

July 24, 1923.

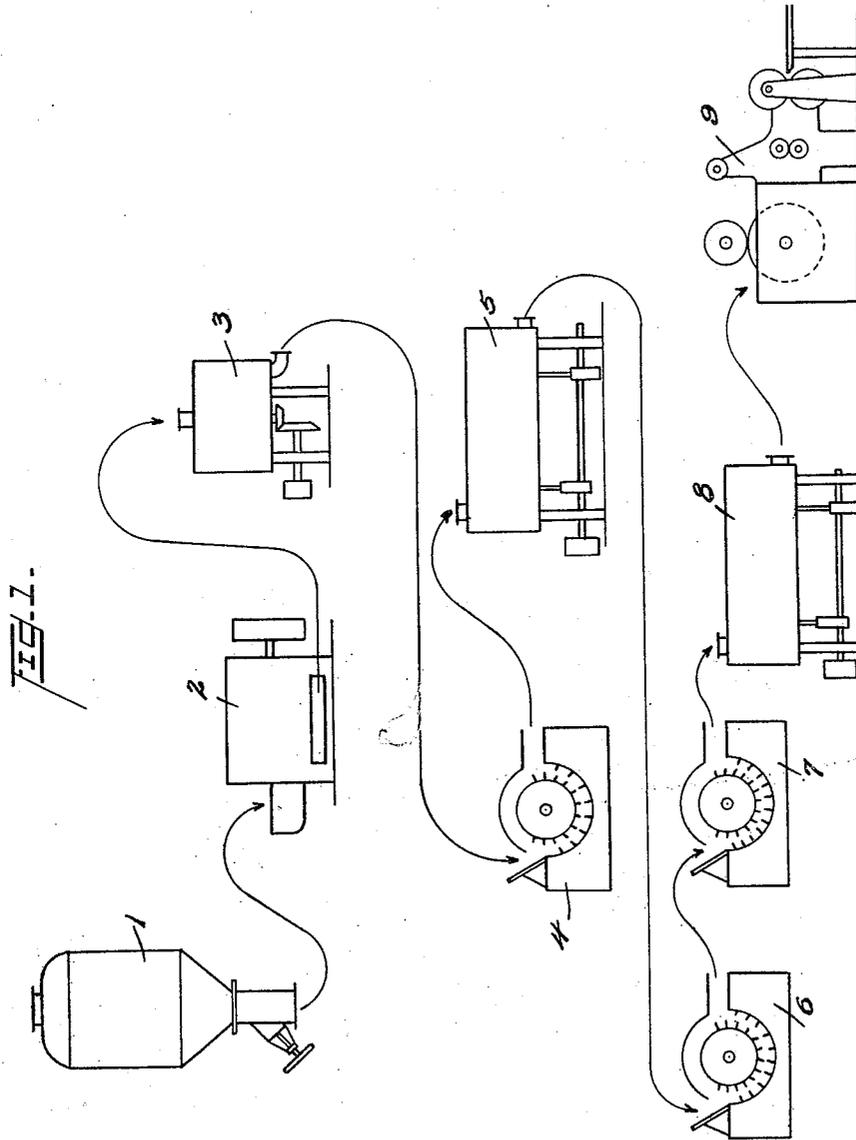
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PROCESS OF MAKING PAPER PULP

Filed July 2, 1921

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

FIG. 2.

