W. E. SHEEHAN.

MEANS FOR MANUFACTURING PAPER, BOARD, AND PULP.

APPLICATION FILED APR. 25, 1906.

902,178. Patented Oct. 27, 1908.

2 SHEETS—SHEET 1.

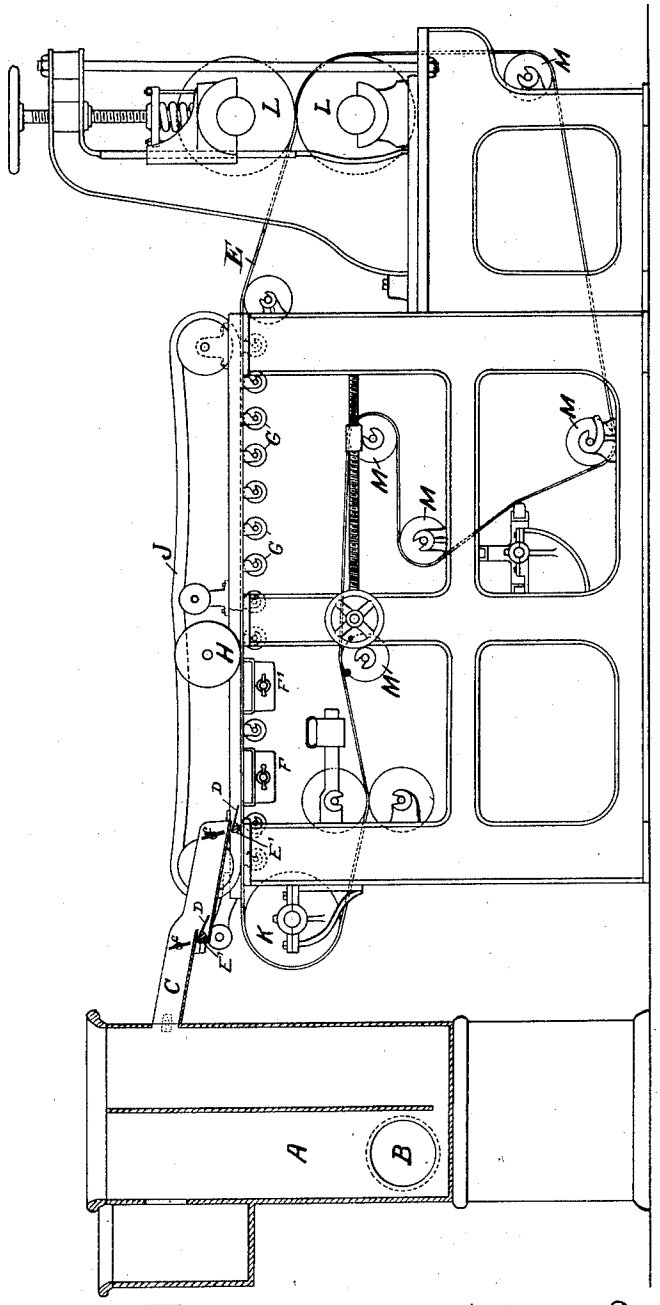


Fig. 1.

Witnesses

Lottie Prior

Inventor

William E. Sheehan

by

Ward & Cameron. Attys.

W. E. SHEEHAN.

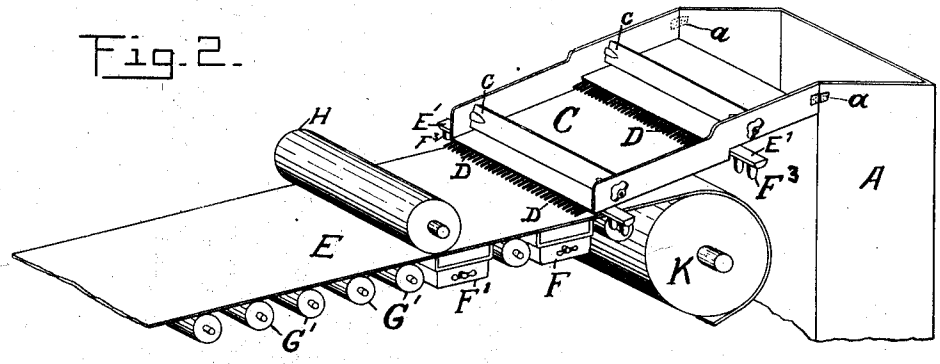
MEANS FOR MANUFACTURING PAPER, BOARD, AND PULP.

