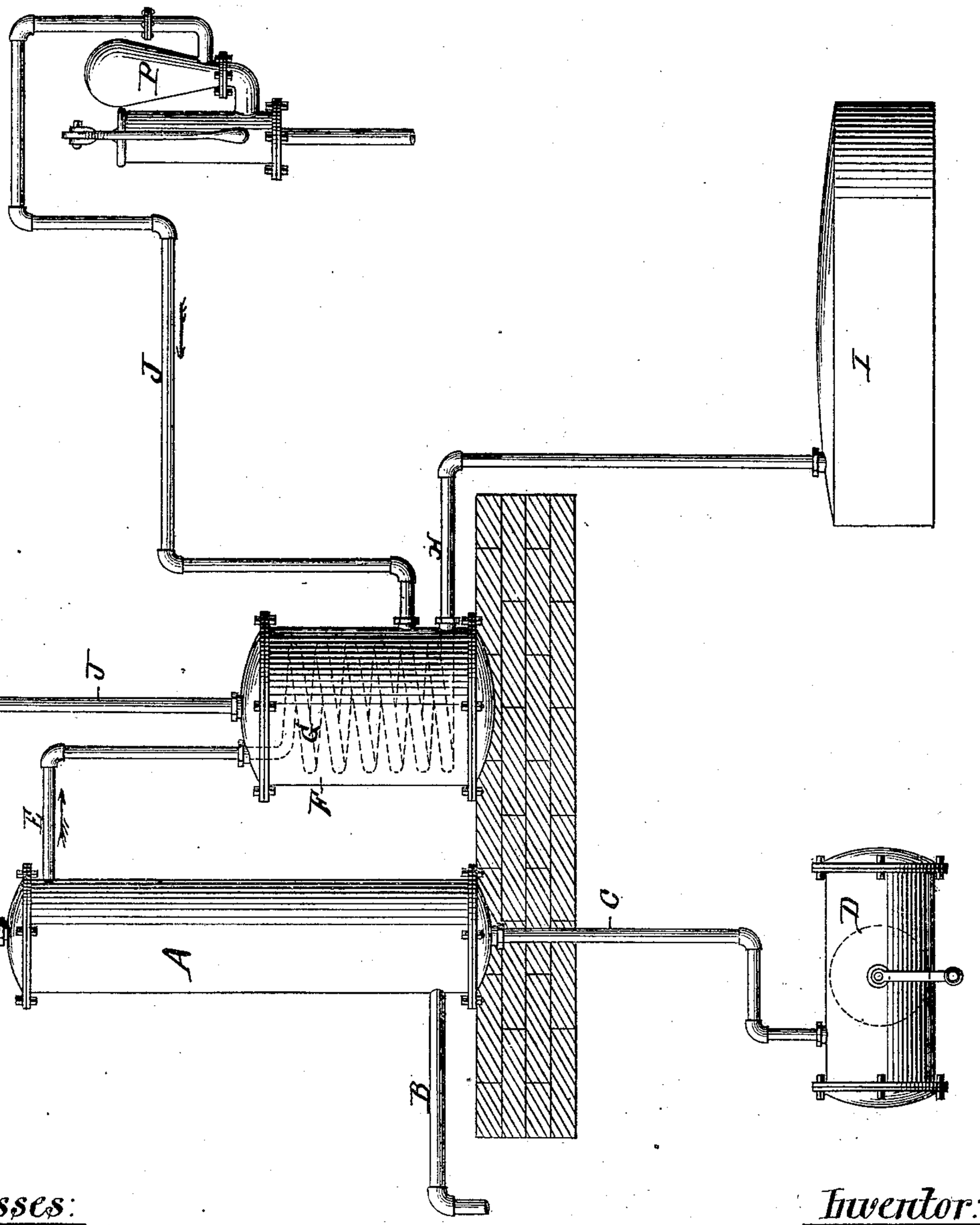
(No Model.)

E. H. WARDWELL.

MANUFACTURE OF AMMONIACAL SALTS.

