so taken up will vary unless some regulating device is employed, and the scraper or doctor S is the most simple and efficient for that purpose. It consists of a metallic plate, perfectly straight upon the edge, and made adjustable, so as to be set at the required distance from the surface of the roller, to control exactly the quantity or thickness of the layer of paste carried over by the roller Q.

This scraper has been employed heretofore, but with different means for adjusting. The plate S is screwed or otherwise secured to several arms, T, and said arms are attached to the rear side of the paste-trough by screws *t*. The front sides of the arms T are slightly curved where they rest against the trough, and thumb-screws U are inserted through the

lower ends of said arms, and bear against the trough, so that when they are run inward they will force the lower ends of said arms away from the trough; consequently force the edge of the scraper S nearer to the surface of the roller Q.

When any change of adjustment of the scraper S is made the screws *t* are slightly loosened, and when the adjustment is completed they should be tightened again.

The paste-trough R requires to be adjusted with as much accuracy as the paper-rolls, and I therefore secure it to the frame of the machine in such a way that one end may be moved laterally. This may be effected by inserting the holding-bolt through a slot at one end, so that the corresponding bolt at the other end will serve as a pivotal point for the necessary adjustment; or a more accurate adjustment may be secured by means of the adjusting-screws *g g*, (see Fig. 5,) which bear against the sides of the box, and move it as may be desired.

In the drawing, the dotted line *b* represents the web of straw-board or other paper which is in the course of manufacture, and is represented as passing over the final driers B B. At the point *c* it is joined by the web of lining-paper *a* and the pressure-roller V, which may be hot, if desired, and may be made either of wood or metal, presses the two webs firmly together. The position of the roller V may be adjusted by the compound movement permitted by the slots *g h* in the standard W and arm Y, while the weight of the roller V produces the requisite pressure.

From this point the lined web passes over the remaining driers, and is either reeled up in rolls or is cut in sheets at C, as may be required.

The proper and regular supply of paste is, of course, of prime importance, and to this end a reservoir of paste is placed in some convenient locality near the machine, and from said reservoir the paste is pumped into a trough, *i*.

The end of the supply-pipe from the pump is represented at *j*. It may, in some situations, be more convenient to have the paste flow by its own gravity from an elevated reservoir; but the plan shown is considered to be the most economical and convenient. From the trough *i* the paste descends through the pipe *m* into the trough R in a constant stream, and overflows at the opposite end of the trough R into the waste-pipe *k*, by which it is conducted back into the reservoir. By these means the flow is constant, and the paste is thoroughly mixed.

I find it convenient to locate the paste-reservoir A' close beside the machine, and directly beneath the apparatus wherein it is made. The pump B' stands in one end of said reservoir, and may be operated from the same prime motor which gives motion to the paste-mixer D'. In mixing the paste the flour

is placed within the tub d' , and water is admitted in a small stream through the water-pipe E' . At the same time the revolving rake or mixer D' is started. When the flour has become thoroughly wetted, and in the condition of dough free from lumps, the water may be let on more rapidly until the paste becomes thin. The water is then shut off, and steam is let into the mass from the steam-pipe F' . The paste soon begins boiling, and so continues until completely cooked. The steam is then shut off, and a valve, e' , is opened to permit the hot paste to descend into the cooling-chamber G' . When it has become cold it is thinned with water to the proper consistency for use, and the valve f' may then be opened, and the paste runs off into the reservoir A' , from which it is pumped, as hereinbefore described.

Having described my invention, what I claim as new is—

1. In combination with the roller E , the clutch H , and adjusting-rod I , substantially as and for the purpose set forth.

2. The adjustable plugs e and nuts f , com-

bined with the hollow roller E and the shaft F , as set forth.

3. The tension-roller L , provided with friction-brake springs, in combination with the paper-roller E , substantially as and for the purpose set forth.

4. The tension-roller L , mounted upon the reversing-arms N , and the two paper-rollers E E , arranged in reference to said roller, as and for the purpose set forth.

5. The two paper-rollers E E , arranged, as described, upon the frame D , combined with the adjustable guide-roller p , as set forth.

6. In combination with the scraper S , the adjusting thumb-screws U , substantially as and for the purpose set forth.

7. The combination and arrangement of the revolving mixer D' with the cooling and thinning chamber G' and the reservoir A , substantially as and for the purpose set forth and described.

BENJAMIN F. FIELD.

In presence of—

TOBIAS REINOEHL,
A. H. RITSCHER.