

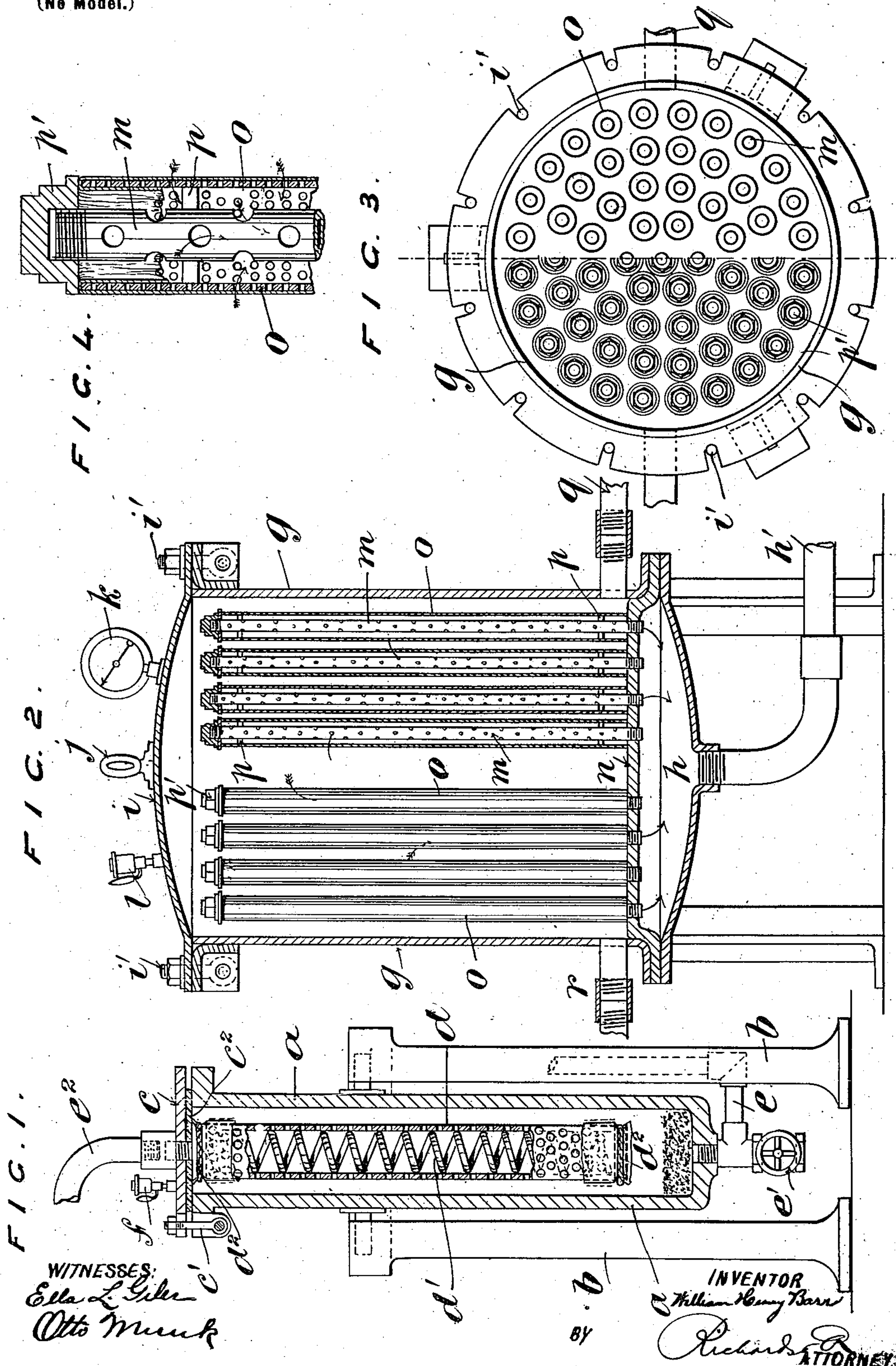
No. 666,044.

Patented Jan. 15, 1901.

W. H. BARR.
METHOD OF FILTERING STEAM.

(Application filed May 29, 1900.)

(No Model.)



WITNESSES:
Ella L. Giller
Otto Munk

INVENTOR
William Henry Barr
BY
Richard A. Richards
ATTORNEY

UNITED STATES PATENT OFFICE.

WILLIAM HENRY BARR, OF BURY, ENGLAND.

METHOD OF FILTERING STEAM.

SPECIFICATION forming part of Letters Patent No. 666,044, dated January 15, 1901.

Application filed May 29, 1900. Serial No. 18,454. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY BARR, a subject of the Queen of Great Britain and Ireland, residing at Bury, in the county of Lancaster, England, have invented certain new and useful Improvements in Methods of and Apparatus for Filtering and Deodorizing Steam, (for which I have made application for patent in Great Britain, No. 13,128, dated June 24, 1899,) of which the following is a specification.

My invention relates to a method of and apparatus for use in filtering and deodorizing steam, by means of which exhaust or live steam may be filtered to remove oily particles, moisture of condensation, and foreign matters held in suspension. Further, when required, bad smells due to hydrogen sulfid or to other volatile organic substances may be removed and the steam thus deodorized. The accompanying drawings show the apparatus devised for this purpose.

