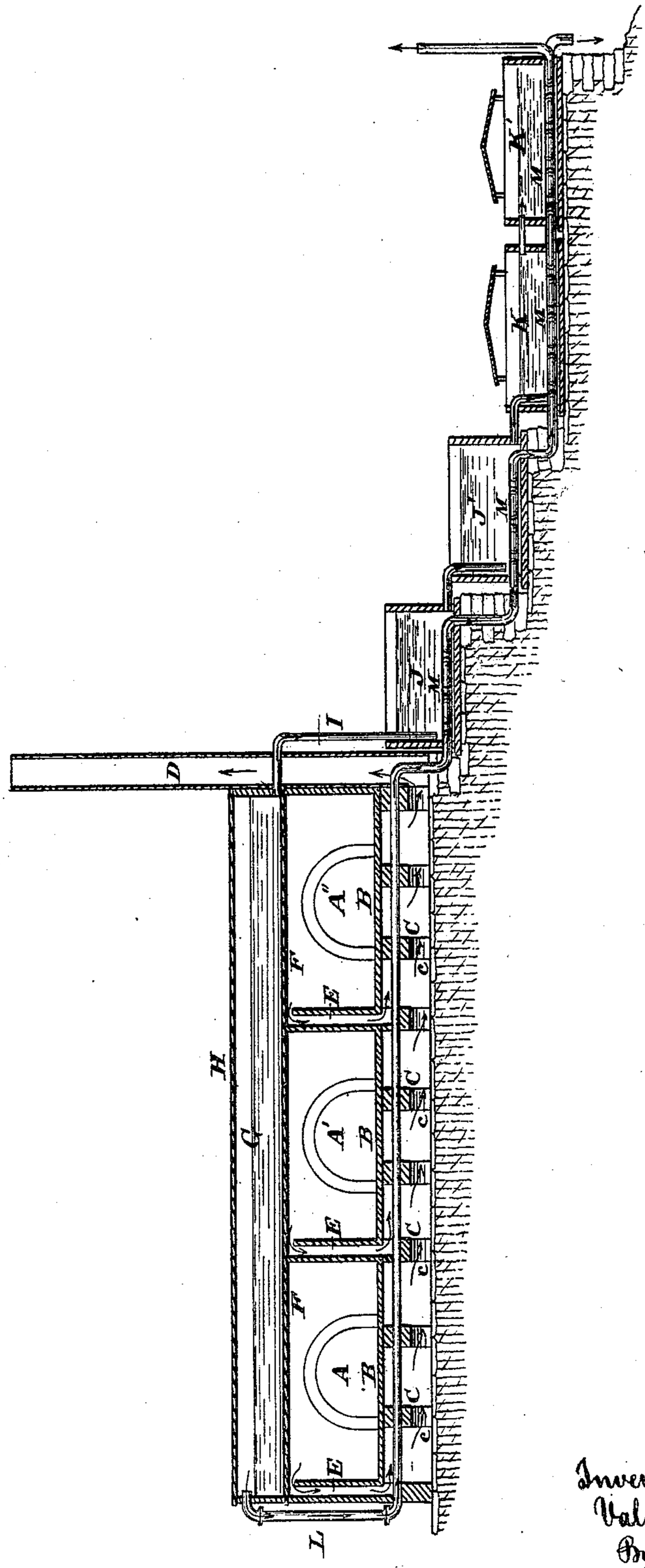
V. P. COLLINS.

Apparatus for Evaporating Brine.

No. 229,871. Patented July 13, 1880.



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UNITED STATES PATENT OFFICE.

VAL P. COLLINS, OF COVINGTON, KENTUCKY.

APPARATUS FOR EVAPORATING BRINE.

SPECIFICATION forming part of Letters Patent No. 229,871, dated July 13, 1880.

Application filed May 24, 1879.

