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PATENTED FEB. 18, 1908.

P. M. HAMLIN.

APPARATUS FOR MAKING MIXED FIBERS.

APPLICATION FILED MAY 25, 1907.

2 SHEETS--SHEET 1.

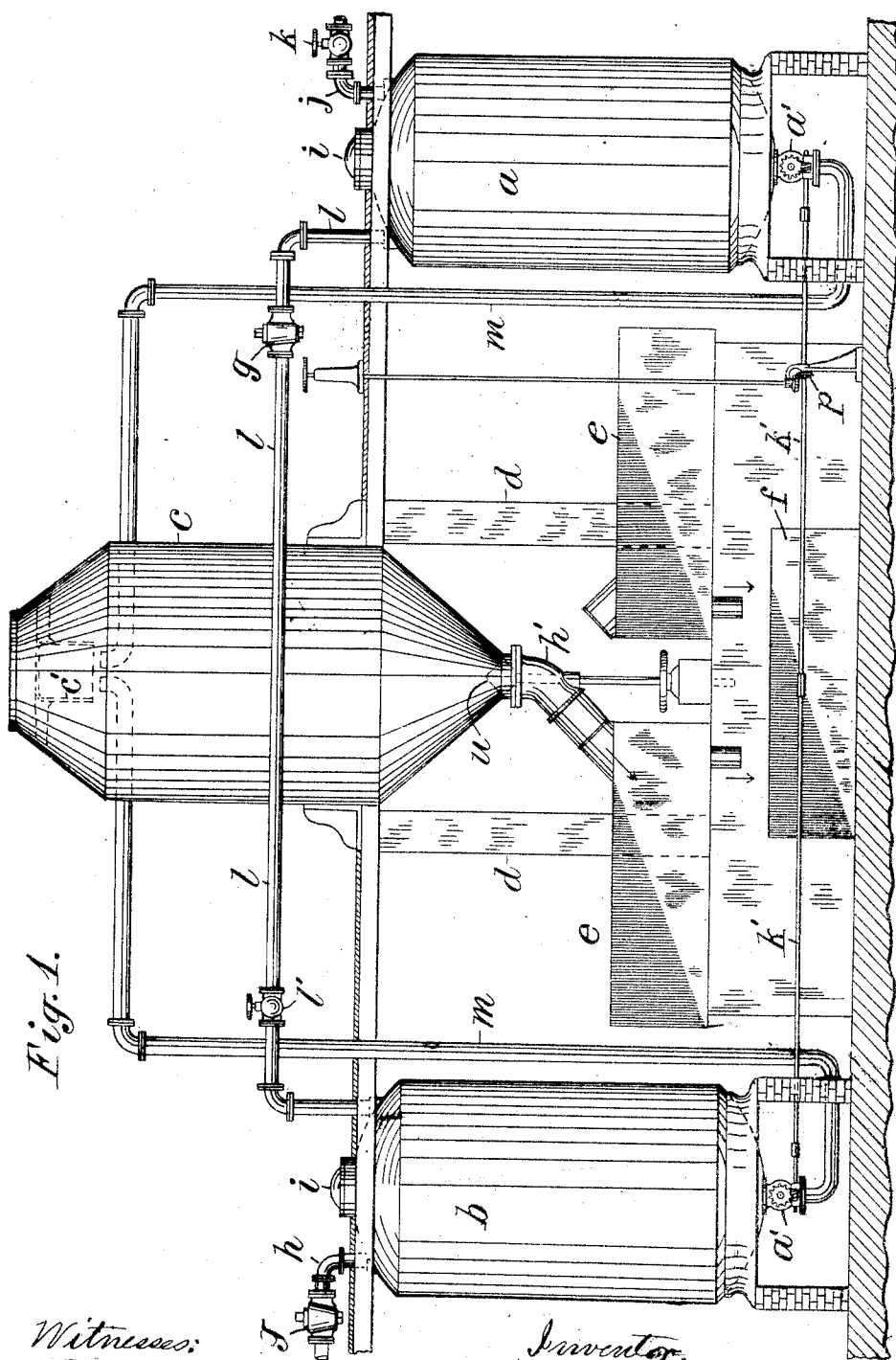


Fig. 1.

