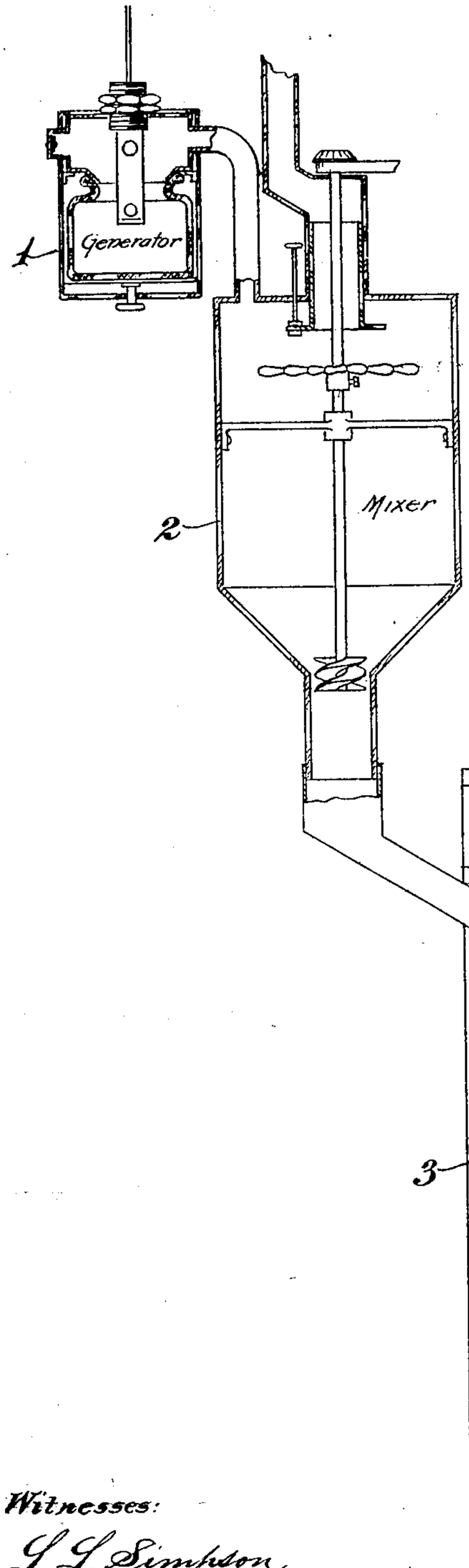
No. 888,106. PATENTED MAY 19, 1908.

F. MEARS.

PROCESS OF PURIFYING GRAIN FROM SMUT OR OTHER FUNGI.

APPLICATION FILED APR. 27, 1907.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRED MEARS, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO HYGIENIC REFINER COMPANY, OF PRINCETON, MINNESOTA, A CORPORATION OF MINNESOTA.

PROCESS OF PURIFYING GRAIN FROM SMUT OR OTHER FUNGI.

No. 888,106. Specification of Letters Patent. Patented May 19, 1908.

Application filed April 27, 1907. Serial No. 370,702.

To all whom it may concern:

Be it known that I, FRED MEARS, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Processes for Purifying Grain from Smut or other Fungi; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an efficient process for the purification of grain from smut or other fungi. To this end, the invention consists of the novel process hereinafter described and defined in the claims.

The offensive character of smut on wheat or other grain, is well known. It is also well known that smut and other fungi, to which wheat and other grain is subject, contains more or less vegetable oil, and gives off a very offensive odor. This smut must be removed, or otherwise the flour or other product from the grain is not well fitted for human food. It is equally well known that the smut spore or reproductive germ is very hardy, and unless entirely removed from the seed grain, the crop grown therefrom is liable to be badly affected by smut, depending more or less, of course, on the character of the season, whether wet or dry.

