

(No Model.)

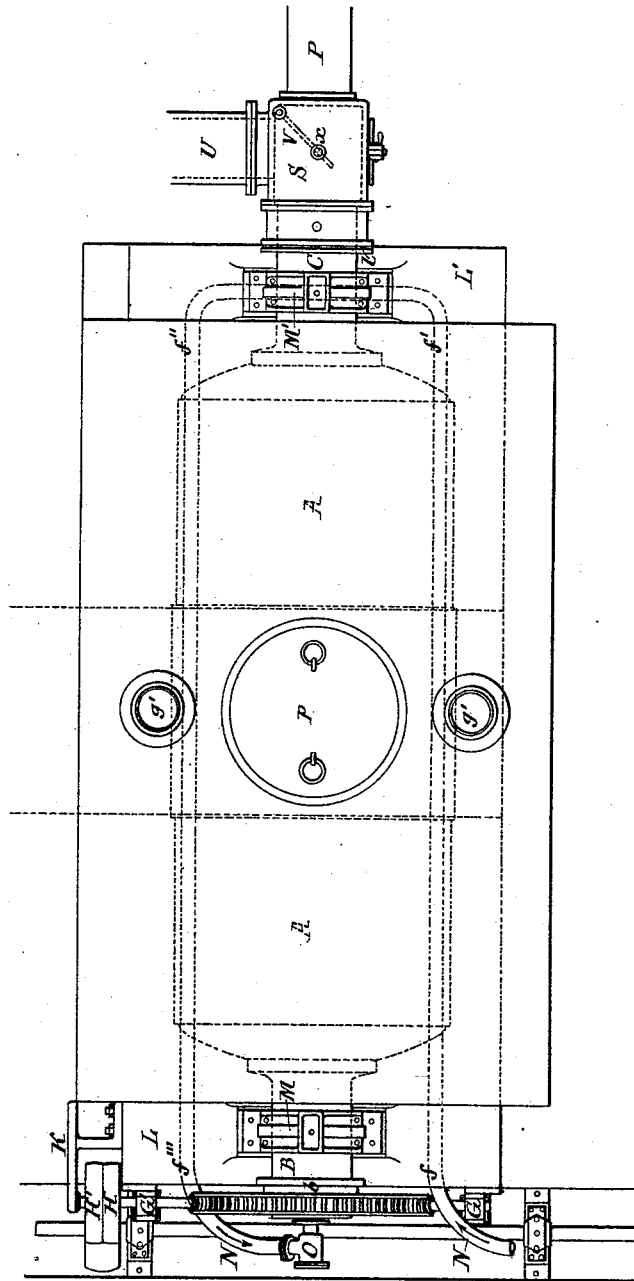
2 Sheets—Sheet 2.

C. DUBOIS.
APPARATUS FOR SUBLIMING SULPHUR.

No. 420,719.

Patented Feb. 4, 1890.

FIG. 2



Witnesses:
William D. Conner.
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UNITED STATES PATENT OFFICE.

CHARLES DUBOIS, OF MARSEILLES, FRANCE.

APPARATUS FOR SUBLIMING SULPHUR.

SPECIFICATION forming part of Letters Patent No. 420,719, dated February 4, 1890.

Application filed August 4, 1886. Serial No. 210,020. (No model.)

To all whom it may concern:

Be it known that I, CHARLES DUBOIS, manufacturer of chemicals, of Marseilles, (Bouches du Rhône,) in the Republic of France, have
5 invented Improvements in Apparatus for Extracting and Subliming Sulphur, of which the following is a specification.

The invention forming the subject of the present application for a patent relates to an
10 apparatus for performing in a practical and commercial manner the extraction of the sulphur contained in sulphurous earths, ores, and, in general, in all materials containing this product, as well as the sublimation of
15 raw or crude sulphur.

The distinguishing feature of this apparatus is the arrangement of a rotatory retort with provision for the supply of superheated or other steam, as hereinafter described with
20 reference to the accompanying drawings, which represent the said apparatus, together with all the details of its construction.

The apparatus, illustrated in vertical and longitudinal section in Figure 1 and in plan
25 in Fig. 2, is composed of a rotating body or chamber A, of cylindrical, spherical, ovoidal, or other form, to the extremities of which are bolted hollow metal trunnions B and C, supported by bearings M M', attached to stand-
30 ards L L', strongly connected together and to the walls or brick-work inclosing the retort A by bolts and rods d d'. Apertures t t', situated diametrically opposite to one another, are provided in the body or chamber
35 A at or near the middle part of the latter. These apertures serve for the introduction and removal of the materials to be treated and are closed by suitable metallic plugs or covers. A steam-supply pipe T is passed through
40 the trunnion B and the gases and vapors produced in the apparatus escape through the trunnion C, which is provided with a flange or collar a for the purpose of preventing any longitudinal displacement of this end of the
45 retort (arising from expansion) in the direction of the trunnion B. Upon the latter is keyed a worm-wheel D, prevented from shifting laterally by a groove b, working over a crescent-shaped plate F, attached to the
50 standard L. The said wheel D is in gear with an endless screw or worm E, keyed upon a shaft rotating in bearings G G' and pro-

vided with fast and loose pulleys H H', receiving motion from the main shaft of the factory or otherwise. The shaft carrying the
55 worm E, in addition to collars or shoulders, is provided with a steel center bearing against a plate or block of the same metal on a thrust-piece K, bolted to the standard L.

