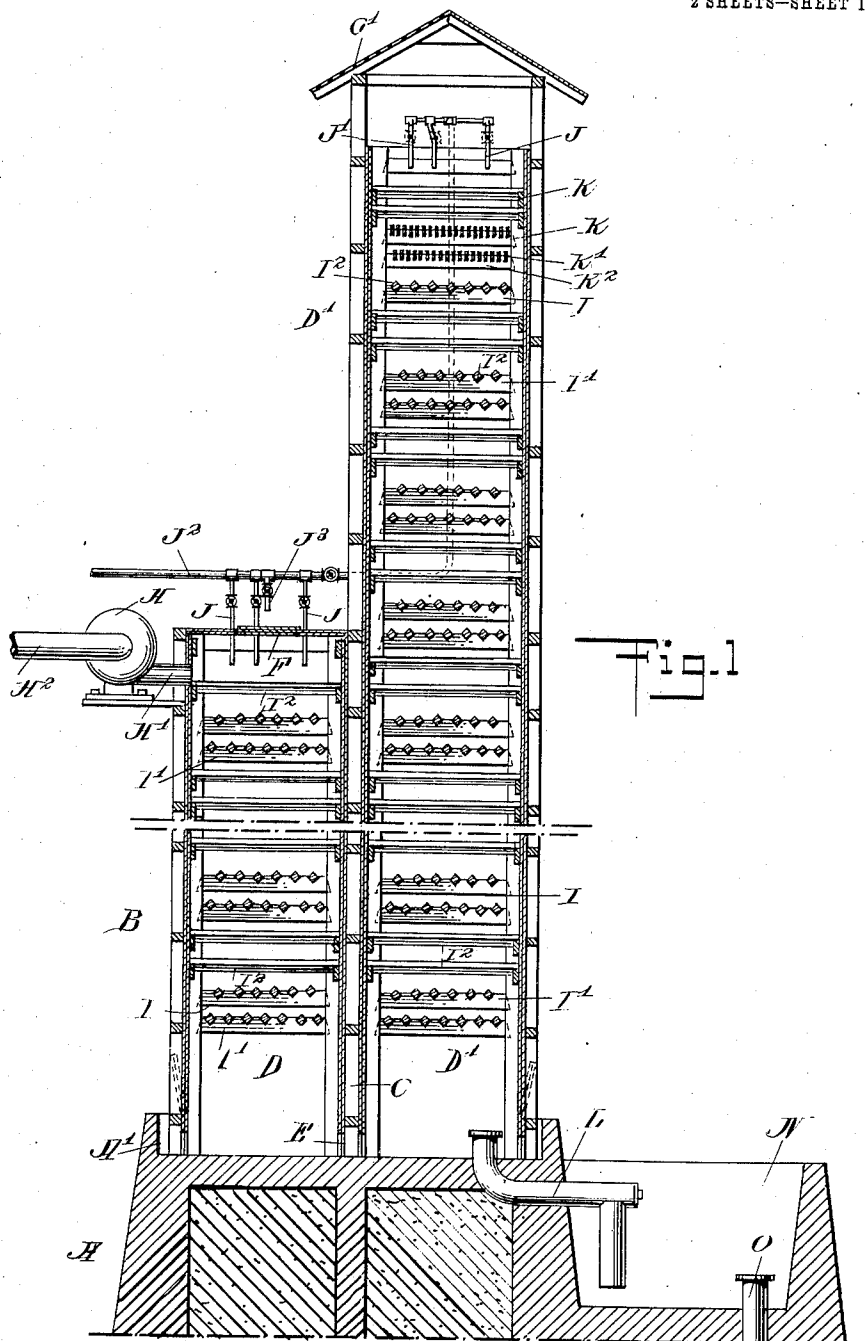


J. J. DYE.
 APPARATUS FOR ABSORBING HYDROFLUORIC ACID.
 APPLICATION FILED FEB. 21, 1911.

1,016,219.

Patented Jan. 30, 1912.

