

No. 775,028.

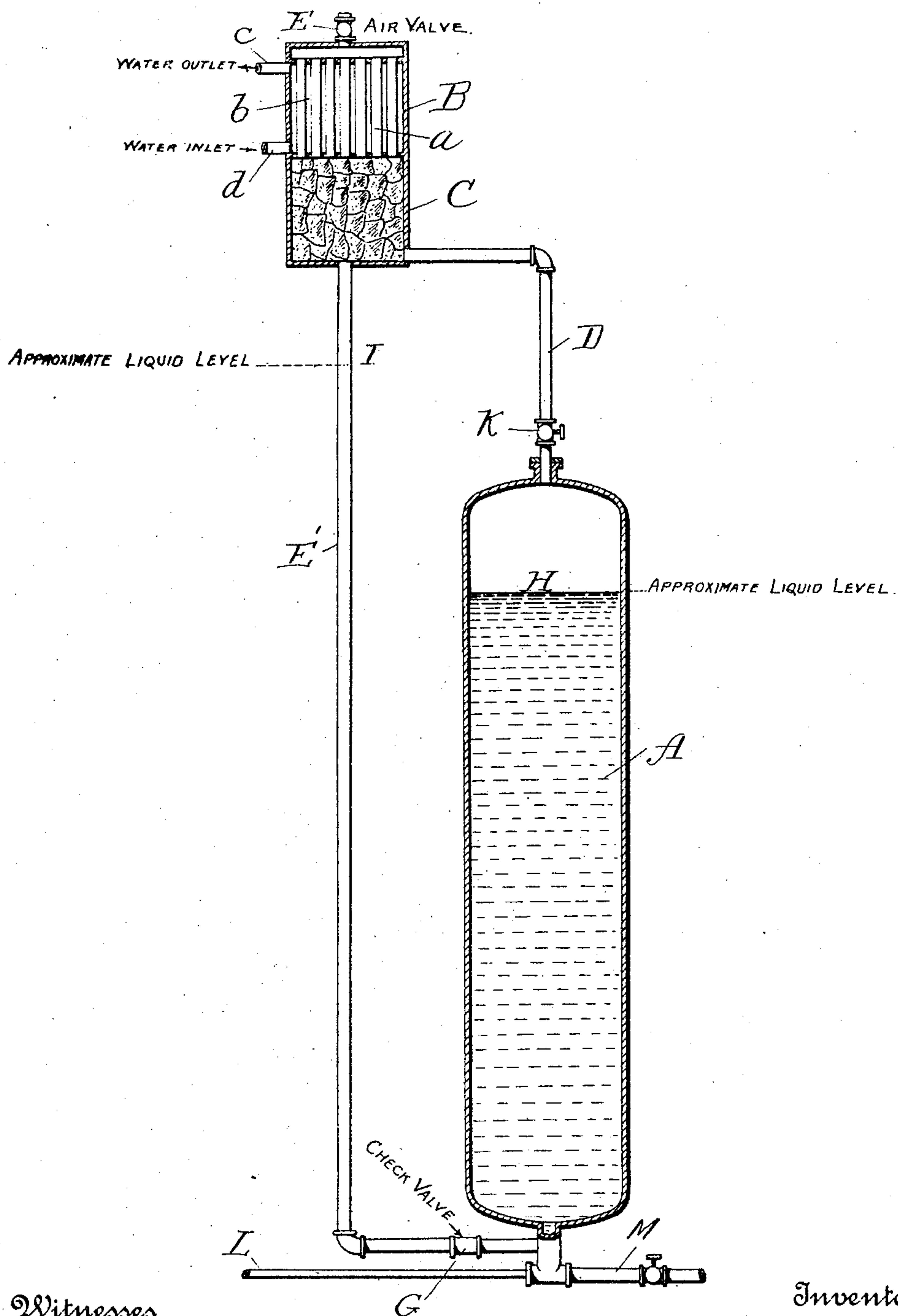
PATENTED NOV. 15, 1904.

F. H. CLOUDMAN.

APPARATUS FOR PREPARING FIBER FOR PAPER MAKING.

APPLICATION FILED JULY 15, 1904.

NO MODEL.



Witnesses
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UNITED STATES PATENT OFFICE.

FRANK H. CLOUDMAN, OF WESTBROOK, MAINE.

APPARATUS FOR PREPARING FIBER FOR PAPER-MAKING.

SPECIFICATION forming part of Letters Patent No. 775,028, dated November 15, 1904.

Application filed July 15, 1904. Serial No. 216,919. (No model.)

