

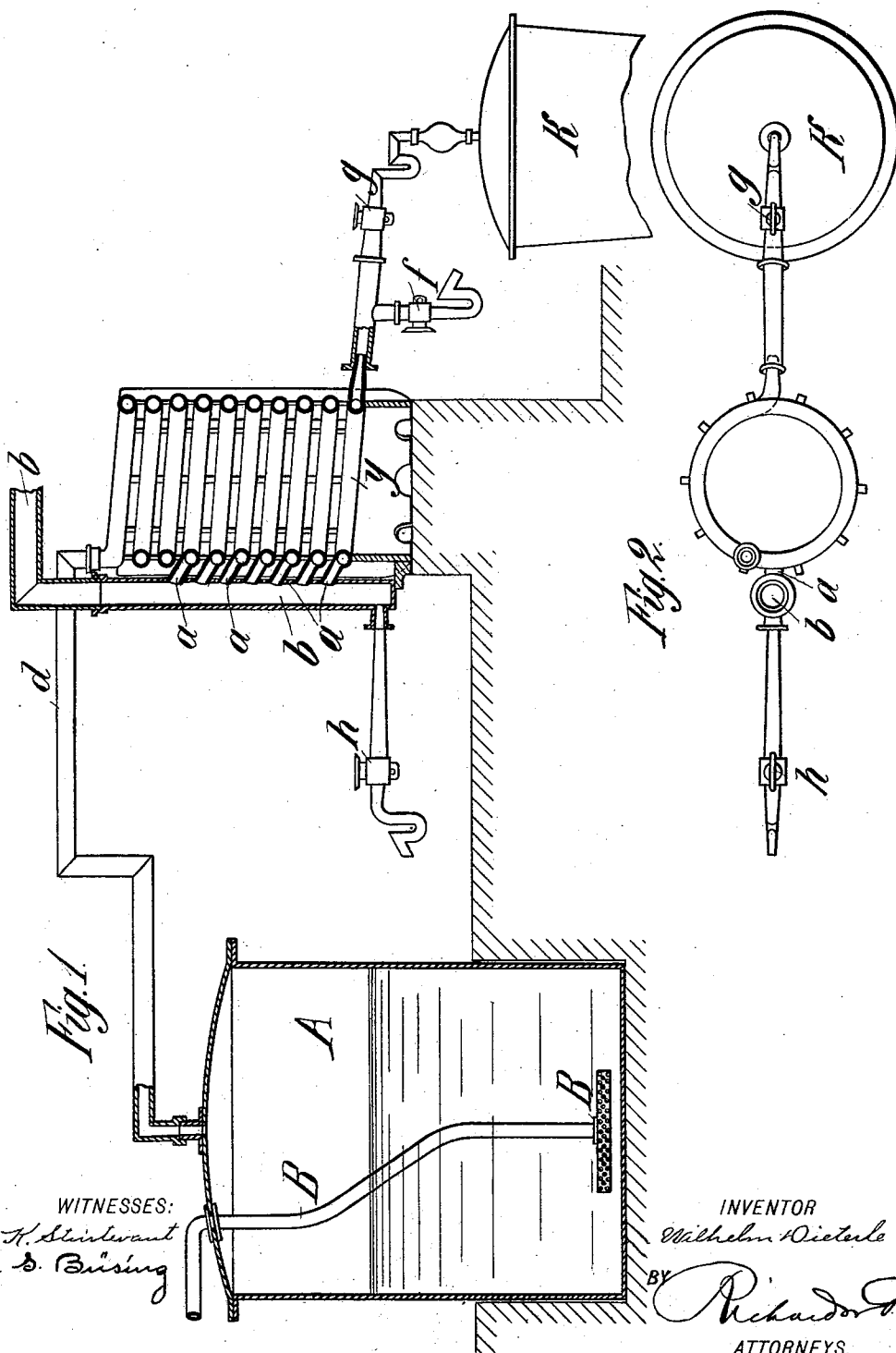
(No Model.)

2 Sheets—Sheet 1.

W. DIETERLE.
APPARATUS FOR PURIFYING NITRIC ACID.

No. 543,826.

Patented July 30, 1895.



WITNESSES:
E. H. Sturtevant
A. S. Busing

INVENTOR
Wilhelm Dieterle
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ATTORNEYS.

