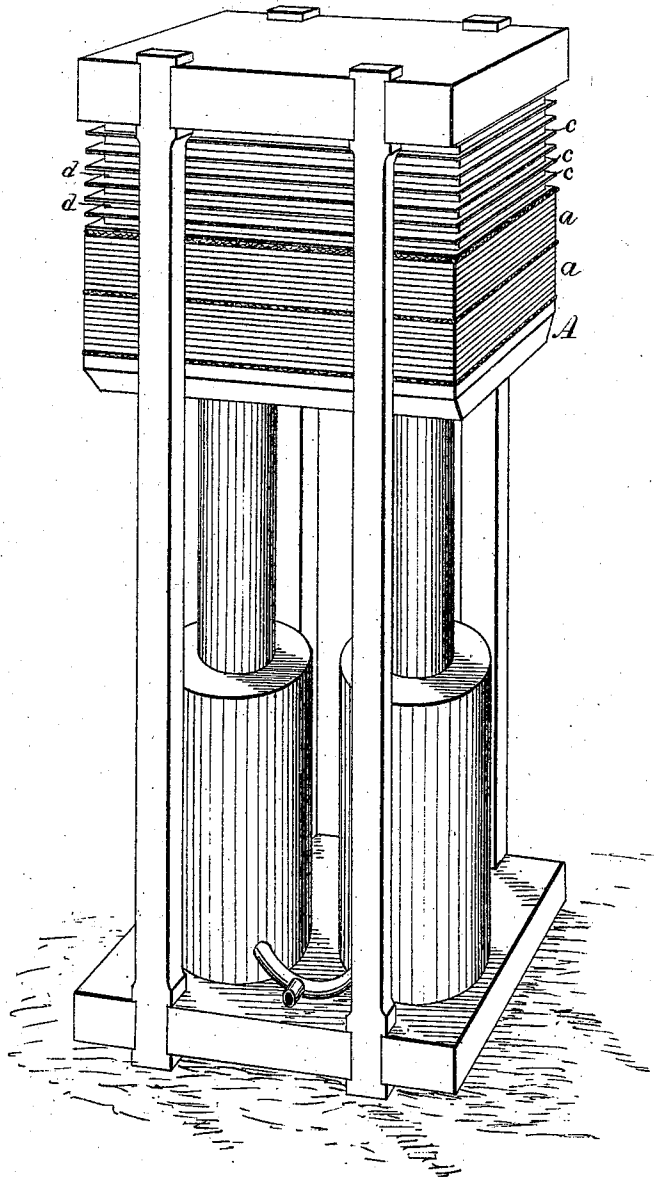


B. F. FIELD.

MANUFACTURE OF STRAW BOARDS.

No. 177,487.

Patented May 16, 1876.



Witnesses
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UNITED STATES PATENT OFFICE.

BENJAMIN F. FIELD, OF FOND DU LAC, WISCONSIN.

IMPROVEMENT IN THE MANUFACTURE OF STRAW-BOARDS.

Specification forming part of Letters Patent No. **177,487**, dated May 16, 1876; application filed May 5, 1876.

To all whom it may concern:

Be it known that I, BENJAMIN F. FIELD, of Fond du Lac, in the county of Fond du Lac and State of Wisconsin, have invented new and useful Improvements in the Manufacture of Straw-Board; and I do hereby declare the following to be a full, clear, and accurate description of the same, reference being had to the accompanying drawings, forming a part of this specification.

The invention relates to the manufacture of boards from such pulp as is ordinarily used in the manufacture of paper of the coarser kinds; and consists more particularly in an improved process for the manufacture of such boards, and in the improved article thereby produced.