To all whom it may concern:

Be it known that I, FRANK H. CLOUDMAN, a citizen of the United States, residing at Westbrook, Cumberland county, Maine, (whose post-office address is FRANK H. CLOUDMAN, Westbrook, Cumberland county, State of Maine,) have invented certain new and useful Improvements in Apparatus for Preparing Fiber for Paper-Making, of which the following is a specification.

My invention is an improvement on the bisulfite method, and has for its principal object the saving of sulfur or sulfur products used in this process. The usual method of procedure in the manufacture of fiber by this process is to fill a large vessel, called a "digester," with wood in the form of chips and then run in the required amount of bisulfite-of-lime solution, close up tightly, and apply steam by means of proper pipes at the bottom of the digester. As the temperature of the solution rises some of the sulfur in the form of sulfur dioxide or "gas" is driven off and, together with the air contained in the wood and steam from the heated liquid, rises to the top of the digester. This accumulation of gas and air if allowed to remain would prevent the proper action of the solutions upon the wood, and therefore the usual custom is to relieve or allow a quantity of these gases to escape by means of proper pipes and valves leading from the top of the digester, more or less steam necessarily escaping at the same time.

The object of my invention is to recover the gas and return it back into the digester.

In the accompanying drawing the apparatus is shown in central vertical section.

The digester is shown at A. The relief-pipe D for the gas leads from the top of the digester to an absorber C, which is arranged at some distance above the top of the digester and is filled with limestone or other suitable material. Above this absorber is located the separator or condenser B, which may be of ordinary form having a series of vertical pipes *a* extending through a water-space *b* of the chamber, with which water-space the water-inlet and water-outlet pipes *c d* connect. This condenser-chamber has a partition extending across it near its upper end, and the series of

pipes open upwardly through this partition, and an air valve or cock E, connected with the space above this partition, is adapted to discharge any air which may separate from the gas. The absorber is connected at its lower end by a return-pipe E' with the lower end of the digester, and a check-valve is located at G in the said pipe, which closes toward the absorber to prevent the pressure of gas in the digester from passing back through this pipe to the absorber.

The pipe for introducing steam to the bottom of the digester is shown at L and the blow-pipe at M. A valve is also provided in the relief-pipe at K. The approximate liquid-level in the digester is indicated at H, while the approximate liquid-level in the return-pipe E' is indicated at I.

The operation is as follows: The digester A is filled with wood in the form of chips and the proper amount of bisulfite-of-lime solution is run in with the chips. Steam is then applied in the usual manner at the bottom of the digester. By means of gages and thermometers (not shown, but suitably connected to the top of the digester) the accumulation of gas and air can be watched, and when deemed necessary the valve K in the relief-pipe can be opened and the gas, air, and steam allowed to pass up through pipe D to the absorber C, and here the gas will be absorbed by the limestone or other suitable absorbent material, and absorption of the gas will also take place by the water of condensation resulting from the action of the condenser, and when a sufficient height of water of condensation, with its contained gas, has been reached in the return-pipe it will be forced into the digester by gravity, it being observed that the condenser and absorber are located at a considerable distance above the top of the digester, and the pressure being equalized throughout the system when the valve K is opened the return of the liquid will take place by gravity. The air-relief valve F, it will be noticed, is at the highest point in the system, and this may be of the automatic or hand operating type.

It will be observed also that the gas and steam passing out from the digester flows

first into the absorber, where the gas is acted on by the absorbing material and the descending fluid from the condenser.

I claim as my invention—

5 1. In combination with a digester, a gas absorber and condenser, pipes connecting said absorber and condenser with the upper and lower parts of the digester, and valve means whereby the pressure may be equalized, the
10 said absorber and condenser being arranged above the level of the digester whereby the return of the gas and liquid takes place by gravity, substantially as described.

15 2. In combination with a digester, an absorber arranged at a higher level, a relief-pipe from the digester to the absorber, a condenser arranged above and connected with the absorber and a return-pipe from the absorber
20 to the bottom of the digester, substantially as described.

3. In combination, a digester, an absorber arranged at a higher level and connected with the top of the digester, a condenser connected with the absorber and arranged above the same, a return-pipe to the digester and an air- 25 relief pipe at the top of the condenser.

4. In combination, a digester, an absorber, a pipe leading from the digester to the absorber, a valve in said pipe, a condenser arranged above and connected with the digester, a return-pipe from the absorber to the 30 digester and a check-valve in the said pipe, substantially as described.

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

FRANK H. CLOUDMAN.

Witnesses:

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