2 SHEETS—SHEET 1.



WITNESSES:

John A. Bergstrom
Rev. J. H. Smith

INVENTOR

Joel J. Dye
 BY *Mum Co.*
 ATTORNEYS

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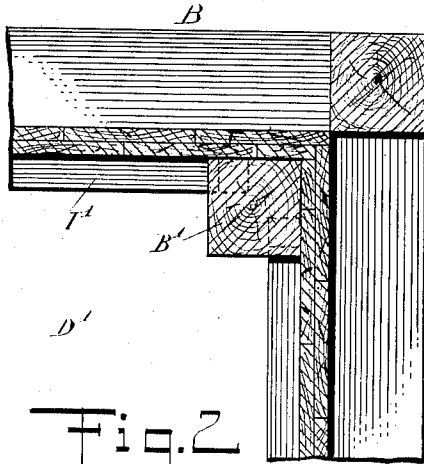


Fig. 2

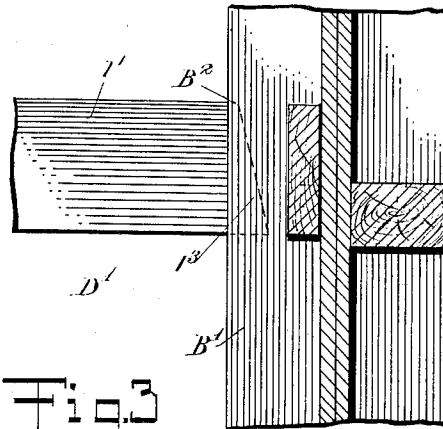


Fig. 3

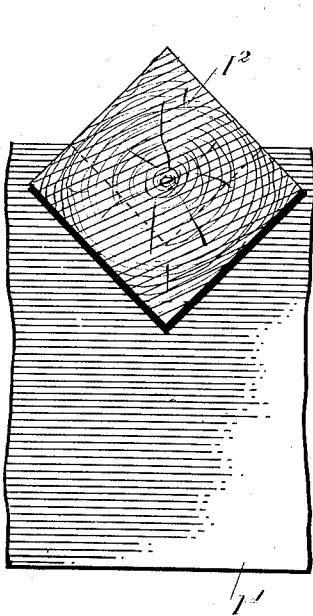


Fig. 4

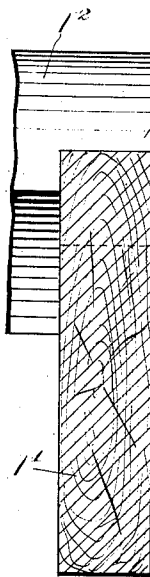


Fig. 5

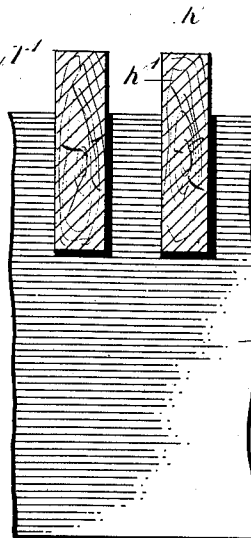


Fig. 6

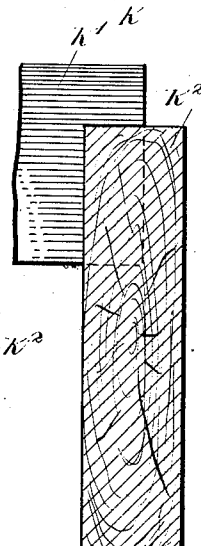


Fig. 7

WITNESSES:
John A. Searles
Wm. H. Hooper

INVENTOR
Joel J. Dye
 BY *Mum Co.*
 ATTORNEYS

UNITED STATES PATENT OFFICE.

JOEL JEATHRO DYE, OF ATLANTA, GEORGIA.

APPARATUS FOR ABSORBING HYDROFLUORIC ACID.

1,016,219.

Specification of Letters Patent.

Patented Jan. 30, 1912.