Witnesses:
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J. W. Greenbaum

Inventor.
Pulaski M. Hamlin
per Thomas T. Crane, Atty

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2 SHEETS—SHEET 2.

Fig. 2.

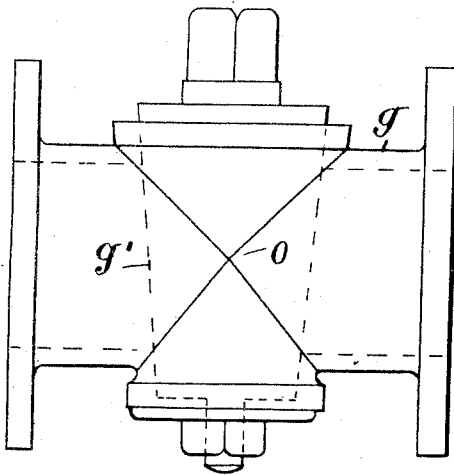


Fig. 3.

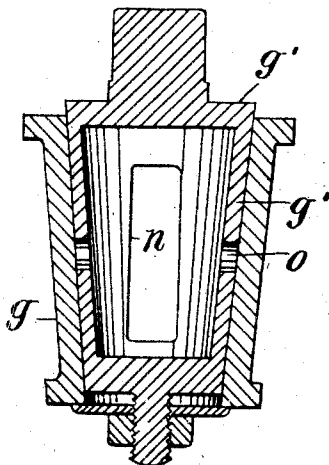
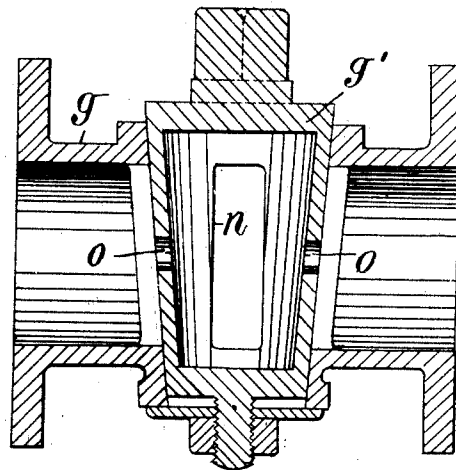


Fig. 4.

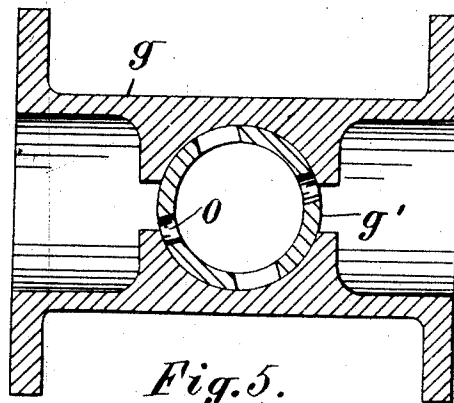


Fig. 5.

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UNITED STATES PATENT OFFICE.

PULASKI M. HAMLIN, OF CATAWISSA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO CHARLES H. UNVERZAGT, OF NEW YORK, N. Y.

APPARATUS FOR MAKING MIXED FIBERS.

No. 879,165.

Specification of Letters Patent.

Patented Feb. 18, 1908.

Application filed May 25, 1907. Serial No. 375,568.

To all whom it may concern:

Be it known that I, PULASKI M. HAMLIN, a citizen of the United States, residing at Shuman street, Catawissa, county of Columbia, and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Making Mixed Fibers, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to save and utilize the steam which is often wasted in the cooking or digesting of wood cellulose, and to produce a mixture of two different fibers by disintegrating and combining them into a single homogeneous substance, by mere discharge into a disintegrating apparatus.

It is known that straw can be reduced at a lower temperature than wood, and I save the cost of the steam which would otherwise be required in cooking the straw cellulose, by using the waste steam from the wood cooking digester. This steam is discharged through a special relief valve which produces a complete and uniform circulation in the wood digester, and which when escaping from the wood-cooking digester passes through the above mentioned relief valve and is piped into the straw-cooking digester. The steam thus escaping from the wood-cooking digester is sufficient to properly cook and digest the material in the straw digester.