The chamber or retort A rotates upon the
60 trunnions B and C, and is inclosed in walls of masonry provided with two fire places or grates W W', the products of combustion from these grates being caused to circulate around the retort on all sides.
65

In the summit or highest part of the roof or vault of the inclosing brick-work or masonry there is a central opening p, serving for the introduction into the retort of the materials to be treated, and two other openings q' q'. The opening p is provided with a metal
70 cover, and each of the openings q' q' is provided with a chimney x.

A discharging-hopper Y, Fig. 1, is provided at the center of the apparatus between the
75 fire-places W W', being provided with a sliding door or valve s, which, when open, allows the materials treated to fall into a tunnel Z, from which they can be removed in any convenient
80 manner.

Steam from any suitable generator is supplied through the pipe N, which enters the apparatus through an orifice f in the support or standard L and is carried along the side of the retort through the hot gases from the
85 fire-places W W'. This steam-pipe then proceeds along the support L' from f' to f'' and returns in a parallel line on the other side of the retort, passing through the end wall again at f'''. By the time it has reached this point
90 the steam is highly superheated, and it is then led through a junction-piece or union O into a pipe T in the interior of the retort. This pipe is provided with nozzles Q, whereby the steam is uniformly distributed throughout the
95 mass of materials under treatment. The junction-piece O is provided with an inspection-hole in the front, and is connected with the trunnion by a gland g. The pipe T, which is screwed into the piece O, is supported at the
100 opposite or hinder end of the retort by a cross-bar h. The nozzles Q are arranged radially and by preference are directed toward the lower part or bottom of the retort, being con-

tracted at their open ends in order to better distribute the steam.

The gases and vapors produced in the apparatus escape through the trunnion C, which is provided with a stuffing-box R, having a gland *l*, into a box or chamber S, from whence the said gases and vapors are delivered either into a main pipe P or into a secondary pipe U, Fig. 2.

Access can be obtained to the interior of the chamber S when the apparatus is not in action by means of a man-hole *v*, provided with a suitable cover. In the upper part of this chamber there is a screw-threaded hole, serving for connecting it to a ring for lifting or carrying the chamber by or for the insertion of a thermometer, in order to observe the progress of the operation, and the lower part is provided with a pipe having a stop-cock *y* for taking samples of the product. This chamber is also provided internally with a double-acting valve V, capable of being operated by means of a lever-handle *n*, fixed on its hinge-pin *m*, so as to close either of the orifices of the pipes P or U, either of which can thus be caused to receive the vapors coming into the chamber from the retort through the trunnion C.

The box or chamber S is not required in cases where it is not necessary to divide the vapors produced. It may then be unbolted and an ordinary cylindrical tube be substituted in its place, so as to connect the stuffing-box R with the pipe P. This is done when the materials under treatment do not contain any product liable to distill over before the sulphur and capable of injuring the quality of the latter.

It is evident that the dimensions and forms indicated in the drawings may be modified in practice according to circumstances, and that my invention is by no means limited to these forms and dimensions or to any particular materials to be employed in the con-

struction of any of the constituent parts, nor to the relative proportions and arrangement thereof. For example, in place of the two openings *t* and *t'* one opening only may be provided, and the residues may be drawn toward the center of the retort by means of a screw or creeper arranged inside the retort. Such a screw will also serve to impart a to-and-fro motion to the materials, which may be happily combined with the motion resulting from the rotation of the retort and the admission of superheated steam in the interior of the mass. In short, the result to be attained by means of this apparatus consists in a progressive and uniform heating of the materials to be treated by the admission of superheated steam, which, on the other hand, facilitates the condensation of the vapors of sulphur by its own condensation. The apparatus is very durable and enables a large yield or output of sulphur to be obtained.

I claim—

1. The combination of the two fire-places and intermediate discharge-hopper with a rotary retort having a discharging man-hole, all substantially as specified.

2. The combination of the combustion-chamber having a man-hole at the top with a rotary retort in the combustion-chamber and having a feeding man-hole, all substantially as described.

3. The combination of the combustion-chamber and rotary retort therein with a steam-pipe passing through the combustion-chamber and into the retort and having radial nozzles therein, substantially as set forth.

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

CHARLES DUBOIS.

Witnesses:

CHARLES D'POISEL,

JULES ARISTIDE SARRAZINE.