

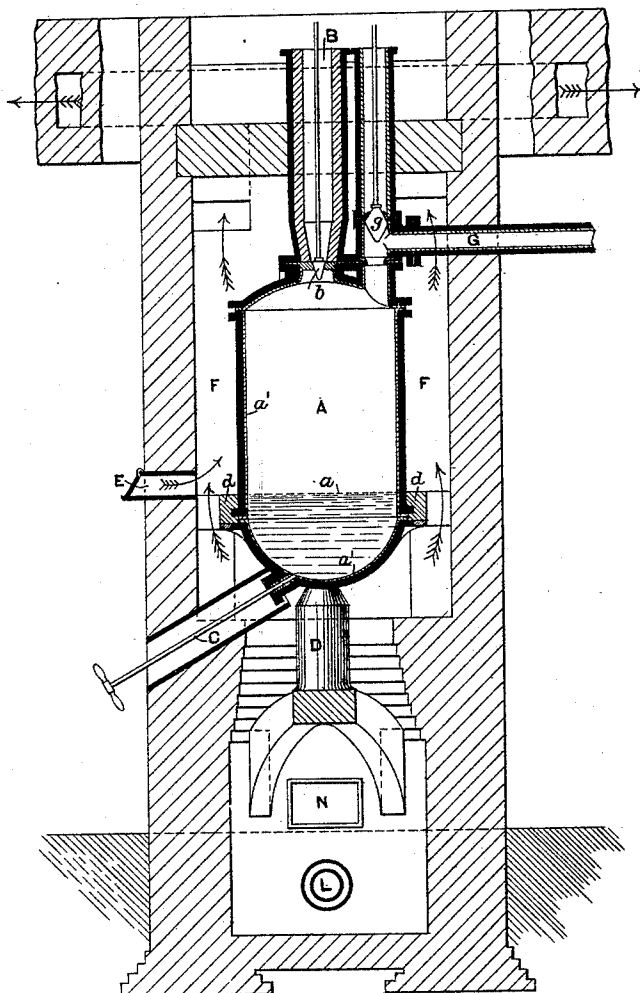
(No Model.)

L. MOND.

APPARATUS FOR VOLATILIZING AMMONIUM CHLORIDE.

No. 491,741.

Patented Feb. 14, 1893.



Witnesses

N. R. Kennedy.

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Inventor

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By his atty.

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UNITED STATES PATENT OFFICE.

LUDWIG MOND, OF NORTHWICH, ENGLAND.

APPARATUS FOR VOLATILIZING AMMONIUM CHLORIDE.

SPECIFICATION forming part of Letters Patent No. 491,741, dated February 14, 1893.

Application filed March 14, 1889. Serial No. 303,316. (No model.) Patented in England February 6, 1889, No. 2,160.

To all whom it may concern:

Be it known that I, LUDWIG MOND, manufacturing chemist, a subject of the Queen of Great Britain, residing at Northwich, in the county of Chester, in the Kingdom of England, have invented certain new and useful Improvements in Apparatus for Volatilizing Ammonium Chloride, (which has not been patented to me in any country except in England, No. 2,160, dated February 6, 1889,) of which the following is a specification.

I have in previous British patents, dated respectively No. 3,238 of 1886 and No. 10,955 of 1887 and United States Patents Nos. 379,487 and 379,488, pointed out the difficulties attending the volatilization of ammonium chloride, and of constructing an apparatus for this purpose, on account of the corrosive action of the vapors of this substance; and have proposed to construct vessels of nickel or cobalt or alloys in which these metals predominate, or to cover iron vessels with nickel or cobalt or their alloys. I have, however, found great difficulties in getting large vessels made of the metals named, and now propose to use vessels for the volatilization of ammonium chloride made of or lined with metallic antimony or with alloys of antimony with other suitable metals, in which antimony predominates to such an extent, that they will resist the corrosive action of the chemicals used. I prefer to use iron vessels lined with antimony or an alloy of antimony. As antimony is fusible at a comparatively low temperature, I distill the ammonium chloride in these vessels with the aid of chloride of zinc or its equivalent in the manner described in my English patent No. 10,955 of 1877, and fill the vessel with the molten chloride of zinc to such an extent that all the parts exposed to the flame on the outside of the vessel are covered with the molten zinc chloride on the inside. In this way I completely avoid local over-heating and the consequent fusion of the antimony.