APPLICATION FILED APR. 25, 1906.

902,178. Patented Oct. 27, 1908.

2 SHEETS—SHEET 2.

Fig. 2.



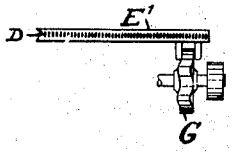


Fig. 3.



Fig. 4.

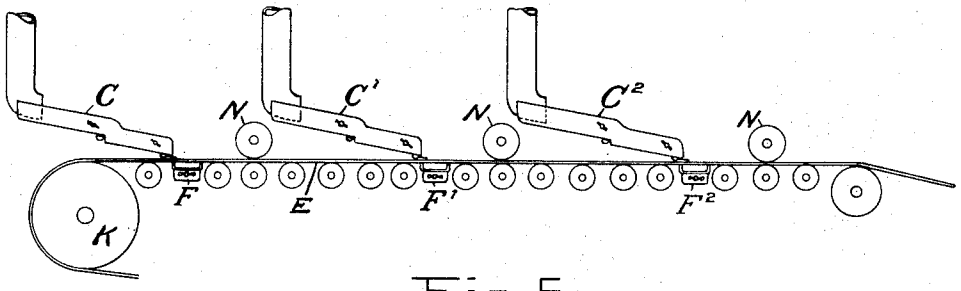


Fig. 5.

Witnesses

Lottie Price.

Inventor

William E. Sheehan.

by

Ward & Cameron. Attys.

UNITED STATES PATENT OFFICE.

WILLIAM E. SHEEHAN, OF ALBANY, NEW YORK.

MEANS FOR MANUFACTURING PAPER, BOARD, AND PULP.

No. 902,178. Specification of Letters Patent. Patented Oct. 27, 1908.

Application filed April 25, 1906. Serial No. 313,574.

To all whom it may concern:

Be it known that I, WILLIAM E. SHEEHAN, a citizen of the United States, residing at the city of Albany, in the county of Albany and State of New York, have invented certain new and useful Improvements in Means for Manufacturing Paper, Board, and Pulp, of which the following is a specification.

My invention relates to the manufacture of paper, paper or other board and various kinds of manufactured pulp, and the object of my invention is to provide a machine for the manufacture of paper, paper board, paper pulp, asbestos pulp, cement &c., made upon felt, and in the making of which the stock does not at any time come in contact with wire.

I accomplish this object by means of the mechanism illustrated in the accompanying drawings, in which:

Figure 1 is a side elevation of a machine for carrying out my process. Fig. 2 is a perspective view of a trough and paper making felt with parts broken away. Fig. 3 is a detail elevation, with parts broken away, showing a means for agitating the fingers in the trough. Fig. 4 is an end elevation of Fig. 3. Fig. 5 is a side elevation of the making felt and a series of troughs, with parts broken away.

Similar letters refer to similar parts throughout the several views.

Heretofore there have, generally speaking, been two distinct methods and types of machines for manufacturing paper and pulp, one known as the Fourdrinier and the other the cylinder. In the Fourdrinier method, technically speaking, the paper or pulp is made on a wire cloth, a portion of which is mounted on a shake frame, whereby the paper stock or pulp is received by the wire cloth and by the action of the shake frame is agitated, causing the particles of fiber contained in and composing the stock to assume a mixed position in relation to each other, extending at various angles to each other, whereby the texture is made strong and tough, very different from that which is made in such a way that the fiber arranges itself in the same direction.

An objection to the Fourdrinier paper and method of producing it, is that it is almost impossible to obliterate the wire marks, since, it is necessary to exert a strong suction, resulting in a very strong adhesion to the wire cloth, in order to remove sufficient water from the paper stock to prevent it from squashing when operated on by the couch rolls, and this engagement of the pulp or paper stock with the wire, under the influence of the said strong suction, marks the paper to such a degree that, although many devices have been employed for removing them, they are, nevertheless, highly objectionable in certain fine papers, especially those used for the reproduction of pictures. Another very great objection to the Fourdrinier method of making paper is that it is so expensive, since the wire cloth is short lived and costly.

In the cylinder type an endless felt is employed and pulp or paper stock is picked by the felt from the wire cloth peripheral surfaces of a series of cylinder molds. One of the principal objections to this type of paper manufacture, is that the fiber arranges itself parallel to each other, and the paper has little or no tenacity, and is worthless in any use that requires strength.

