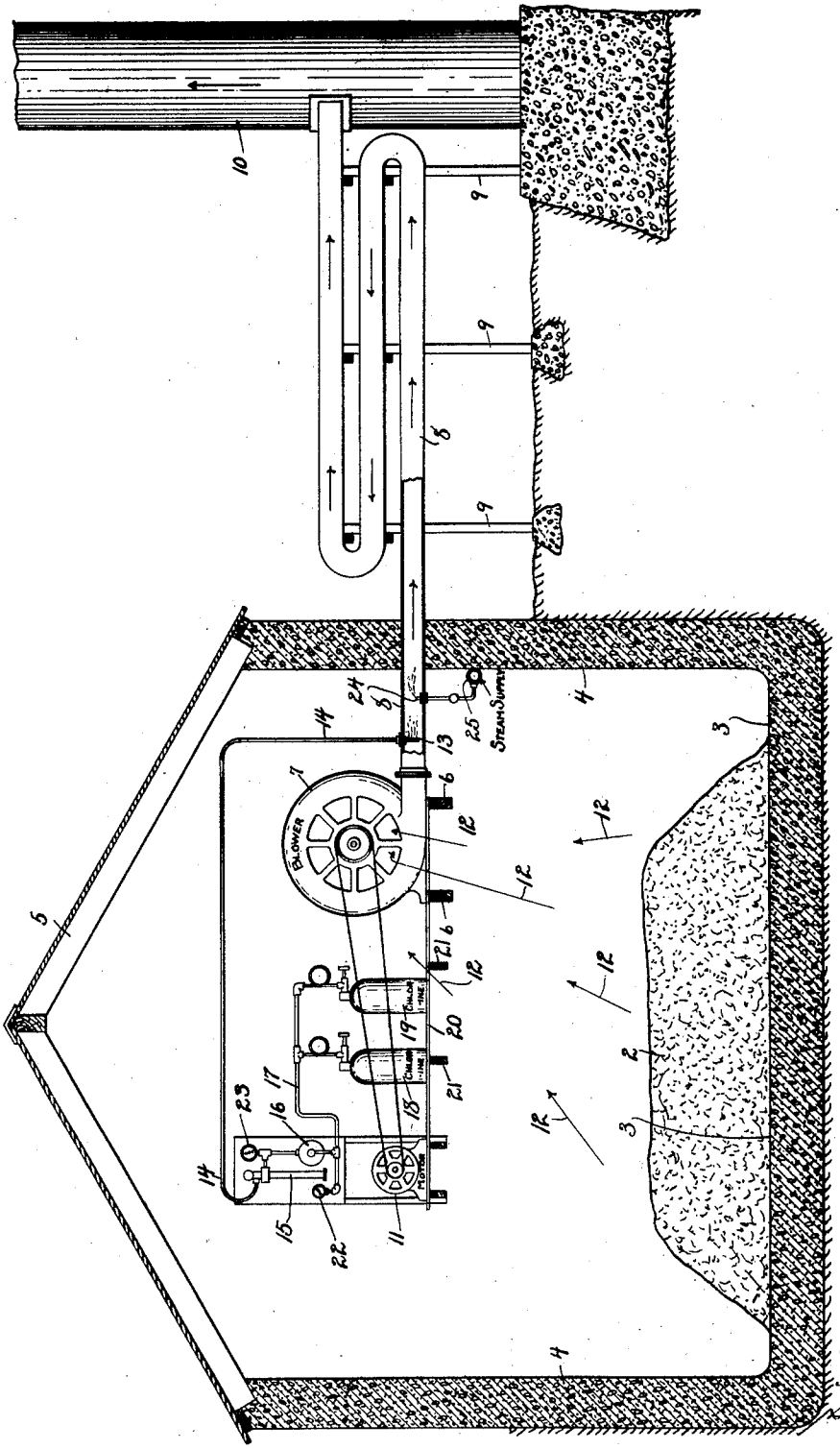
Y. HENDERSON AND H. W. HAGGARD.