Hitherto, it has been regarded as a very difficult and expensive problem thoroughly to remove the smut or other fungi from grain. I have discovered that this can be thoroughly and cheaply done by my process herein disclosed and claimed. The process consists in first subjecting the grain to a gas composed of one or more of the compounds of nitrogen and oxygen, and then, in subjecting the grain to a scouring action. The gas which I have found to be most effective for the purpose is nitric oxid (NO); but if this comes freely into contact with air, it will take up an additional atom of oxygen and become peroxid of nitrogen (NO_2); and hence, in practice, the gas which is actually applied may be chiefly nitric oxid but partly peroxid of nitrogen, or wholly peroxid of nitrogen, depending upon the way in which the gas is generated and applied to the grain. It is desirable to apply the nitric oxid as directly and quickly as possible to the grain after the gas is generated, and with the exclusion of air, as far as practicable.

The gas attacks the vegetable oil in the smut or other fungi, thereby taking up and removing the oil and reducing the remnant of the smut to a dry, brittle, powder-like form which can be readily removed. Because of its form and condition, this remnant may well be called the smut ash. With the removal of the oil, the offensive odor peculiar to the smut, disappears. The spore or germ is also killed or removed, thereby sterilizing the remnant or smut ash. This being the condition of the grain after it has been subjected to the gas, or first step of the process, it is only necessary to subject the grain to a scouring action to secure the complete removal of all the smut ash from the grain, thus rendering the purification of grain complete. Any suitable grain scourer of the kind in general use, for removing dust and other adherent material from grain, may be used for the purpose.

Any suitable generator can also be applied to generate and supply the nitric oxid gas, or other compound of nitrogen and oxygen. It is well known that these generators are usually composed of a suitable receptacle adapted to hold a solution of nitric acid with sulfate of copper, and to permit galvanized iron to be fed into the solution; and, are also provided with means to collect and lead the generated gas to the point desired. The gas can be applied to the grain in any suitable mixing machine adapted to drop the grain through the gas or feed the gas to the showered grain, or to commingle the gas and grain as they are fed into the machine.

The single view of the accompanying drawing illustrates, in diagram, partly in section and partly in elevation, a complete apparatus suitable for utilizing the process or method herein disclosed and claimed. In said drawing, the gas generator 1 and the grain and gas mixer 2 are of the structure and related to each other as disclosed in the pending joint application of Fred Mears and Joseph Craig, S. N. 370,719, filed April 27th, 1907; and the scourer 3 is or may be of the structure disclosed in the expired patent to Charles B. Slater #343,402, of date June 8, 1886. When the proper ingredients are applied within the generator 1, nitric oxid gas will be generated and delivered under a gravity feed to the

grain and gas mixer 2. This grain and gas mixer 2 is of such structure that the grain entrance and exit will be packed by the grain, and that air will be excluded therefrom. Hence, the nitric oxid will be applied to the smutty grain and will have the effect on the smut above set forth. From the mixer 2, the gas treated grain will pass by gravity to the scourer 3, and therein the smut ash will be removed from the grain, as above stated.

If it be desired to employ peroxid of nitrogen (NO_2) instead of nitric oxid (NO), this can be accomplished with the same apparatus above illustrated in said drawing, by simply arranging for the free admission of air with the generated gas, as the nitric oxid will then take on an additional atom of oxygen.

While this invention was especially intended for use in the purification of wheat and other grain from smut, it has been found, in practice, to be capable of successful use for the removal of other forms of fungi, such, for example, as mold. The effect on the mold is similar to the effect on the smut.

What I claim is:—

1. The process of purifying grain from smut or other fungi, which process consists in subjecting the grain to a gas composed of the compounds of nitrogen and oxygen, for extracting the vegetable oil from said fungi and reducing the remnant to a dry powder-like ash, substantially as described.

2. The process of purifying grain from smut or other fungi, which process consists in first subjecting the grain to a gas composed of the compounds of nitrogen and oxygen, for extracting the vegetable oil from said fungi and reducing the remnant to a dry powder-like ash, and then, in subjecting said gas treated grain to a scouring action to remove the said ash, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FRED MEARS

Witnesses:
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