The shape of the furnace, flue or heating chamber is immaterial, but for the better understanding and carrying out of my invention, I herewith show a vertical section of a suitable apparatus. In this, A is a chamber or retort formed of cast iron lined with a lin-

ing *a'* of antimony and filled with fused zinc chloride *a* up to the level of brickwork *d*.

B is a hopper kept filled with solid ammonium chloride, the exit of which into chamber A is regulated by valve *b*.

C is a valve for washing out or emptying the chamber A, as required, D firebrick support for chamber A, *d* side supports, E entrance for air used to regulate the temperature above the level *a* and supports *d* so as to obviate all danger of the antimony becoming fused, F flues, G exit pipe for ammonium chloride vapor, *g* valve on same, L, and a similar pipe opposite to it, (not shown,) the entrances for air and producer gas respectively for the purposes of heating the apparatus, N manholes.

Prior to my invention it was found extremely difficult to obtain any inexpensive metal which would withstand the heat required in volatilizing chloride of ammonium, and which would also resist the corrosive effects of chloride of zinc and chloride of ammonium. It was only after years of experimenting that I discovered that I could effect the desired object with an antimony lined vessel, for although vessels lined with antimony had been proposed for other uses it was deemed impossible to use antimony in volatilizing chloride of ammonium since the fusing point of antimony is but slightly above that of the volatilizing point of chloride of ammonium so that it is practically impossible to evaporate chloride of ammonium alone in an antimony vessel without melting down the antimony since the heat has to considerably exceed the volatilizing point of chloride of ammonium in order to be quickly communicated to the chloride, the vapor of the chloride being like the vapor of water and other vapors a good non-conductor of heat. It was only after I discovered that chloride of zinc, a good conductor, would fuse considerably below the fusing temperature of the antimony and give its heat up quickly to the chloride of ammonium, and thus be kept at a nearly uniform temperature and in turn keep the retort at nearly a similar temperature that it became possible to use a retort of antimony for this purpose. Moreover, it was unknown until the time of my invention that antimony

could resist chloride of ammonium or chloride of zinc.

For the above reasons no one had used, proposed to use or deemed it possible to use an
5 antimony lined vessel for the volatilization of chloride of ammonium prior to the date of my invention.

I claim as my invention:—

1. In apparatus for volatilizing ammonium
10 chloride the combination of the heating chamber and flues F, retort A, interior surface thereof of antimony *a'* and the fused chloride of zinc filling all that part of the retort exposed to direct fire heat, whereby an
15 even temperature is secured all over the retort hot enough to volatilize ammonium chloride without undue heating of any part of the apparatus.

2. In apparatus for volatilizing ammonium
20 chloride the combination of the retort A, interior surface of antimony *a'*, valve *b* and

hopper B above for admitting solid chloride of ammonium and bath of fused chloride *a*, whereby the chloride of ammonium can be easily introduced into the retort and rapidly
25 and uniformly heated by a good conducting liquid without the antimony being fused.

3. The combination of the heating chamber and flues F, retort A having its lower part set in and exposed to the heat of said chamber,
30 lining of antimony *a'*, bath of easily fused chloride of zinc *a*, valve *b* for the entrance of ammonium chloride and exit tube G set in heating chamber for the delivery of the volatilized ammonium chloride.
35

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

LUDWIG MOND.

Witnesses:

ALFRED J. BOULT,
HARRY B. BRIDGE.