No. 273,411. Patented Mar. 6, 1883.



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MANUFACTURE OF AMMONIACAL SALTS.

SPECIFICATION forming part of Letters Patent No. 273,411, dated March 6, 1883.

Application filed May 20, 1882. (No model.)

To all whom it may concern:

Be it known that I, EDWARD H. WARDWELL, of New York city, in the county and State of New York, have invented certain new and useful Improvements in the Manufacture of Gas-Liquor and Ammoniacal Salts, of which the following specification is a description.

The object of my invention is to obtain the volatile products of crude ammoniacal liquor of the gas-works, or that resulting from the carbonization of bones in retorts; and my invention consists in means whereby the crude material is heated before it passes into the still, where it comes in contact with steam which liberates the volatile products, and means whereby such volatile products are condensed as they pass from the still to the receiving-tank.

In the drawing is shown one form of apparatus which may be employed to carry my invention into practical effect.

A designates a still of the usual construction, consisting of a vertical column filled with a series of distributing shelves or trays or lumps of coke or other suitable filtering material. An inlet steam-pipe, B, is connected to one end of the still, by means of which steam may be forced into the still.

C designates a waste-pipe leading from the bottom of the still to carry off the waste liquor to tank or generator D, and E is an outlet-pipe leading from the still to a combined heater and condenser, F, to provide for the escape of the volatile products. This outlet-pipe E is connected to one end of a coil, G, of metal pipe contained within the heater and condenser F, the other end of the coil G being connected to a pipe, H, leading to a receiver, I. P is a force-pump with an outlet or discharge pipe, J, leading to the heater and condenser F, by means of which the crude liquor is forced through said heater and condenser and passes into the still.

The operation is as follows: The crude liquor is first pumped into the heater and condenser, passing thence into the still, where it is distributed by means of the shelves and trays or lumps of coke or other material, and at the same time steam is let into the still, which, as it comes in contact with the crude liquor, liberates the volatile bodies thereof, which are driven out by the steam-pressure and pass through the coil in the condenser and heater into the receiver. It will be seen that as the volatile bodies pass through the coil they are cooled by the surrounding liquor which is being forced into the condenser and heater by the pump, and hence pass into the receiver in a condensed state, and are thereby concentrated for transportation. It will also be seen that as the crude liquor passes through the condenser and heater to the still it is heated by the coil and enters the still in a heated state, and hence it takes less steam to liberate the volatile bodies from the heated liquor than if the crude liquor entered the still in a cold state. Thus it follows that my combined heater and condenser answers the double purpose of heating the crude material and condensing and concentrating the volatile products, thereby saving considerable fuel and yielding a larger net result. Ammoniacal salts may be produced from such crude liquors by my method by the use of mineral acids in the usual way.

The different parts of the apparatus described may be of any suitable material, and of such special construction as may be found to be the most advantageous in practice.

I am aware that it is old to utilize the waste heat carried off by the sulphureted hydrogen gas in the manufacture of sulphate of ammonia, and at the same time deprive it of its deleterious effects by heating the incoming ammonical liquor and simultaneously cooling the gas previous to passing it into water to absorb it, and I make no broad claim to such, my method differing from this in passing the vaporized matter or volatile products directly from the still in a closed pipe through the condenser to the receiver.

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

1. The apparatus for the distillation of ammoniacal liquor, consisting of a supply apparatus, a heater, provided with a pipe-coil, a still, and a receiver, with suitable pipe-connections arranged to force the liquor from the supply apparatus through the heater to the still and the volatilized products of the still through the pipe-coil to the receiver, whereby

the liquor-supply is heated and the volatilized product condensed at one and the same operation, substantially as described.

2. The combination and arrangement, substantially as shown and described, of the still A and its steam-inlet pipe B, the vessel F, the pipe E, extending from the still, coiled at G in the vessel F, and leading, as pipe H, to the receiver I, the pump P, and the pipe J, for conducting the crude liquor from the pump through the vessel F around the coil G and out of said vessel into the still.

EDWARD H. WARDWELL.

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