

No. 619,056.

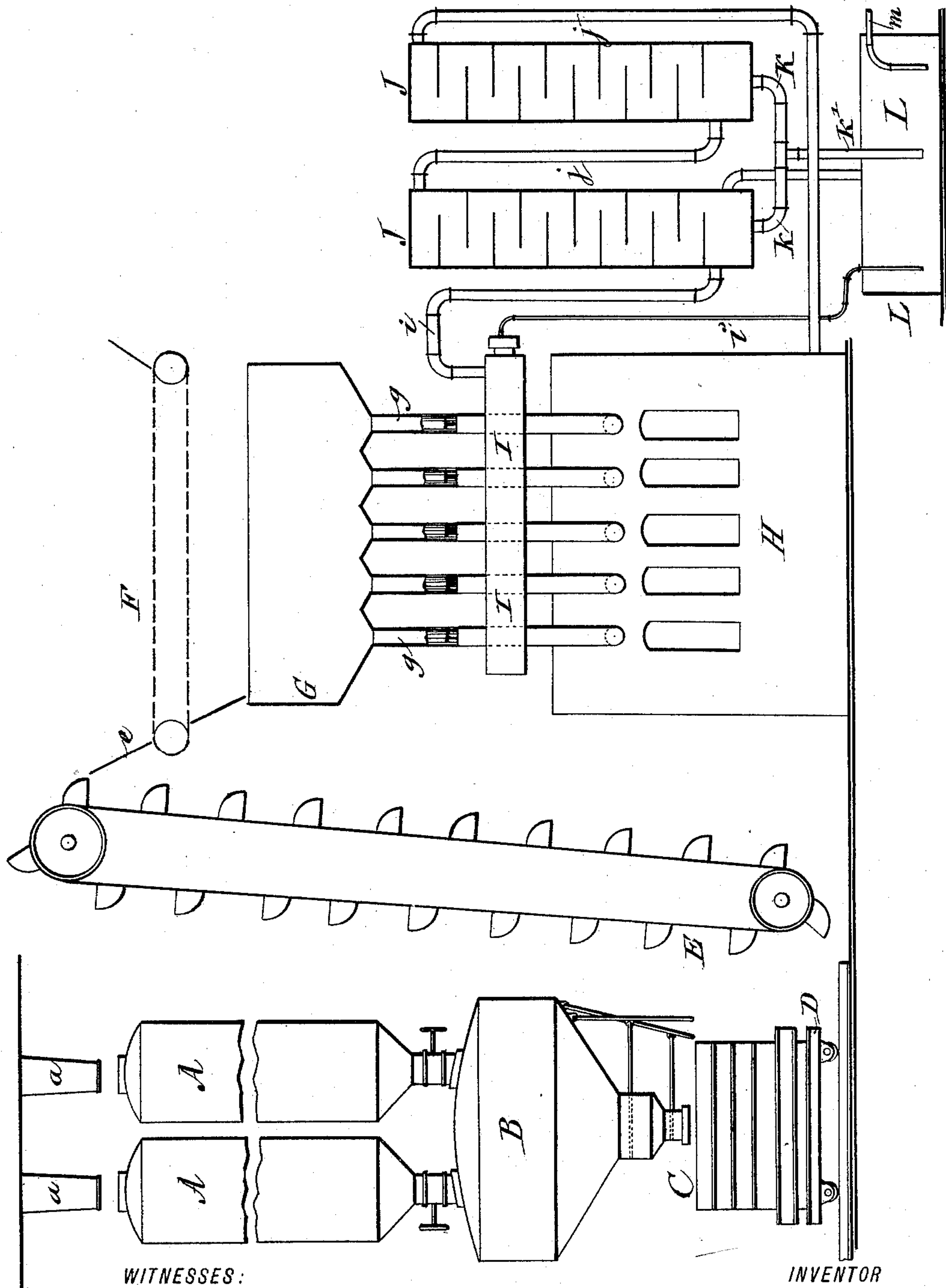
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B. TERNE.

PROCESS OF MAKING FERTILIZERS FROM GARBAGE.

(Application filed May 24, 1898.)

(No Model.)



WITNESSES:

M. H. Wurtzel
Trainer Hall

INVENTOR

Bruno Terne
BY *Georg Regeuer*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

BRUNO TERNE, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF MAKING FERTILIZERS FROM GARBAGE.

SPECIFICATION forming part of Letters Patent No. 619,056, dated February 7, 1899.

Application filed May 24, 1898. Serial No. 681,635. (No specimens.)

To all whom it may concern:

Be it known that I, BRUNO TERNE, a citizen of the United States, residing in the city of Philadelphia, in the county of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Processes of Treating Garbage, of which the following in a specification.

This invention relates to an improved process of treating garbage so as to utilize the same for the production of ammonia and fertilizers; and the invention consists in a process of treating garbage by subjecting the pressed garbage from which the grease has been extracted to dry distillation for obtaining the ammonia contained therein and phosphated charcoal as the residue.

The invention consists, further, in mixing the phosphated charcoal thus obtained with the concentrated tank liquors obtained by boiling the garbage and using the mixture after drying as a fertilizer.

An apparatus which can be used to carry out my process is shown in elevation in the accompanying drawing.

