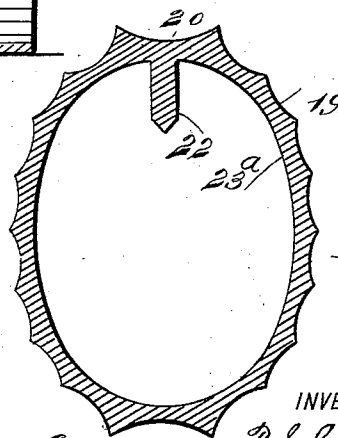
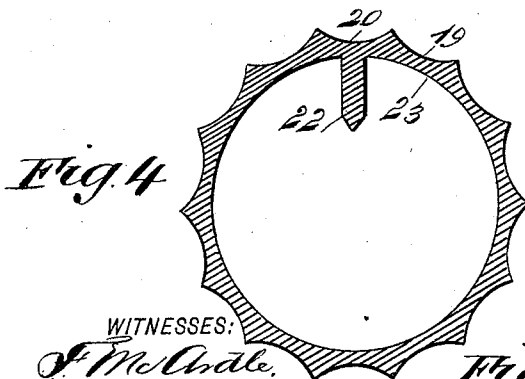
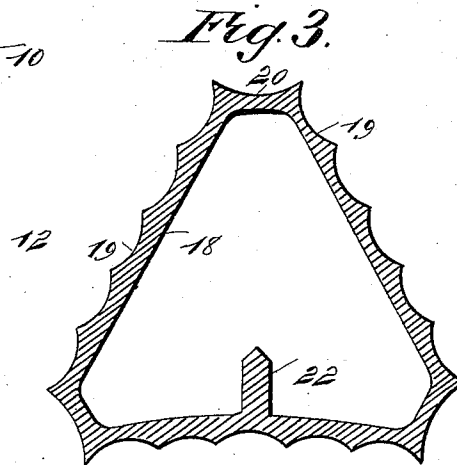
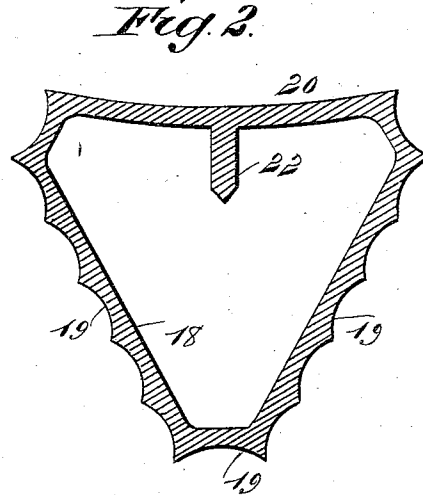
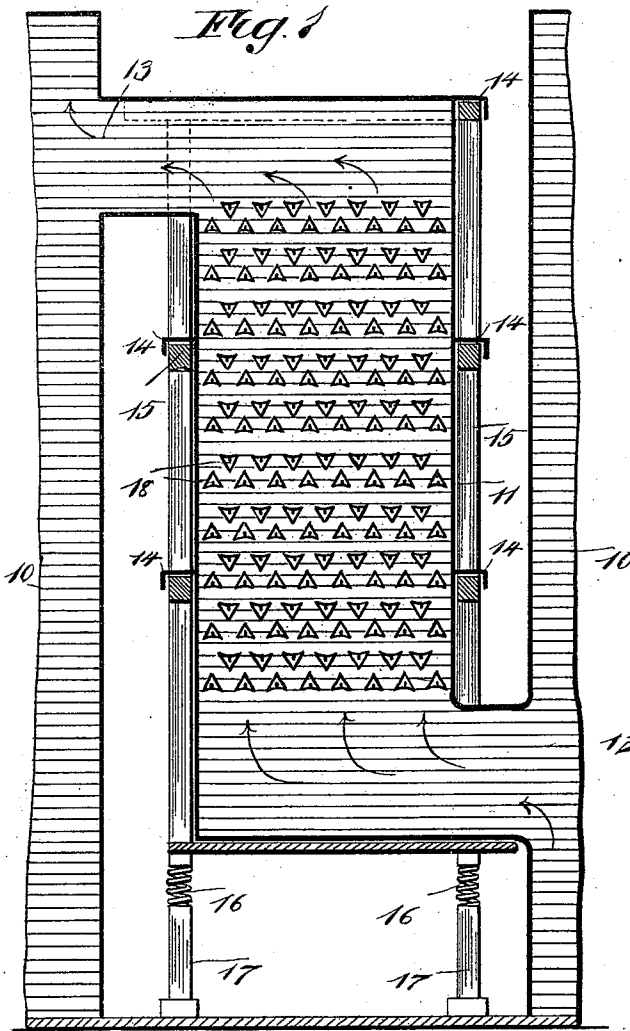


(No Model.)

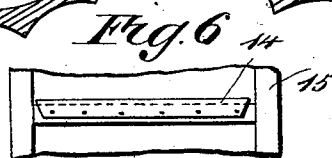
P. S. GILCHRIST.
APPARATUS FOR MAKING SULFURIC ACID.

No. 527,680.

Patented Oct. 16, 1894.



WITNESSES:
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PETER S. GILCHRIST, OF CHARLESTON, SOUTH CAROLINA.

