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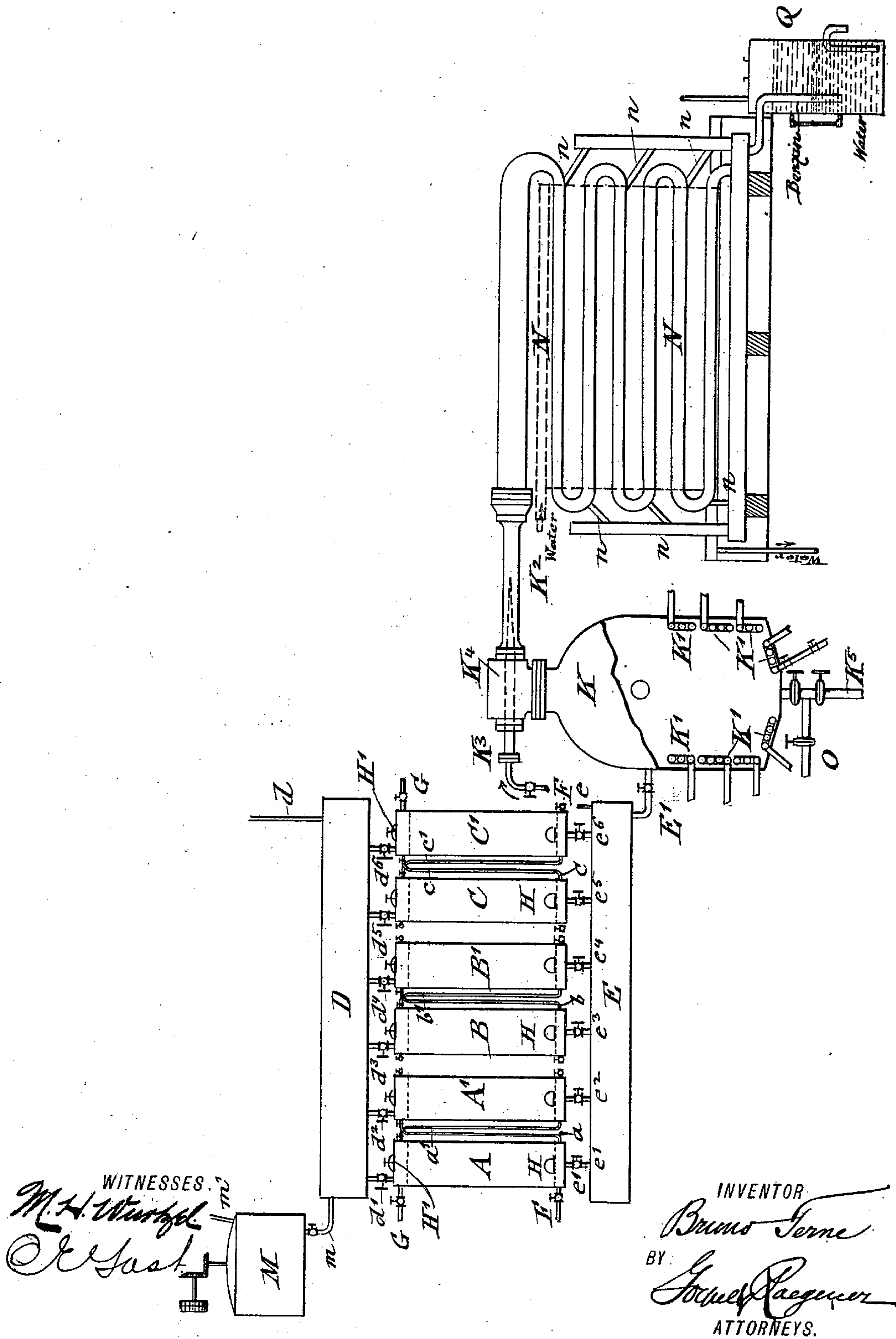
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B. TERNE.

APPARATUS FOR REFINING GARBAGE GREASE.

(Application filed May 17, 1899.)

(No Model.)



UNITED STATES PATENT OFFICE.

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APPARATUS FOR REFINING GARBAGE-GREASE.

SPECIFICATION forming part of Letters Patent No. 646,715, dated April 3, 1900.

Application filed May 17, 1899. Serial No. 717,131. (No model.)

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, county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Refining Garbage-Grease, of which the following is a specification.

This invention relates to an improved apparatus for refining garbage-grease or similar fatty products, so as to improve the color of and remove the obnoxious odor from the same; and the invention consists of an apparatus for refining garbage-grease, which comprises a mixer, a storage-tank connected therewith, a battery of filtering-tanks, valved pipes connecting said filtering-tanks in pairs with each other and with said storage-tank, a receiver below said battery and connected with the same, a still connected with said receiver, a condenser, and means for exhausting the vapors from the still into the condenser, and, further, in the combination, with such an apparatus, of means for admitting steam to said still and a separator for separating the condensed vapors from the water of condensation resulting when steam is employed and mixed with the vapors from the still.

The accompanying drawing represents a side elevation of my improved apparatus for refining garbage-grease or other waste grease.