Another objection to the cylinder type of machine is the expense of the wire cloth apron and the cylinder molds, which are used for conveying the stock to the felt. The cylinder surfaces, made up of wire cloth, wear out very quickly and cost a great deal of money.

By my machine I entirely do away with the use of wire cloth.

It is necessary to cause the fiber in the paper stock to become mixed and be retained in the mixed position on the making-portion of the endless felt, in order to obtain the tenacity required for strong paper, of the Fourdrinier type. It is also advisable to make the paper entirely free from all inequalities, such as have heretofore been impressed therein by wire cloth, and it is practically and commercially necessary that the paper should be made economically. Therefore I agitate the paper stock or pulp before it is delivered to the making-portion of the traveling cloth apron or frame, and provide a means for causing the agitated mass of pulp to be retained in the position in which it engages the traveling felt, until the water is sufficiently abstracted therefrom, and it has passed under the couch rolls and retains a consistency which prevents any possibility of assuming a weakened condition.

Referring to the drawings, the pulp entering the flow-box, A, through the pipes, B, is

discharged into the trough, C, under the influence of a pump, not shown, and within the trough, C, which may be placed at any suitable angle to the felt, I preferably arrange one or more gates, *c*, *c*, for regulating the flow of the pulp through the trough.

For the purpose of agitating the pulp in its passage through the trough I preferably arrange a series of agitators, preferably either needles or fingers, D, which may be secured to a bar, E′, extending across the trough from one side to the other, as shown in Fig. 2, and having at one end the pins, F^3, between which revolves the wheel, G, having cam-shaped surfaces as shown in Fig. 3, and by means of which the bar, E′, is moved transversely during the rotation of the wheel, G. I do not however, limit myself to the arrangement of pins, F^3, and wheel, G, for reciprocating the bar, E′, since any suitable device may be used for this purpose. The trough may be oscillated by securing the bar E′ to the trough and the wheel G acting thereon will agitate the trough on the hinges, *a*, *a*, or it may be oscillated in any suitable manner.

I have shown in Fig. 2 two bars, E′, each carrying a series of fingers or needles, D, in the trough, C, one of said bars being located near the discharge end of the trough, the other about midway between the ends of the trough. I do not limit myself to the number of the bars carrying the fingers or needles, D, or their position in relation to the trough. It is, however, advisable that the fingers, D, should not come in contact with the felt or endless woven cloth, E, upon which the pulp or paper stock is delivered from the trough, but it is preferable to arrange a means for agitating the pulp at the time of its delivery to the felt, E, and, therefore, there should be some agitating device, such as the fingers, D, on the reciprocating bar, E′, arranged to operate the pulp immediately before, or at the time of its delivery upon the felt, or the trough may be agitated.

In order that the pulp may be retained on the felt, E, in the position in which it is brought in contact therewith, I place immediately beneath the portion of the felt upon which the pulp is delivered from the trough a suction-box, F, by means of which strong suction is exerted upon the under side of the traveling felt, E. I place another suction-box, F′, preferably separated a short distance from the first suction box, F, beneath the felt, E, in order that the action on the felt by suction may be such that the particles of the fiber in the paper stock or pulp may be caused to adhere firmly to the felt immediately upon the delivery of the pulp to the felt.

I do not limit myself to the number of suction boxes employed, it being understood that a sufficient number are to be used to effectually hold the fiber in the pulp in position on the felt and to draw the water therefrom.

The fibers of the woven material forming the endless apron are so intermingled that they act as a filter or strainer, preventing any loss of the fiber or finely powdered materials composing the substance to be operated upon through the mesh when subjected to suction or pressure, but permitting the water to be drawn therefrom.

Beneath the traveling felt are placed the rollers, G′, mounted in the usual manner, and above the felt is a dandy roll, H, mounted in the usual way.

I have shown the deckles, J, Fig. 1, mounted in the usual manner and for the usual purpose. I do not limit myself to the extent or position of the deckles, as they may, if desired, be made shorter or mounted in any manner.

I have shown the traveling felt, E, extending over the breast roller, K, and between the couch rolls, L, L, from which it passes over a series of rollers, M, M, mounted in any convenient manner, as shown in Fig. 1.

My machine may also be used for manufacturing pulp or material of pulp consistency, such as asbestos, cement and other material used in the manufacture of board of various qualities. It is not necessary when manufacturing pulp to agitate the stock, and it is usual to use cylinder machines rather than the Fourdrinier type when making manufactured pulp. My machine performs all of the functions of the cylinder machine and does away with the cylinder molds, making a more economical operation.