Referring to the drawing, A A indicate the digesters, into which the garbage is deposited through spouts *a a*.

B is a receiver for the digested garbage from the digesters A A and from which the same is deposited in forms C, which are placed on a truck D, so that the garbage may be conducted to the press (not shown) for expressing the liquid from the solid matter.

The compressed solid matter is taken up by the endless bucket elevator E and deposited on a slatted distributer-apron F, being conducted thereto by guides *e*, and from the apron F it is dropped into a storage-bin G, from whence it is conducted to the retorts of kiln or furnace H.

I is a hydraulic main connected with the retorts, *i j* pipes leading to and connecting scrubbers or condensers J J, and *j'* a gas-pipe leading to the kiln or furnace H.

k k k' are pipes leading to the receiving-tank N, from which a pipe *m* leads.

i' is a pipe leading from the hydraulic main.

In treating garbage heretofore it was either subjected to boiling under high steam-pressure in closed tanks or the garbage was treated with naphtha for the purpose of extracting

the grease contained therein. The garbage after being thus treated is discharged from the digesters into closed receivers and from them transferred by means of conveyers to presses, by which the liquid matter is separated from the solid matter. The liquid matter obtained from the pressed garbage is run into settling-tanks and separated in the same according to specific gravity. The grease is skimmed off from the surface of the tank liquors which were heretofore permitted to run off as waste. The solid matter is treated in suitable driers, so that the moisture retained therein is reduced from forty per cent. to about ten per cent. The dried material is then screened and separated from any coarse foreign matter in the same.

The process hereinbefore described is well known.

The object of my improved process is to utilize the pressed and dried garbage in a more thorough manner for the manufacture of ammonia and fertilizers, and for this purpose consists, first, in a process of treating the garbage by subjecting the pressed and dried solid matter to destructive distillation, separating the condensible vapors of distillation by condensation from the non-condensable gases, and then separating the ammonia from the condensed vapors.

The invention consists, further, in mixing the phosphated charcoal obtained as the residue from the dry distillation with the concentrated tank liquors obtained from the garbage by pressure and using it as a fertilizer.

In practically carrying out my improved process the pressed garbage instead of being transmitted to the driers is transferred directly from the presses by suitable conveyers to the retorts or ovens at H. It depends on local circumstances whether a system of upright retorts or a system of ovens is most preferable. When large quantities of garbage have to be handled, the well-known coke-ovens can be used with advantage. It is obvious, however, that any approved retort or oven may be used in the further treatment of the garbage. The pressed garbage, which still contains from about thirty-five to forty per cent. of moisture, is delivered to the retorts or ovens with a somewhat-reduced percentage of moisture by means of conveyers

E F, which act in the nature of partial driers on the garbage. The charge of pressed garbage, which may be from four to five tons in weight, is then subjected in the ovens to
5 a temperature of about 900° centigrade. The gases which are generated from the material are conducted through hydraulic main I to a suitable system of condensers J J. The condensed matter which contains the ammonia
10 is conducted through pipes *k k k'* to the receiving-tank L and from there to a suitable still (not shown) for regaining the same in purer form, either as ammoniacal liquor or in the form of ammonia salts. The non-con-
15 densible gases, of which from six to seven thousand cubic feet are obtained per ton of pressed garbage, are conducted through pipe *j'* to the furnaces of the retorts or ovens and utilized as fuel. After the system of retorts
20 or ovens has been charged and fired a sufficient quantity of gas is generated for keeping the furnaces going, while the surplus heat from the ovens can be utilized for making the steam necessary for the ammonia
25 plant by locating the boilers between the ovens and the smoke-stack. After all the gases have been driven out from the garbage by the heat the residue in the ovens is discharged in the form of a charcoal-like sub-
30 stance, being in quantity about thirty per cent. of the original charge and containing by analysis from ten to twelve per cent. of phosphoric acid and twenty-five per cent. of charcoal. This phosphated charcoal is then mixed
35 with the tank liquors, which are concentrated to a specific gravity of from 25° to 30° Baumé.

The proportion of tank liquor to the phosphated charcoal has to be such that a marketable fertilizer is obtained. This mixture is finally heated in a drier and is then ready for
40 use. It forms a valuable fertilizing material, which is obtained in addition to the grease separated from the garbage and the ammonia obtained by the dry distillation of the pressed garbage. A more effective and re-
45 munerative utilization of the garbage is thereby obtained in place of the present crude and wasteful treatment of the same.

Having thus described my invention, what I claim is—

1. The process herein described of treating garbage, which consists of subjecting the pressed and dried solid matter obtained from the same to destructive distillation, then mixing the phosphated charcoal obtained as the
55 residue of said dry distillation with the concentrated tank liquors, expressed from the garbage, and then drying this mixture, substantially as set forth.

2. As a new product, a fertilizer consisting
60 of a mixture of phosphated charcoal obtained by dry distillation of the pressed garbage and the concentrated tank liquor, substantially as set forth.

In testimony that I claim the foregoing as
65 my invention I have signed my name in presence of two subscribing witnesses.

BRUNO TERNE.

Witnesses:

PAUL GOEPEL,
GEO. W. JAEKEL.