Prior to this, my invention, as I am well aware, boards made from straw or other pulp, of considerable thickness, have been subjected to pressure in hydraulic presses, and, for the purpose of preserving the sheets entire, these sheets have been placed between metal plates in the press; but in such instances the plates, whether of wood or metal, were simply for the purpose of protecting the sheets from injury by lateral displacement and rupture, and were interposed between masses of the sheets, and were not arranged between all the sheets, so as to bring a smooth surface in contact with the surface of each sheet. But where any considerable number of the wet sheets are placed together, without an interposed plate between successive sheets, no great amount of pressure can be applied without some lateral displacement, and without crushing the sheets into one mass, and thus destroying their form and identity. The water could not, therefore, be in that way effectually expelled; nor, furthermore, was it possible to give the sheets where they came in contact with each other under the pressure a smooth and finished surface. Moreover, where the interposed metal plates, placed so as to inclose a number of the sheets, have been covered with a cloth surface, for the purpose of preventing any outward movement of the pulp which composed the sheets, the contact of the cloth prevented these sheets from receiving a smooth surface when pressed.

In my improved process the sheets are formed directly from the pulp in any suitable manner, and each sheet when formed is placed

upon a metal plate, the surfaces of which have been made perfectly smooth. Upon this plate, thus covered with the wet sheet, another similar metal plate is placed, and upon it a second sheet of the wet board; and so on the metal plates and the sheets of wet board are laid in succession until a pile of sufficient height is formed, when the whole pile is transferred to a powerful hydraulic press, and there subjected to heavy pressure.

In this way I am enabled to take the wet sheets formed directly from the pulp, and without previous drying, and subject them to a pressure of a thousand tons, if necessary, sufficient to expel all the water that can be driven out by pressure alone. As each sheet is held between two firm metallic plates, however soft or pulpy it may be when placed in the press, it cannot possibly, under any degree of pressure, be crushed out of shape or injured in any way whatever. Moreover, as both sides of each sheet are directly in contact with the smooth metal surfaces, the boards come from the press at the end of the operation in perfectly smooth and finished condition, all the felt marks and other irregularities being pressed out by the same pressure which expels the moisture. After receiving this pressure the boards are taken from this press and the drying process completed by exposure to heat, and they are then subjected to a second pressure in the same manner as before, by which they are rendered fit for use.

In carrying out my invention I use for the production of the raw sheets of pulp ordinary apparatus, such as is used in making air-dried boards. When the ordinary endless felt is used, and the sheet of pulp is formed on a roller, it may be received upon the metal plate directly from the roller, and the plates with the wet sheets laid upon them may be conveniently piled one upon the other. I find it convenient to arrange the press and the pile of metal plates with the raw sheets interposed, so that the whole pile when formed may be moved without lifting upon the platen of the press. The first pressure which is then applied expels the bulk of the water and compacts the boards into an exceedingly solid and tough condition, and leaves them with a smooth surface. They may then be taken from the

press and the slight remaining moisture be removed by exposure to heat in any of the known ways—preferably in accordance with the improved process and apparatus made the subject of an application for Letters Patent of even date herewith. After this final drying I subject the boards to another pressure, as before described.

The press used by me is such as is represented in the drawing hereto annexed.

On the platen A of the press there represented I have shown interposed plates with a number of sheets of the paper board between the pairs of plates, as at *a a*. Immediately above these are represented the metal plates *c c c* and the interposed sheets of pulp *d d d*, arranged in accordance with my invention.

I do not here claim, broadly, the use of metal plates in the manufacture of paper board, as I have described the use of such plates in forming a thick board out of thin sheets previously finished and pasted together in another application filed on December 24, 1874, in the Patent Office, and now pending.

I here limit myself to the use of these plates in the process in which the sheets are formed directly from the pulp, as has been described.

Nor do I here claim, broadly, paper boards formed by compression between smooth metal plates. The boards, however, produced by the process herein described are improved in this respect, that, being made directly from the pulp instead of being composed of finished thinner boards pasted together, they are homogeneous throughout, and there is no possibility of splitting, as might be the case with thick boards formed of several layers of thinner.

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

The process of forming paper boards directly from the pulp, which consists in placing raw sheets or layers of pulp, in any desired thickness, separately between the surfaces of smooth metal plates, then subjecting the same to pressure, whereby the water is expelled and each sheet or layer is compressed into board, then removing each sheet or board from the press, and drying the same, and finally pressing again, as and for the purposes set forth.

BENJAMIN F. FIELD.

Witnesses:

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