PROCESS OF DEODORIZING OFFENSIVE GASEOUS EMANATIONS FROM ORGANIC MATTER.

APPLICATION FILED MAR. 5, 1921.

1,410,249. **Patented Mar. 21, 1922.**



Inventors
Y. Henderson
H. W. Haggard
by Seymour & Cox
attys

UNITED STATES PATENT OFFICE.

YANDELL HENDERSON, OF NEW HAVEN, AND HOWARD W. HAGGARD, OF WOODBRIDGE, CONNECTICUT.

PROCESS OF DEODORIZING OFFENSIVE GASEOUS EMANATIONS FROM ORGANIC MATTER.

1,410,249. Specification of Letters Patent. Patented Mar. 21, 1922.

Application filed March 5, 1921. Serial No. 449,636.

To all whom it may concern:

Be it known that we, YANDELL HENDERSON and HOWARD W. HAGGARD, citizens of the United States, residing, respectively, at New Haven and Woodbridge, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Processes of Deodorizing Offensive Gaseous Emanations from Organic Matter; and we do hereby declare the following, when taken in connection with the accompanying drawing and the characters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawing constitutes part of this application, and represents a schematic view showing the application of our improved process and apparatus to a plant for rotting manure.

Our invention relates to an improved process of deodorizing offensive gaseous emanations from organic matter such for instance as the offensive content of the effluent air of ventilating systems of whatever character, the object being to provide, at a low cost, simple and effective means of deodorizing offensive and unsanitary air so as to overcome the public nuisance following the discharge of such air into the atmosphere.

With these ends in view, our invention consists in the process to be hereinafter described and pointed out in the claims.

For the illustration of our invention we have chosen to show it as applied to an establishment or plant using large quantities of horse manure which must be turned over and over in the process of rotting it and preparing it for use. We would have it understood, however, that we do not limit the use of our invention to such establishments, as it is applicable to a great variety of situations in which air, charged with offensive or deleterious odors, however developed, is removed by means of a ventilating system and discharged into the atmosphere.

In the application of our invention to a manure plant, a mass of manure 2 is shown as piled upon the concrete floor 3 of a building having concrete side walls 4 supporting a roof structure 5. Horizontal girders 6 located within the building support a blower 7, which may be of any standard type, such as the Sturtevant blower. This blower is connected with a long deodorizing flue 8, located without the building, returned, as shown, upon itself to increase its length, carried by uprights 9 and leading into a stack 10. The length of the flue 8 and its construction and arrangement will, of course, be varied according to the requirements of the specific application of our invention. When the blower is operated by its motor 11, which may be of any suitable type and construction, the air within the building will be drawn into the blower and expelled from the building through the flue 8 into the stack 10 under more or less pressure, which will vary with the speed of the blower, the size of the flue, and other factors, the general course of the air from the manure pile 2 to the blower 7 being indicated by arrows 12. As the air, under pressure, leaves the blower and enters the flue, it receive a small predetermined quantity of chlorine gas from a perforated chlorinator nozzle 13 located in the flue at a point close to the blower, this nozzle being supplied with chlorine gas from a low-pressure feed-pipe 14 connected, as shown, with a chlorine meter 15 receiving a supply of chlorine gas from a pressure compensator 16, which maintains a uniform pressure of gas in the feed-pipe 14 and which is connected by a supply-pipe 17 with tanks 18 and 19 of liquid chlorine, these tanks being placed on a platform 20 supported on girders 21. The pressure in the supply-pipe 17 at any given time is indicated by a pressure-gage 22, while a pressure-gage 23 indicates at any given time the pressure in the feed-pipe 14.

For the effective action of chlorine gas as a deodorizing agent there must be some moisture present. If the effluent air to be deodorized is not sufficiently moist, we employ a hydrator 24 consisting, as shown, simply of a feed-pipe connected with a steam-pipe 25 and entering the flue 8 at a point just in advance of the chlorine-nozzle 13. Of course, where the air to be deodorized is supplied with a sufficient amount of moisture for the effective reaction of the chlorine (as probably would be in the case of deodorizing the air rising from rotting manure), a hydrator would not ordinarily be necessary, but is shown as illustrating the manner of its use in situations where the air to be deodorized is dry.

