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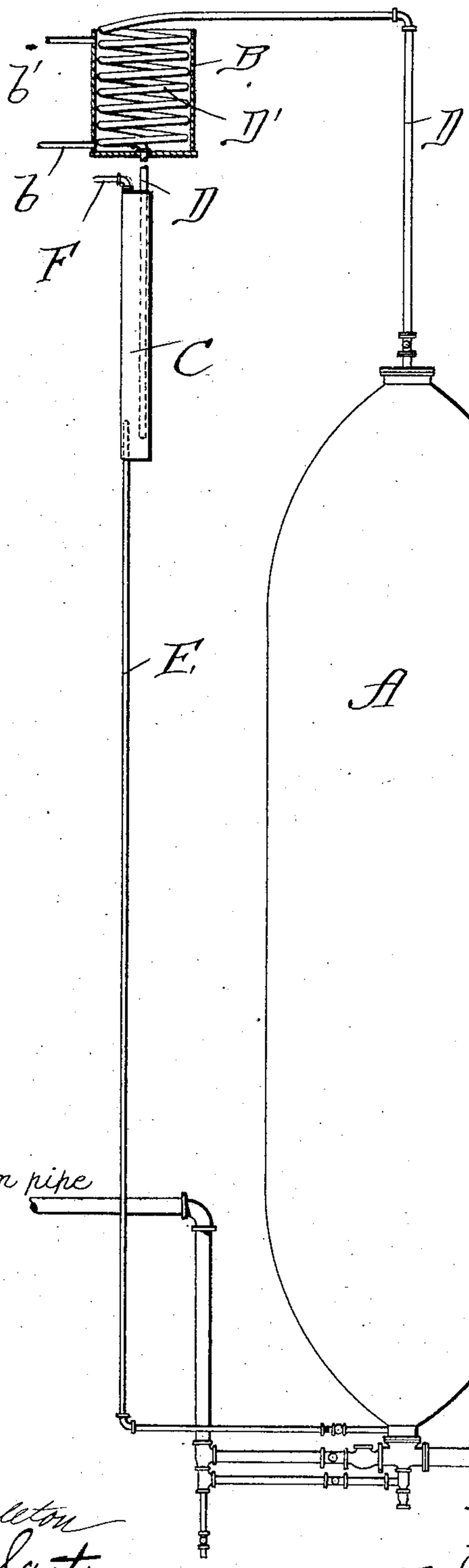
F. H. CLOUDMAN.

APPARATUS FOR PREPARING FIBER FOR PAPER MAKING PURPOSES.

APPLICATION FILED AUG. 22, 1903.

NO MODEL.



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No. 775,027. Patented November 15, 1904.

UNITED STATES PATENT OFFICE.

FRANK HERBERT CLOUDMAN, OF RUMFORD FALLS, MAINE.

APPARATUS FOR PREPARING FIBER FOR PAPER-MAKING PURPOSES.

SPECIFICATION forming part of Letters Patent No. 775,027, dated November 15, 1904.

Application filed August 22, 1903. Serial No. 170,430. (No model.)

To all whom it may concern:

Be it known that I, FRANK HERBERT CLOUDMAN, a citizen of the United States, residing at Rumford Falls, Maine, have invented certain new and useful Improvements in Apparatus for Preparing Fiber for Paper-Making Purposes, 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 dioxid 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 solution 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. For this purpose I employ a condenser attached to above "relieving-pipe." This condenser may be any of the usual forms; but for convenience of illustrating my method I have shown it in the form of a spiral pipe surrounded by water. I also employ an apparatus, which I have named an "absorber-separator," placed on the pipe leading from the condenser. The apparatus serves the double purpose of absorbing the gas and separating the air from the liquid. A portion of the gas will be absorbed by the water formed by condensing the steam; but to aid and make more complete the absorption of the gas the absorber-separator may be partially filled with limestone or any other suitable substance. The absorber-separator consists of a closed pipe or vessel with proper manhole for supplying the limestone and having the pipe from the condenser passing through the upper part and extending nearly to the bottom. The outlet is placed some distance above the bottom, thus providing means for the air to separate from the liquid and rise to the top part of the apparatus, where it may be taken out by means of a valve working automatically or otherwise. The outlet-pipe is carried to the bottom or any other part of the digester desired. The condenser, absorber separator, and all pipes connecting are under the same pressure as the digester. Now by placing the condenser and absorber-separator at a point higher than the top of the digester the condensed liquid can be made to return into the bottom or any other part of the digester, for the liquid will accumulate in the pipes, absorber separator, and condenser until sufficient height is reached to force it into the digester. As these are under the same pressure as the digester, it is obvious that this height or level will need to be but little higher than the level of the liquid in the digester.

Referring to the drawing, A is the digester. B is the condenser. C is the absorber-separator. D is the relief-pipe leading from top of digester to the condenser. E is the pipe leading from absorber-separator to lower part of digester. F is an air valve or cock. G is a check-valve. H is approximate level of liquid in digester. I is approximate level of liquid in absorber-separator. K is valve in relief-pipe.

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 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 connected to the top of the digester the accumulation of gas and air can be watched, and when deemed necessary valve K can be opened and the gas, air, and steam allowed to pass up through pipe D to condenser B, where the steam is condensed. Valve F will be opened (slightly, not enough to lower the pressure) either automatically or otherwise and the air allowed to pass out of the system. The gas

will be absorbed by the condensed steam and limestone, and when sufficient height is reached the resulting liquid will be forced into the digester through pipe E. This operation is repeated from time to time, or it may be continuous until the wood in the digester has been sufficiently cooked or digested.

I claim as my invention—

In combination with a digester, a condenser connected with the upper part thereof and arranged above the digester, and air-separating and gas-absorbing means between the said condenser and the digester and connected with the lower part of the digester through which the condensation liquid and absorbed gas will return to the digester by gravity after leaving the condenser, said air-separating means having an outlet for the discharge of the air, substantially as described.

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

FRANK HERBERT CLOUDMAN.

Witnesses:
I. A. BEARCE,
W. H. RAYE.