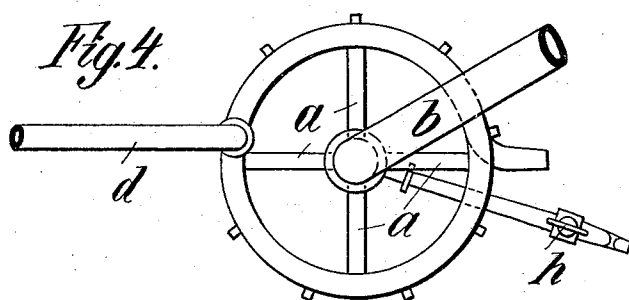
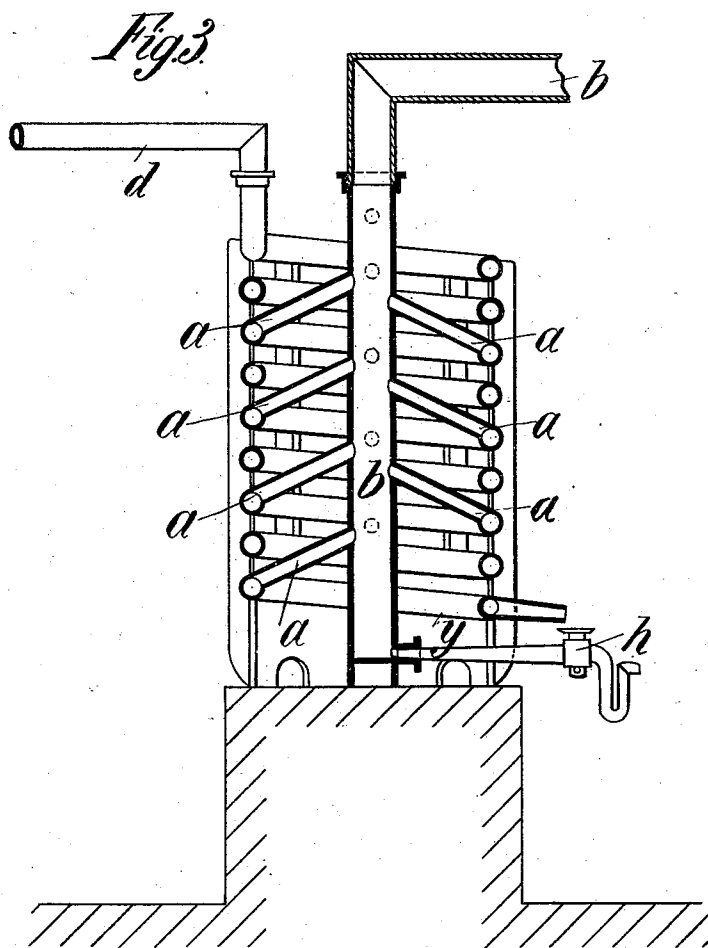
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UNITED STATES PATENT OFFICE,

WILHELM DIETERLE, OF FEUERBACH, GERMANY.

APPARATUS FOR PURIFYING NITRIC ACID.

SPECIFICATION forming part of Letters Patent No. 543,826, dated July 30, 1895.

Application filed September 6, 1894. Serial No. 522,236. (No model.)

To all whom it may concern:

Be it known that I, WILHELM DIETERLE, a subject of the King of Württemberg, residing at Feuerbach, near Stuttgart, Germany, have invented certain new and useful Apparatus for Purifying Nitric Acid, of which the following is a specification.

The present invention relates to an improved apparatus for purifying nitric acid; and the object of the invention is to provide for the production of nitric acid free of halogen and nitrous acid by means of a cooling apparatus permitting of rapid and perfect escape of the low oxides.

The apparatus is shown in the accompanying drawings, in which—

Figure 1 is a cross-section showing worms or serpentine pipes of clay. Fig. 2 is a plan view of the same. Fig. 3 is a cross-section of a modification, and Fig. 4 is a plan view of Fig. 3.

A in the drawings represents the generating receptacle containing the mixture, into which air or other indifferent gas is forced by means of a tube B. From this receptacle the air laden with nitric acid vapors is conducted by a pipe *d* to a cooler or condenser composed of a series of coils of pipe *y*, forming a worm.

A tube *b* is connected to the coils of the worm by small inclined branch pipes *a*, and terminates in a suitable reservoir, it being provided with a siphon-cock, as shown at *h*.

The lower coil of the cooler or condenser communicates through a suitable pipe with the receiver K for the purified nitric acid. The air laden with the nitric acid and the impurities passes to the cooler, and condensation thereof takes place in the upper coils; and in order that this condensation may more tranquilly and effectually take place the said upper coils (three in the drawings) are not in communication with the tube or canal *b*. By this means a nitric acid free of halogen and nitrous acid is produced within the cooler, and in this quality the nitric acid is then conveyed to the receiver.

It frequently happens that small quantities of the liquid nitric acid are carried bodily from the receptacle A into the condenser when the air is first introduced into the re-

ceptacle A before the removal of the chlorine and the bleaching have taken place. The quantities of nitric acid thus carried into the cooler are still weakly colored, and show a small reaction of chlorine. For collecting this impure nitric acid a branch pipe is introduced between the cooler and receiver, siphon-cocks *f* and *g* being provided, so that the first nitric acid may be drawn off through siphon-cock *f*, and afterward this cock closed and the cock *g* opened to let the pure acid pass directly to the receiver. The impure acid thus collected may be returned to the receptacle A. It is impossible, also, during distillation to prevent small quantities of the vapors of nitric acid passing along with the air through the tubes *a* to the canal *b*, where they are condensed. In order to collect this a reservoir may be provided, in connection with the lower end of tube *b*, with a siphon-cock *h*. In the drawings this reservoir is shown as formed by extending the tube or canal *b* a short distance below the lower coil of the condenser, and the acid condensing here may be permitted to continuously drip off and thus be collected, or the cock may be closed and the acid caused to overflow through the lower branch *a* and coil *y* to the receiver K.

The siphon-cocks permit advantageously of tests being made during operation.

It will be understood that the acid condensing within the canal is stronger than the acid already condensed within the cooler. As shown, the canal *b* has a greater section than the coils of the condenser. When extended at the upper part the canal *b* may be connected to a suitable absorber.

It will be obvious that the cooler may be made of any suitable material and that it may be used for all distillations in which pernicious gases are produced.

Having thus described my invention, what I claim is—

1. In combination with an evaporating receptacle, a condenser connected therewith and comprising a series of coils, a vertical canal adjacent thereto, and tubes connecting the canal with said coils, substantially as described.

2. In combination with an evaporating receptacle, a condenser comprising a series of

coils, a vertical canal adjacent thereto, a series of inclined tubes connecting the canal with said coils, a reservoir and siphon cock at the lower end of said canal, and a tube
5 leading from the condenser to a receiver for the purified acid, substantially as described.
Signed at Stuttgart, Kingdom of Würtem-

berg, Germany, this 26th day of July, in the year 1894.

WILHELM DIETERLE.

Witnesses:

ERNST DIETRICH,
PAUL DRISCHER.