To all whom it may concern:

Be it known that I, VAL P. COLLINS, of Covington, Kenton county, Kentucky, have invented a new and useful Apparatus for Evaporating Brine, of which the following is a specification.

My invention relates to improvements in the apparatus in which the waste heat of coke-ovens is made available for the evaporation of the watery portions of brine.

It consists of an arrangement, hereinafter fully described, of a flue within each oven and a pipe for conveying brine from the brine-pan to the cisterns, covered brine-pan, from whose upper part is conducted a steam-pipe, which, having been made to traverse a series of flues under the ovens, is made to pass through the settling and graining cisterns.

The accompanying drawing represents, by vertical section, a train of evaporating-pans and settling and graining cisterns for the production of salt, and a series of coke-ovens whose waste heat is utilized for the salt-producing apparatus.

A A′ A″ may represent coke-ovens of any preferred or suitable form and of any desired number. The hearths B of these ovens rest upon piers or arches C, having openings *c*, which, with the inclosing side walls, constitute flues that permit the escape of the gaseous products of the ovens into a smoke-stack or chimney, D. Each partition-wall and one end wall has a downtake or descending flue, E, that conducts the said products from the ovens into the flue *c*.

The top F of the series of ovens is of metal, and said top constitutes the bottom of the salt-evaporating pan or steam-chest G. This pan, while in use, is closed at top by a cover, H, which operates to confine the steam.

Customary pipes I conduct the strong brine into the usual or any suitable set of settlers, J J′, and thence into customary grainers K K′.

The evaporation in the cisterns J J′ K K′ is effected by the instrumentality of a pipe, L, which, being conducted from the steam-space of the evaporating pan or tank G, passes thence through the flue *c*, where its contents become superheated, and thence pass into copper pipes M, that occupy the lower parts of the settling and graining cisterns J J′ K K′.

This process of using superheated steam from the brine-tank for evaporation of the contents of the settling and graining cisterns is of threefold benefit: first, it adds to the evaporating power of the pipes in the bottoms of the settlers and grainers, thus largely increasing the yield; secondly, it produces thereby a finer-grained salt of much greater marketable value; thirdly, the cost of manufacture is greatly lessened, partly by the saving of labor for a given yield and partly by reason of further saving in fuel, as before explained.

It is obvious that the full heat of the coke-ovens is applied to the entire under surface of the evaporator, and, as the coke will pay for its own manufacture, the three to four dollars cost of fuel to every hundred bushels of marketable salt as customarily produced is wholly saved, and, moreover, with greater yield for the same amount of labor and extent of apparatus, and this great staple is consequently rendered capable of being given to the public at a corresponding diminution of price.

An inferior modification of my invention may consist of an arrangement whereby the gaseous products of combustion may be conveyed in pipes to and burned underneath a series of brine-evaporating-pans located at a considerable distance from the coke-ovens.

I am aware that the waste heat of coke-ovens has been utilized in the evaporation of the watery portions of brine, and that in apparatus for such purpose the top of the coke-ovens has constituted the bottom of one of the evaporating-vessels, and that an eduction-pipe for steam has been conducted from the top of a closed salt-pan, placed on a furnace, through flues or through the fire-box, and through salt-pans for superheating steam, and thereby heating and evaporating brine in the pans, and therefore disclaim novelty in any of these expedients, separately or broadly considered.

I claim as new and of my invention—

The combination, in an apparatus for evap-

orating brine, of the covered brine-chest G, whose bottom constitutes the top of the coke-oven, pipe L, communicating at one end with the upper part of the chest G and passing through the horizontal flue in immediate contact with the products of combustion, flue E, brine-conveying pipes I, settling and graining cisterns J J′ K K′, and pipes M, arranged within the bottom of said cisterns, substantially as and for the purposes set forth.

In testimony of which invention I hereunto set my hand.

VAL P. COLLINS.

Attest:
GEO. H. KNIGHT,
JOE L. LOGAN.