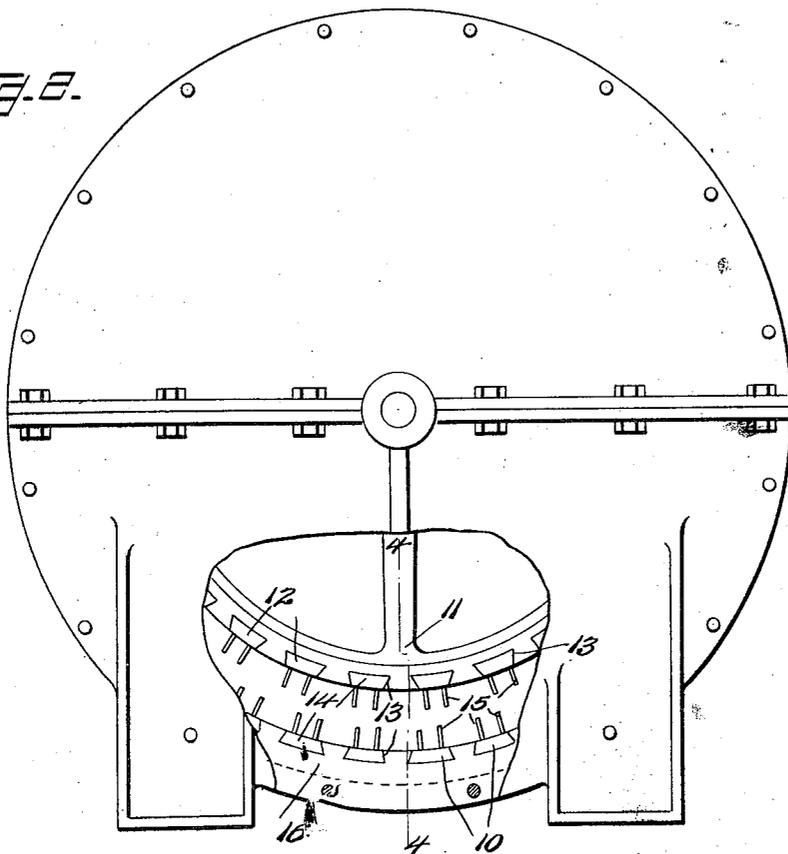


FIG. 3.

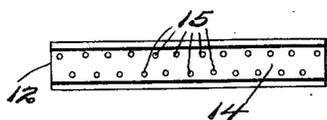
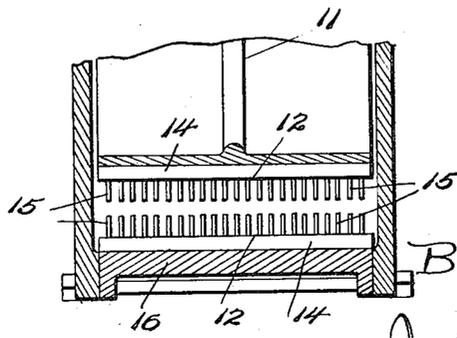


FIG. 4.



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UNITED STATES PATENT OFFICE.

BURT J. BELLINGER, OF DEXTER, NEW YORK.

PROCESS OF MAKING PAPER PULP.

Application filed July 2, 1921. Serial No. 483,180.

To all whom it may concern:

Be it known that BURT J. BELLINGER, citizen of the United States, residing at Dexter, in the county of Jefferson and State of New York, has invented certain new and useful Improvements in Processes of Making Paper Pulp, of which the following is a specification.

My invention relates to a process of producing sulphite pulp and one of the objects of the invention is to produce a pulp which will have longer fiber than that produced by the present processes.

The present state of the art of producing sulphite pulp I understand to be as follows: The chipped wood is cooked in a digester of well-known character, sufficiently to dissolve out the constituent gums, thereby liberating the fiber. The fiber is then passed to the knotter which separates those portions, consisting of bark, knots and foreign matter which has not been reduced to pulp in the digester, from the fibrous portions. This rejected portion of bark, knots, etc. is then ground and stored for use as hereinafter described.

The fibrous pulp is then passed over a cut-plate screen having slots there through of 18 to 21 thousandths in width. Through these slots 75 to 90 per cent of the pulp passes. This product is partially prepared "firsts." This variation of from 75 to 90 per cent is due to the varying toughness of the wood fiber and the variation in degree of intensity of cook. The 10 to 25 per cent of stock, consisting of partly prepared "seconds," which passes over the screen is stored in bins for later treatment as hereinafter described. Then the 75 to 90 per cent of firsts is passed through a Jordan or Holland beater, or a collar gang in which the pulp is ground by rigidly set steel opposite steel, steel opposite stone, or stone opposite stone. While this operation further separates fiber from fiber it also tends to break and cut the fiber into shorter lengths, to its injury.

From this operation the pulp is passed to another cut-plate screen finer than the earlier one, and having slots from 8 to 12 thousandths wide. About 90 per cent of this

pulp passes through the cut-plate, the product being finished "firsts," which is then ready to go to the wet machine. The 10 per cent rejections from this cut-plate is then mixed with the 10 to 25 per cent rejections of the first cut-plate and fed to a Jordan or Holland or collar gang.

From there the pulp is sent over a cut-plate screen having 8 to 12 thousandths slots. That portion of the pulp, about 85 per cent passing through this screen is called "seconds" and is ready for use in a wet machine for making an inferior stock. The 15 per cent rejection is then mixed with the ground rejections from the knotter and is ready for use as filler for cardboard, etc.

In the herein described process, it is desirable to conserve the strength of the fiber, to cook the chips the least possible amount consistent with suitable disintegration of the chips, so as to liberate the fiber without undue oxidation. If the chips are under-cooked the pulp requires more beating and a larger percentage passes into seconds. If the pulp is over-cooked, the fibers are weakened and become unduly shortened by breakage in the beaters. It will also be understood that substantially all the foregoing steps are performed in the presence of sufficient water to cause the pulp to flow freely.

My improved process has for its fundamental point, the fact that instead of separating the fibers in the customary manner by means of a Jordan or Holland beater or collar gang as hereinabove described, I subject the digested pulp to the operation of a Bellinger carding machine in which the fiber is efficiently separated without being cut or shortened.