Application filed February 21, 1911. Serial No. 610,112.

To all whom it may concern:

Be it known that I, JOEL J. DYE, a citizen of the United States, and a resident of Atlanta, in the county of Fulton and State of Georgia, have invented a new and Improved Apparatus for Absorbing Hydrofluoric Acid, of which the following is a full, clear, and exact description.

The invention relates to the manufacture of commercial acid phosphate, and its object is to provide a new and improved apparatus, designed for condensing the obnoxious and destructive gases or fumes arising in mixing phosphate rock with an acid, the apparatus being arranged to convert the gases into solid form and prevent the same from escaping into the atmosphere to the detriment of human beings and vegetation. For the purpose mentioned use is made of a shaft filled with checker work and provided with a water spray for condensing the gases or fumes passing through the shaft, the products of condensation gathering on the checker work.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a sectional side elevation of the apparatus; Fig. 2 is an enlarged sectional plan view of one corner of a compartment and showing the supporting beams of the wooden racks in front on the corner post; Fig. 3 is a sectional side elevation of the same; Fig. 4 is an enlarged cross section of part of one of the racks; Fig. 5 is a sectional side elevation of the same; Fig. 6 is an enlarged cross section of part of one of the crates; and Fig. 7 is a sectional side elevation of the same.

The base A is built of brick, concrete or other material, and the top of the base forms a pan A' in which is set a shaft B, preferably provided with a transverse partition C terminating a distance from the pan A' and dividing the shaft B into compartments D and D' connected with each other at their lower ends at E, as indicated in the drawing. The top of the compartment D is closed and provided with a trap door F, while the upper end of the compartment D' is preferably extended beyond the top of the compartment D and is open and protected by a roof G. Into the upper closed end of the compartment D discharges the discharge pipe H' of

a suction fan H, having the inlet pipe H² connected with the bin or bins in which the phosphate rock is mixed with the acid so that gases or fumes arising from the mixture are drawn out of the bin by the action of the suction fan H and discharged by the pipe H' into the compartment D, in which the gases or fumes travel downward and then pass by way of the opening E into the lower end of the compartment D' to rise therein.

The compartments D and D' are filled above the opening E with checker work I, preferably made in the form of wooden racks, each consisting of supporting beams I' and parallel bars I² removably held on the supporting beams I', one close to the other, as plainly indicated in the drawing. The supporting beams I' are provided with beveled ends I³, fitting correspondingly-shaped recesses B² in posts B' forming part of the shaft B, and the bars I² are preferably polygonal in cross section so as to present a large condensing surface to the gases or fumes circulating through the compartments D and D', as previously explained. The ends I⁴ of the bars I² are preferably reduced and are seated in seats I⁵ cut into the tops of the beams I', to removably hold the bars I² in position on the beams I'. It is understood that the wooden racks are arranged one above the other, and alternate pairs of said racks have their supporting beams I' and bars I² arranged at a right angle, one to the other, as will be readily understood by reference to the drawing. Into the upper ends of the compartments D and D' extend the perforate lower ends of spraying devices J, J' connected with a water supply pipe J² leading to a suitable source of water supply, so that the water is sprayed in the upper ends of the compartments D and D'. Now when the condenser is in use and the gases or fumes circulate through the compartments D and D', as previously explained, and sprays of water are discharged into the compartments then a condensing of the gases or fumes takes place in the said compartments and the products of condensation readily adhere or settle on the checker work I, that is, on the bars I² and their supporting beams I'. In the upper end of the compartment D' below the spraying pipes J' are arranged tiers of lattice work or crates K, each formed of spaced bars K' supported on beams K²