The further object of this invention is to furnish means of combining fibers thus cooked into a homogeneous mass to produce a pulp suitable for a high-grade paper, having the qualities of the several fibers used. For making such composite fiber, the blow-off pipes of the two digesters are connected with the same blow-tank, and the blow-off valves are simultaneously operated so that the blowing of the fibers into the tank at the same time operates not only to combine the fibers, but to disintegrate the material in the most perfect manner, and thus produces a homogeneous product without the use of any mechanical disintegrator.

The invention will be understood by reference to the annexed drawing, in which Figure 1 is a diagram illustrating the digesters, the blow-tank and their respective connections. Fig. 2 is a side elevation of the relief-valve; Fig. 3 is a longitudinal sec-

tion of the same; Fig. 4 is a transverse section at the middle of the plug; and Fig. 5 is a horizontal section at the middle of the plug.

a designates the high pressure digester in which wood is reduced to fiber; *b* the low pressure digester in which straw is reduced; and *c* the blow-tank into which the two fibers are discharged to disintegrate and mix the same.

The blow-tank is supported upon frames *d*, and washpans *e* are shown below the blow-tank to receive the mixed fibers therefrom to wash the same; and in practice, a receptacle *f* is arranged still farther below the washpans for holding the washed fiber or pulp. The blow-tank is shown with an outlet valve *u* and a swinging spout *h'* which may be placed in turn over each of the washpans for discharging the fiber thereto.

Each digester has a manhole by which it can be filled, and which is provided with a tight cover *i*. The digester *a* is supplied with steam under pressure by a pipe *j* and valve *k*. A steam connection between the two digesters is formed by a pipe *l* having a steam-valve *l'*, and having also inserted in it the relief-valve *g* which vents a limited amount of steam from the digester *a* to the digester *b*; which latter is also provided with a discharge-pipe *h* having a similar relief-valve *g*.

The worms on the blow-off valves *a'* of the two digesters are connected by a shaft *k'* fitted with bevel-gears *p*, so that both can be opened simultaneously; and they are both connected by outlet-pipes *m* with the blow-tank *c*, so that the contents of both the digesters may be discharged into the tank together.

The relief-valve, shown in Figs. 2 to 5, is formed with a rotary plug *g'* having the main passage *n* by which the steam can when desired be freely discharged from the digester, and having at right angles thereto a much smaller vent-passage *o* extending through the plug, which may be set in any desired position, as shown in Fig. 5, to discharge a limited amount of steam through the valve.

It is well known that where steam is turned into a receptacle without venting the same, the circulation of steam ceases and the temperature falls, but that the venting of a small amount of steam permits new steam to enter, thus maintaining the temperature at the desired point. The relief-valve connected with

the digester *a* performs this function, and also serves to supply the low pressure digester with the steam needed to cook the material therein. The digester *b* is vented in a similar manner by its relief-valve *g*, which permits enough steam to escape to maintain the circulation in such digester. The stop-valve *l'* in the pipe *l* serves to wholly disconnect the digesters when desired, so that either digester *a* or *b* can be used alone.

In Fig. 1 of the drawing, the blow-tank is shown provided with an inverted baffle-tank *c'*, into which the fiber is blown upward as it enters from the digesters, the two fibers being thus disintegrated by impact with the baffle-tank while they are simultaneously mixed together in the most effective manner; but the construction of the blow-tank is not material, as any means may be used for mixing the fibers intimately when discharged from the digesters. The blow-tank is commonly open at the top. With this apparatus a charge of the requisite material is placed in each of the digesters, and the relief-valve *g* for the digester *a* is turned in such position as to slowly discharge some steam into the digester *b*, the venting of the steam therefrom by its own relief-valve completing the cooking of the material in the digester *b* at about the same time that the material is cooked in the digester *a*. When thus completely cooked, the material is discharged from both digesters simultaneously by the rotation of the shaft *k'*, thus delivering the material into the blow-tank in such a manner as to disintegrate and intimately mix the same. The disintegration is caused by the concussion of the fibers with one another and with the walls of the inverted baffle-tank *c'* which is shown of such small dimensions that the fibers discharged into this baffle-tank are thrown into direct contact with one another and mingled intimately while driven out of such baffle-tank by the succeeding current of material.