Referring to the drawings;

Fig. 1 is a flow sheet illustrating the steps of the process, and

Fig. 2 is a side elevation of the carding machine broken away to show the internal arrangement, and

Fig. 3 is a view of a carding brush, and

Fig. 4 is a section on the line 4-4 of Fig. 2.

In my process, the chipped wood is cooked

in a digester 1 as heretofore, except that the cook is milder, whereby a rawer undercooked fiber is produced and which fiber, while still containing a residue of its cementitious gums, is definitely stronger than as if cooked longer and results in a greater weight of fiber per cord of wood used. These remaining gums hold the fibers together to some extent but said fibers are later separated successfully in the Bellinger machine without injury to the fiber. Next the cook is passed through the knotter 2, where the bark and knotty portions are removed. This rejected portion of bark and knots is ground and stored, for use as hereinafter described. Then the pulp portion is put through a thickener 3 which abstracts a portion of the water, reducing the pulp to as stiff a consistency as will flow vertically downwardly over a wet board. Thence into the Bellinger machine 4 which partially separates the fibers from each other without breaking or cutting or otherwise shortening them.

The pulp is then passed over a cut-plate screen 5 having 18 to 21 thousandths slots, resulting in from 95 to 97 per cent of partially prepared "firsts." The remaining three to five per cent of partly prepared "seconds" are stored for further treatment, to be described later herein. These firsts may be then put through a succession of Bellinger units 6 and 7 resulting in a further separation of the fibers. Then the pulp is passed over a cut-plate screen 8, having 8 to 12 thousandths slots, resulting in 95 to 97 per cent of finished "firsts" which are then ready for the wet machine. The remaining 3 to 5 per cent of "seconds" is then mixed with the earlier lot of "seconds" and the resultant mass of pulp put through a succession of two or three Bellinger units. The product is then passed over a cut-plate screen having 8 to 12 thousandths slots resulting in 80 to 90 per cent of finished "seconds" which are ready for the wet machine 9 for making an inferior stock. The 10 to 20 per cent rejections are then mixed with the ground bark and knots for use as filler for cardboard, etc.

It will be observed that my improved process entirely omits the use of a Jordan or Holland beater or of a collar gang, thereby conserving the integrity of the fiber. The Jordan and other beaters cut the fiber crosswise, thereby shortening the length of the fiber and greatly reducing its felting quality. The Bellinger machine does not cut the fiber but efficiently separates the fibers from each other without injury to the fiber.

Other advantages inherent in my new process are:

As the chips are cooked under less pressure and for a shorter time and with weaker

acid the result is a definitely stronger fiber. Also the shorter time required for a cook, permits more cooks per week and therefore greater production. There is also a material saving in temperature, pressure, and steam, therefore of coal to produce the steam.

The "under-cooking" of the chips results in the retention of a larger proportion of the cementitious wood gums, thereby producing more weight of useful product per cord of wood. Under the old process these gums were more fully dissolved and wasted.

A definite reduction of equipment and floor room required therefor is attained by the elimination of the beaters. Also the power required to drive the beaters is saved. The beaters are definitely injurious to the stock in reducing the length of the fibers. Also the beaters tend to ball the stock and not to open it out.

The Bellinger machine performs a distinct carding action, separating and combing the fibers apart.

The particular carding machine which I find suitable for this purpose comprises a stationary receptacle 16 provided with carding brushes 10 and a revoluble member 11 provided with similar carding brushes 12. The carding brushes in both members are removably held in place by the dove tail connections 13. The carding brush consists of a base portion 14 to which are secured the teeth 15 of the proper strength and resiliency. The pulp in the presence of a sufficient amount of water is subjected for a suitable period of time to the action of the cards as will be well understood.

What I claim as new and desire to secure by Letters Patent is:

1. The process of making paper pulp comprising digesting the chipped wood and then subjecting the digested pulp directly to carding to separate the fibres.

2. The process of making paper pulp comprising digesting the chipped wood, removing the knots and the bark therefrom and then subjecting the digested pulp directly to carding to separate the fibres.

3. The process of making paper pulp comprising digesting the chipped wood, removing the knots and the bark therefrom, extracting a portion of the water from the stock and then carding the stock, then adding water to the stock and then screening the stock.

4. The process of making sulphite pulp comprising mildly cooking the pulp, whereby a raw, undercooked fiber is produced containing a residue of its cementitious gums and thereafter carding the stock to separate the fibres.

5. The process of making sulphite pulp comprising mildly cooking the pulp, whereby a raw, undercooked fiber is produced con-

taining a residue of its cementitious gums, removing the knots and bark therefrom and then carding the stock to separate the fibers.

6. The process of making sulphite pulp comprising mildly cooking the pulp whereby a raw, undercooked fiber is produced containing a residue of its cementitious gums,

removing the knots and the bark therefrom, extracting a portion of the water from the stock and then carding the stock to separate the fibers, then adding water to the stock and then screening the stock. 10

In testimony whereof I affix my signature.

BURT J. BELLINGER.