In working a manure pile over and over during the process of rotting it, the odors

rising from it are so objectionable and generally with such a heavy ammonia content, that the air must be constantly removed by a ventilating system to enable the workmen to stay in the pit and turn over the manure. If the air is removed by a blower and discharged into the atmosphere, the same is so polluted as to create a public nuisance. Under our invention, this objection is removed by chlorinating the effluent air and thereafter confining the same for a sufficient period before it is discharged into the outer air, to permit the chlorine to act upon and deordorize it. As soon as the blower is started, the valves of the chlorine tanks 15 and 16 are opened to permit the feeding to the nozzle 13 of a predetermined quantity of chlorine gas, which is commingled with the column of air being forced past the nozzle by the blower 7 into the long deodorizing flue 8, in which the commingled foul air and chlorin gas are confined until the latter has, in its reactions upon the former, completely deordorized it, after which it passes into the stack for discharge into the atmosphere. Practical demonstrations on a large scale have shown that the heavily laden fumes of rotting manure are completely deodorized by our improved process and apparatus, despite the presence in the air of considerable amounts of ammonia, supposed heretofore to nullify the action of chlorine as a deordorizing agent.

While we are not, at this time, prepared to give a comprehensive list of the odoriferous compounds entering into the air and rendering it intolerable or extremely objectionable, which are nullified by the use of our improved process and apparatus, we insert a list of compounds nullified thereby:

I. Odoriferous organic hydrosulphides and sulphydrates, such as: ethyl mercaptan, ethyl sulphide, methyl mercaptan, etc.

II. Aldehydes, ketones, and aromatic alcohols with disagreeable odors.

III. The secondary amines which have unpleasant odors, as, for example: trimethylamine.

IV. Higher members of the olifine series, the carboxy derivatives of the paraffines, and fatty acids and their derivatives, such as: butyrate, valerianate, heptylate, laurate, myristicate.

V. Besides the above many odoriferous compounds of extremely complex and little known structure.

We would have it understood, as already stated, that we do not limit the application of our invention to deordorizing the air rising from rotting manure, but consider that a great variety of uses in a great variety of situations fall within the purview of and are covered by our invention.

We are aware that liquid chlorine has been used in the field of sanitation to sterilize water and sewage, liquid industrial wastes and tannery effluents. We also are aware of the use of chlorine gas in the disinfection of buildings and factories in place of fumigants, but we believe that we are the first to deordorize the effluent air of ventilating systems by injecting chlorine gas into confined effluent air and retaining such effluent air in confinement until its chlorine content has deodorized it, after which it is permitted to escape into the atmosphere. Our method and apparatus are applicable to the deodorization of the effluent air of garbage, however treated.

We claim:

1. A process of deodorizing offensive gaseous emanations from organic substances, comprising admixing with an air current carrying the same chlorine in gaseous form and in amount sufficient when admixed with said current to substantially remove all objectionable odor therefrom.

2. A process of deodorizing air carrying offensive odors arising from organic matter, which consists in conducting said air through a chamber and injecting gaseous chlorine into it during its passage therethrough and causing a thorough admixing to permit the chlorine to substantially remove all objectionable odor before the discharge thereof from said chamber.

3. A process of deodorizing effluent air from ventilating systems, consisting in injecting gaseous chlorine and moisture into the effluent air current, and causing an admixture of the same to permit the chlorine to substantially remove all objectionable odor.

4. A process of dedorizing the effluent air from ventilating systems, consisting in injecting gaseous chlorine and moisture into the confined effluent air current, causing an admixture of the same to permit the chlorine to substantially remove all objectionable odor, and then allowing the discharge of said air to the atmosphere.

5. A process of deodorizing the effluent air from ventilating systems, consisting in injecting gaseous chlorine into the effluent air current, and causing an admixture of the same to permit the chlorine to substantially remove all objectionable odor.

YANDELL HENDERSON.
HOWARD W. HAGGARD.