I want it understood that my machine is to be used not only for the manufacture of paper and paper board, but also in the manufacture of asbestos board and pulp to be used for the manufacture of paper or paper board and viscous semi-liquid mass to be used in manufacturing asbestos board or any other composition or substance capable of being manufactured or formed on a traveling felt, and where I refer herein to paper or paper board, I intend to be understood as meaning any pulp or material which may be manufactured on a machine constructed and operated as described, and where I refer herein to the pulp delivered on to the traveling felt or cloth I intend to be understood as meaning any liquid or semi-liquid substance which may be used.

In Fig. 5 I show a series of troughs, C, C′, and C^2, for the purpose of delivering, at different intervals, pulp to the paper-making-felt, thus when the pulp is delivered by the trough, C, and is caused to adhere thereto by the action of the suction beneath the felt, an additional layer is placed thereon when the trough C′ is reached by the traveling felt, and shortly thereafter a third layer of pulp is

added when the trough, C^2, is passed. There are the suction boxes, F, F' and F^2, one at least beneath the felt at the point of delivery of the pulp from each of the troughs, C, C' and C^2. In this way board is constructed of the thickness desired, which board may have its layers differing in color.

When desired a roller, N, may be placed above the felt, E, to engage the pulp immediately after it is delivered to the felt, as shown in Fig. 5.

By my invention paper is made in which there are no wire marks to be obliterated and the texture of the paper is tenacious and strong.

I am not aware that heertofore the Fourdrinier type of paper has ever been made upon felt, nor am I aware that in a cylinder machine, or means for making paper or manufacturing pulp by the cylinder method, that pulp has been delivered to the felt except by the felt picking it from a cylinder having a wire cloth pulp carrying surface.

By my invention I have provided a means for making the strongest kind of paper in a very simple and inexpensive manner.

It will be noted that I can supply to the paper what is commonly known as the "water mark", which is done by the dandy roll, H, engaging the pulp on the felt, E. Water marks could not heretofore be placed upon paper made by cylinder type of machine.

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

1. In a paper making machine, a flow box; a trough; a means for agitating the pulp in said trough; a traveling felt upon which said pulp while in an agitated condition is deposited from said trough; a means for exerting suction upon the pulp immediately upon its delivery to the felt, from beneath the felt, substantially as described.

2. The combination of a traveling felt; a trough mounted at an angle to said felt; means for delivering pulp to said trough; a means for regulating the flow of pulp through said trough; a means for agitating the pulp emitted through said trough at the time of its emission; a means for exerting suction upon the pulp at the time of its delivery delivered on the felt from said trough.

3. The combination of an endless woven cloth; a trough mounted at an angle to said cloth; means for delivering pulp to said trough; a means for regulating the flow of pulp through said trough; a means for exerting suction upon the pulp at the time of its delivery to said cloth, substantially as described.

4. The combination of a flow box; a trough; a bar adapted to reciprocate near the opening of said trough; a series of fingers attached to said reciprocating bar and an endless woven cloth adapted to receive the contents of said trough.

5. In a machine for making millboard and similar substances, the combination of a pair of press-rolls, a series of suction-boxes, an endless band of felt passing over said suction-boxes and through said rolls and means for initially depositing a dilute mixture of pulped fiber and cement on the upper section of said endless felt.

6. In a machine for making millboard and similar substances, the combination of a pair of press-rolls, a series of guide-rolls, an endless band of felt passing over said guide-rolls, and through said press-rolls, and means for initially depositing a dilute mixture of pulped fiber and cement on the upper section of said endless felt, together with a distributing-roll located over the felt near the point where the material is delivered to it.

7. In a machine for making millboard and similar substances, the combination of a pair of press-rolls, a series of guide-rolls, an endless band of felt passing over said guide-rolls and through said press-rolls and means for initially depositing a dilute mixture of pulped fiber and filler on the upper section of said endless felt, together with a distributing-roll located over the felt near the point where the material is delivered to it, said roll revolving in a direction to produce circumferential travel on its under side opposite to the travel of the felt at the point of contact therewith.

8. The combination of a pair of press rolls; a series of guide rolls; an endless band of felt passing over said guide rolls and through said press rolls; a means for initially depositing a dilute mixture of pulped fiber on the outer section of said endless felt; a series of suction boxes over which said endless band passes.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM E. SHEEHAN.

Witnesses:
FREDERICK W. CAMERON,
LOTTIE PRIOR.