It is well known that the fiber produced from pine and analogous woods has considerable length and tenacity, but very little hardness; while the fiber produced from straw possesses hardness and smoothness, and is very short and therefore lacks tenacity. The mixture of the two fibers produces a composite fiber which combines the good qualities of both. This composite fiber is not claimed herein as it is made the subject of a separate application.

In practice, it is found that by the use of the waste steam, from the treatment of wood in the high pressure digester, to cook the straw cellulose in the low pressure digester, less chemicals are required to cook the straw, for the reason, that in venting steam from the high pressure digester more or less of the caustic solution always escapes with the steam and produces a perceptible effect upon the straw.

My present invention relates chiefly to the mechanism for thus venting the steam from a high pressure digester to a low pressure digester which is engaged in simultaneously cooking a fiber requiring a low temperature, and also when the fibers are simultaneously cooked, to means for discharging them simultaneously into the same blow-tank into contact with one another so as to disintegrate and mingle the fibers.

Having thus set forth the nature of the invention what is claimed herein is:

1. The combination, with high and low pressure digesters operated simultaneously to cook at diverse pressures fibers which require materially different temperatures for their reduction to cellulose, of a pipe supplying steam under high pressure to the high pressure digester, and means for connecting the tops of the two digesters and venting a regulated amount of steam from the high pressure digester into the low pressure digester, to maintain therein the lower temperature required to cook the fiber therein.

2. The combination, with high and low pressure digesters operated simultaneously to cook at diverse pressures fibers which require materially different temperatures for their reduction to cellulose, of a pipe supplying steam under high pressure to the high pressure digesters, and a pipe connecting the tops of the two digesters with a valve in such pipe having a vent passage for venting a regulated amount of steam from the high pressure digester into the low pressure digester to maintain therein the lower temperature required to cook the fiber therein.

3. The combination, with high and low pressure digesters *a* and *b* operated simultaneously for cooking fibers at diverse pressures, of a pipe *j* supplying steam to the high pressure digester for cooking the material in the same, the pipe *l* connecting the two digesters with the valve *g* in such pipe having a vent-passage for venting a limited amount of steam from the digester *a* to the digester *b*, and the low pressure digester *b* having a pipe *h* and valve *g* for discharging the steam from such digester, the valve having a main passage for discharging the steam freely when required, and a smaller vent passage for venting the steam from the lower pressure digester during the cooking operation.

4. The apparatus for making a composite fiber comprising two digesters with steam connections arranged and operated for cooking two materials in the two digesters, a blow-tank to receive and disintegrate the two materials when cooked in the two digesters, the blow-off valves *a'* upon the digesters with pipes connecting such valves to the blow-tank, and means for simultaneously opening such blow-off valves and discharging the materials from both the digesters into the tank simultaneously in contact with

one another, for disintegrating and mingling the two materials into a composite fiber.

5 5. The apparatus for making a composite fiber, comprising the digesters *a* and *b* for operating at different pressures, the pipe *j* and valve *k* for supplying steam to the high pressure digester, steam connections for delivering a regulated amount of steam from the digester *a* to the digester *b* for maintain-
10 ing a lower temperature in the digester *b* than in the digester *a*, the blow-off valves *a'* one upon each of the digesters, the blow-tank *c* with pipes connecting the blow-off valves *a'* with the said tank, and a shaft con-
15 necting such blow-off valves with means for operating it to open both blow-off valves simultaneously and discharge the contents

of both digesters into the blow-tank simultaneously.

6. The apparatus for making a composite 20 fiber, comprising means for simultaneously cooking two materials to produce two different fibers simultaneously, and means for discharging such cooked fibers simultaneously under pressure into contact with one 25 another to disintegrate the fibers and mingle the same into a homogeneous composite fiber.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

PULASKI M. HAMLIN.

Witnesses:

JESSIE G. VANDINE,
ELIZABETH DE HART.