attached to the posts B', similar to the beams I'. The lattice work or crates K serve to check the escape of vapors that have not been condensed, it being understood that the gases or vapors which finally pass out of the upper open end of the compartment D' are free of obnoxious or detrimental particles. The solid particles which adhere or are deposited on the checker work I are washed off by the water entering the upper ends of the compartments D and D' and pass down into the pan A' from which leads a pipe L to a well N, preferably arranged in the base A to one side of the shaft B, as indicated in the drawings. A water discharge pipe O extends into the bottom of the well N, and the inlet to the discharge pipe O is a distance above the bottom of the well N, so that the solid substances carried by the water from the pan A into the well N settle therein, while the surplus water overflows into the pipe O to be carried to a suitable place of discharge. The inlet end of the pipe L extends a distance above the bottom of the pan A' so that a small amount of water is held in the pan A' within the shaft B to form a seal and thus prevent leakage of the obnoxious gases or fumes from the shaft B at the bottom thereof.

From the foregoing it will be seen that the gases or fumes arising from the mixing of the phosphate rock with acid in the bins is circulated through the compartments D, D' of the shaft B, and during this circulation the fumes or gases are subjected to sprays of water, so as to condense the gases or fumes. The products of condensation adhere or are deposited on the checker work I and are washed off the same, to be finally carried to the well N. The vapors or gases which are not condensed can pass through the open end of the compartment D' into the atmosphere, but as such escaping vapors are harmless no further treatment of the same is necessary.

The water supply pipe J² is provided with a valved flushing pipe J³ above the door F, so that when it is desired to clean the condenser the door F and the valve of the pipe J³ are opened, so that water can be passed into the apparatus for flushing purposes.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An apparatus of the class described, comprising a base, a shaft on the said base and having two compartments of unequal height and communicating with each other at their lower ends, the shorter compartments being closed at the top and the longer one open, a gas supply connected with the said upper closed end of the shorter compartment, spraying devices in the upper ends of the said compartments, and checker work in the said compartments.

2. An apparatus of the class described, comprising a base, a shaft on the said base and having a partition extending upwardly a distance from the said base to form two compartments of unequal height connected with each other at their lower ends, one of the compartments being closed at the top and the other being open, a gas supply connected with the said upper closed end, spraying devices in the upper ends of the said compartments, checker work in the said compartments, and a perforate arrester in the said upper open end.

3. An apparatus of the class described, comprising a base having a pan at the top, a shaft set on the said base and having a vertical partition reaching to within a distance from the said pan and forming compartments of unequal height connected with each other at their lower ends, one of the compartments being open at the top to form an escape for vapors, and the other compartment having its top provided with a door for normally closing the compartments, means for discharging the gases to be condensed into the upper closed end of the latter compartment to cause the gases to travel down in this compartment and up in the other compartment, wooden checker work held in the said compartments, and water-spraying devices in the upper ends of the said compartments.

4. An apparatus of the class described, comprising a base having a pan at the top, a shaft set on the said base and having a vertical partition reaching to within a distance from the said pan and forming compartments of unequal height connected with each other at their lower ends, one of the compartments being open at the top to form an escape for vapors and the other compartment having its top provided with a door for normally closing the compartment, means for discharging the gases to be condensed into the upper closed end of the latter compartment to cause the gases to travel down in this compartment and up in the other compartment, wooden checker work held in the said compartments, water-spraying devices in the upper ends of the said compartments, and a lattice work in the upper open end of the one compartment.

5. An apparatus of the class described, comprising a base having a pan at the top, a shaft set on the said base and having a vertical partition reaching to within a distance from the said pan and forming compartments of unequal height connected with each other at their lower ends, one of the compartments being open at the top to form an escape for vapors and protected by a roof and the other compartment having its top provided with a door for normally closing this compartment, means for discharging the gases to be condensed into the upper

closed end of the latter compartment, to
cause the gases to travel down in this com-
partment and up in the other compartment,
wooden checker work held in the said com-
partments, water-spraying devices in the up-
5 per ends of the said compartments, a well, a
pipe leading from the said pan into the well,
and a water discharge pipe leading from the
well to carry off the water and to allow the

products of condensation to settle in the 10
well.

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

JOEL JEATHRO DYE.

Witnesses:

J. R. WALRAVEN,
E. R. MCGLOSSON.