APPARATUS FOR MAKING SULFURIC ACID.

SPECIFICATION forming part of Letters Patent No. 527,680, dated October 16, 1894.

Application filed March 30, 1894. Serial No. 505,693. (No model.)

To all whom it may concern:

Be it known that I, PETER S. GILCHRIST, of Charleston, in the county of Charleston and State of South Carolina, have invented a new and Improved Apparatus for Making Sulfuric Acid, of which the following is a full, clear, and exact description.

My invention relates to improvements in that class of apparatus which is used in the manufacture of sulphuric acid, and my invention is an improvement on the apparatus shown in Letters Patent of the United States, No. 503,847, dated August 22, 1893.

My invention relates particularly to the construction of the columns or cases between the several lead chambers of a sulphuric acid apparatus; and the object of my invention is to construct these columns or cases in such a way that they may expand freely without breaking or buckling the lead composing them; and a further object of my invention is to improve the construction of cross air pipes which are arranged in the column, to the end that the pipes may be exceptionally strong, that they may cause a very thorough mingling of the gases which pass through the column, that they may collect weak acid, which coming into contact with the nitrosulphuric acid formed on the surfaces of the pipes, decomposes the said acid and for these reasons the process of acid manufacture may be greatly promoted, and consequently cheapened.

To these ends, my invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a vertical cross section of one of the improved columns embodying my invention, showing its connection with adjacent lead chambers. Fig. 2 is an enlarged detail cross section of one of the air pipes which are arranged in the column. Fig. 3 is a cross section of another form of the pipe. Fig. 4 illustrates a cross section of another modification of the pipe. Fig. 5 shows still another modification thereof; and Fig. 6 is a broken detail elevation, showing the man-

ner in which the column or case is supported on the sides.

The several lead chambers 10 of the apparatus are arranged in the usual way between the Glover and Gay-Lussac towers, and between every two chambers is arranged a column or case 11, which is preferably of lead and which communicates with one chamber at the bottom, as shown at 12, and with another at the top, as shown at 13, so that there is a passage for gases through the column in the direction indicated by the arrows in Fig. 1.

The case or column 11 partly rests on the floor or base, and in addition thereto is supported by means of side straps or lugs 14 which engage the supporting frame 15, and the lower portion of this frame is mounted on springs 16 which are preferably spiral springs, as shown, and which are supported on posts or equivalent supports 17. This arrangement permits the case or column to expand vertically, while the frame 15 follows the movements of the column, as when the latter expands, the springs are compressed.

The case or column is traversed by numerous air pipes 18 which are arranged, as illustrated in the former patent referred to, so that cool air may be forced through them, but these pipes instead of being smooth as in the patent referred to, are provided with numerous corrugations 19 on their sides, which corrugations are preferably parallel although they are not necessarily so. The pipes are preferably triangular in cross section, as shown in Figs. 2 and 3, and are arranged with each horizontal row placed so that the pipes alternate, that is, do not align vertically, and the broad side of one row of pipes is preferably placed down and the broad side of the next row up. Each pipe has a relatively wide corrugation 20 at the top, which serves as a basin, in which collects weak acid. This coming in contact with the nitrosulphuric acid condensed on the surfaces of the pipes, promotes a rapid formation of sulphuric acid.

By providing the pipes with corrugations, their outer surface, which acts as a condensing surface for the gases, is greatly increased in comparison with that of a smooth pipe of the same diameter. Furthermore, the ribs of the said corrugations form ledges obstructing the gases in their passage, and the depres-

sions between the ribs form trays to retain moisture or the weak acid above referred to. It will be understood that this weak acid or moisture is introduced into the column in any suitable manner, for instance by admitting the weak acid through a distributor on the top of the column, or by injecting steam into the column along with the gases. It will be obvious that a smooth surfaced pipe has no receptacles or pockets for holding such acid or moisture, nor does it present any one of the above enumerated advantages.

Instead of making the pipes triangular in cross section, a round pipe 23 may be used, or an oval pipe 23^a, but each pipe, whatever its form, is provided with a longitudinal rib 22 which may be placed at either the top or bottom of the pipe and which serves to prevent the pipe from sagging. This is an important feature of the invention, as the pipes are of lead and consequently soft.

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

1. In an apparatus for the manufacture of sulphuric acid substantially as described, an air pipe adapted to retard the flow downward and provided in its upper surface with a depression or recess adapted to receive and accumulate the weak acid, substantially as and for the purposes set forth.

2. In an apparatus for the manufacture of sulphuric acid, an air pipe provided in its upper side with a depression or recess for the accumulation of weak acid and along its sides with longitudinal ribs or corrugations by which to retard the passage of such weak acid along such sides, and so prolong the period of exposure of such acid to the gas passed in contact with such pipe, substantially as set forth.

3. In an apparatus for manufacturing sulphuric acid a column or case provided with a series of transverse air pipes having in their upper sides depressions or recesses forming pockets in which weak acid is accumulated, the said pipes being alternated substantially as described and shown whereby the gases in passing through the series is directed into close contact with the pockets in the tops of the pipes, substantially as set forth.

4. The combination with the case or column, of the transverse air pipes therein having roughened surfaces and relatively large longitudinal corrugations on top, substantially as described.

PETER S. GILCHRIST.

Witnesses:

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