In the drawing, M represents a mixing-tank, which is provided with a mechanical stirrer which is rotated in any suitable manner. In place of the mechanical stirrer the mixing operation may be accomplished by compressed air. The mixing-tank M is made perfectly tight and fitted with a suitable vent-pipe m' , leading to a suitable condenser. The waste garbage-grease is first thoroughly mixed in the mixing-tank with any suitable volatile liquid and the solution then drawn off from the tank by means of the pipe m into the storage-tank D, below which is arranged a battery of filters A A' B B' C C', each of which is connected by a suitable valved pipe (lettered, respectively, d' d^2 d^3 d^4 d^5 d^6) with the storage-tank D. The storage-tank may be of any length and diameter, according to the number of filters to be supplied from the same, and is provided with a

vent-pipe d , leading to the condenser to which the pipe m' is connected or to any other suitable condenser. The filtering-tanks are preferably of a height of from twelve to twenty-four feet and from thirty to thirty-six inches in diameter. They have to stand a pressure of from eighty to one hundred pounds. They are supplied in the usual manner with a perforated false bottom, which is covered with a layer of felt, bagging, or other coarse textile material, so as to prevent the filtering material with which they are charged from being carried off in the filtering operation. Two adjacent filters are connected by pipes a a' b b' c c' , respectively, with each other, so as to permit the flow of liquor from A to A', B to B', C to C', or in opposite direction—i. e., from A' to A, B' to B, C' to C—as may be desired. The connecting-pipes are provided with valves, so that the tanks may be cut off from each other, if desired. Below the filtering-tanks is arranged a receiver E, which is connected with the tanks by means of suitable valved pipes e' e^2 e^3 e^4 e^5 e^6 and provided with a vent-pipe e , leading to a suitable condenser. It is obvious that by proper adjustment of the valves the solution may be permitted to flow from the storage-tank directly through all the filtering-tanks into the receiver or any tank may be cut out. It is preferable, however, to adjust the valves so that the liquid will enter at the top of one of the tanks of a pair, pass out the bottom of the same by the connecting-pipe to the top of the other tank of the pair, and through that tank into the receiver, thus traversing two tanks before being discharged. It may be caused to enter either of the tanks of a pair, being discharged from the other tank. The receiver E is connected by a valved pipe E' with an evaporating or vaporizing still K, into which the filtered solution passes. The size of the still is in proportion to the daily production of garbage-grease, so that large and economical runs can be made. The still may be constructed entirely of wrought-iron, or the upper part may be of wrought-iron and the lower part of cast-iron. The still is heated by coils of steam-pipes arranged in the lower part of the same. When steam is passed through these pipes K', the filtered solution therein is heat-

ed, so that the volatile solvent is driven off in vapor from the grease, which is left behind in the still. This vapor is conducted out at the top of the still through the pipe K² into the condenser N. To facilitate the movement of the vapor, a steam-pipe K³ is connected to the side of the still-head K⁴ in such a manner that a jet of steam may be blown into the pipe K² and produce a suction of the vapor from the still toward the condenser. After all the vapor is evaporated from the solution in the still *in vacuo* live steam is forced through the pipe K⁵ into the still for a short time through the body of grease, so as to thoroughly agitate it and volatilize all the remaining solvent liquid, the steam and vapors being then passed into the condenser N and condensed therein. The purified grease, which is collected in the still after the distilling operation is completed, is drawn off by means of the pipe O to a suitable storage-tank, from which it is drawn as required. The condenser N is provided with relief outlet-pipes *n* at the lower part of each alternate bend, so that the condensed steam and solvent are conducted off through collecting-pipes *n'* to a separator Q, where by reason of the difference in the specific gravities of the liquids the separation of the water and the solvent quickly takes place. The latter is drawn off from the separator into a suitable storage-tank and may be used again in the process. The water of condensation is conducted off by a waste-pipe into the sewer.

The object of the vent-pipes *m'*, *d*, and *e* is to permit by cutting off the various parts of the apparatus from each other the forcing of steam in one or the other direction through the same, so as to cleanse the part or parts connected and vaporize and carry to the condenser any of the solvent remaining in the parts. This condenser referred to may be a separate condenser from the condenser N used in the process, or it may be the condenser N, as the same will not be otherwise employed when the parts are being cleaned. When it is desired to charge a filtering-tank with fresh filtering material, the tank is cut off from the storage-tank by means of the valve in the connecting-pipe and likewise cut off from the receiver and the other tank with which it is connected. Live steam is supplied to the bottom of the filtering-tank at F, below the false bottom of the same, so that the vola-

tile solvent liquid is vaporized and forced with the steam through the pipe G to the condenser. As soon as only steam passes out at G the operation is interrupted and the charge taken out through the gate H at the bottom and the filtering-chamber charged again with filtering material through the manhole H' in the top of the vessel. The discharged material is then transferred to a revivifying apparatus to be cleaned.

By my improved apparatus the solvent liquid is separated by distillation from the grease after having passed with the same through the filtering material, and the so distilled and condensed solvent liquid can then be used again for mixing with a fresh charge of grease. The apparatus permits the carrying out, therefore, of a very economical and highly-effective process for the purification of garbage-grease and other waste grease.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The apparatus herein described for refining garbage-grease, consisting of a mixer, a storage-tank connected therewith, a battery of filtering-tanks, valved pipes connecting said filtering-tanks in pairs with each other and with said storage-tank, a receiver below said battery and connected with the same, a condenser, and means for exhausting the vapors from the still into the condenser, substantially as set forth.

2. The apparatus herein described for refining garbage-grease, consisting of a mixer, a storage-tank connected therewith, a battery of filtering-tanks, valved pipes connecting said filtering-tanks in pairs with each other and with said storage-tank, a receiver below said battery and connected with the same, a still connected with said receiver, means for admitting steam to said still, means for exhausting the vapors and steam from said still into the condenser, and a separator for separating the water of condensation from the condensed vapors, substantially as set forth.

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

BRUNO TERNE.

Witnesses:

H. P. BROWN,
FRANK TERNE.