Figure 1 is a sectional elevation of a single unit apparatus for filtering and deodorizing steam. Fig. 2 is a sectional elevation of an apparatus suitable for the treatment of very large volumes of steam. Fig. 3 is a plan of Fig. 2 with the cover removed. Fig. 4 is an enlarged detail view of a portion of one of the filter-beds employed with the apparatus shown in Figs. 2 and 3.

Referring in the first place to Fig. 1, the apparatus consists of a pressure-proof casing *a*, carried by a suitable stand *b*. A cover *c* is supplied, secured by means of hinged bolts *c'*, while a disk *c''* of asbestos provides a fluid-tight joint between the lid or cover *c* and the casing *a*. To the cover *c* is secured a filter-bed *d*, which consists of a perforated metallic tube. When larger than two inches in diameter, I strengthen the tube *d* with an interiorly-arranged metallic coil *d'* to prevent collapse of the tube owing to excessive steam-pressure. The tube *d* is formed at each end with grooves *d''*. The perforated tube *d* is covered with a jacket or with rolls of strong cotton cloth, preferably of long stapled cotton, such as Egyptian or Sea Island, which cloth has been mercerized, but with the stretching process omitted, so that the interstices are reduced in size and at the same time the tensile strength of the cloth fibers is

increased, and the cloth is thus rendered very suitable as a straining material. The straining-jacket is secured to the tube *d* by means of a cord wrapped around the grooves *d''*.

To filter the steam, I throw into the bottom of the clean empty casing *a* a small quantity of porous earth, such as kieselguhr or agalite or any other suitable porous and absorbing substance of a like character, sufficient in quantity to cover the jacketed cylinder *d* to the thickness of from one thirty-second to one-eighth of an inch. A thicker coating of filtering-earth may be used, but for all practical and economical purposes one thirty-second of an inch is sufficient. The impure steam is introduced into the bottom of the casing *a* through the inlet-pipe *e*, which is provided with a valve *e'*. By the upward direction of the incoming steam the light particles of kieselguhr or other filtering medium is thrown onto the jacketed cylinder in a smooth and even coating, thus automatically forming a porous filtering-bed of absorbing material. The filtered steam escapes through the pipe *e''*, secured to the cover *c*. I prefer kieselguhr as my filtering medium because of its great porosity and absorbing powers, but other filtering-earths—such as agalite, chalk, and the like—may be used with less efficiency.

So far I have only provided for the removal of oily particles, foreign matters in suspension, and moisture of condensation; but when it is desired to remove bad smells from the steam, due to hydrogen, sulfid, or to other volatile organic substances, I use about equal proportions of a filtering-earth, such as kieselguhr or agalite, and oxid of zinc or other basic metallic oxid, which is deposited at the bottom of the pressure-proof casing *a*, and before turning on the steam I introduce, through the cup *f*, a few ounces of "terebene" or other hydrocarbon of this class of terebenes. This has the effect not only of purifying and filtering the steam, but of destroying bad smells by the chemical and deodorizing action. Thus in addition to filtering steam and removing oily particles and other foreign matter therefrom it is possible to purify steam raised from canal or other impure water and use such purified steam for humidifying purposes—such as in weaving-sheds and spinning-rooms. Steam so puri-

fied and deodorized has an agreeable aromatic odor, and by its action of developing ozone purifies the atmosphere in such rooms with beneficial results. During the working of the apparatus the terebene is introduced daily through the cup *f*, and when required for cleansing purposes the filter-bed *d*, attached to the lid, can be removed therewith, so that the cloth strainer can be removed and cleansed.

For filtering and deodorizing larger volumes of steam I employ a number of filtering units arranged as shown in Figs. 2 to 4. I employ any suitable number of filtering-cylinders, according to the volume of steam to be treated, and mount such filtering-cylinders in concentric circles, as shown in the plan view Fig. 3, within a pressure-proof casing *g*. The cylinders deliver the purified steam into a receiver *h* at the bottom of the case, from whence it passes through the delivery-pipe *h'*. Figs. 2 and 3 show such an arrangement for sixty-one cylinders. A lid or cover *i* is secured to the casing *g* by means of swing-bolts *i'*, which cover also carries a balance-weight hook *j*, pressure-gage *k*, and cup *l*. The filter-beds each consist of a central perforated drainage-tube *m*, screwed and expanded in the diaphragm-plate *n*, which forms a roof to the reservoir or receiver *h*. The perforated drainage-tubes *n* serve to carry and support pervious cylinders *o*, a concentric circulating-space being provided by distance-pieces *p*. The pervious cylinders *o* are wrapped with mercerized unstretched cotton cloth, the ends of which are tucked within the cylinders *o* and the whole secured in position by means of cap-nuts *p'*, which screw on the top of the inner tubes *m*, so that the cylinders *o* are jammed tightly in position, the turned-in layers of cotton fabric providing a fluid-tight joint. The filtering earth or

media is thrown upon the diaphragm-plate *n* at or near the steam-inlet pipe *q*, which is upon the same level as the diaphragm *n*, so that the incoming rush of steam at once seizes the filtering-earth and throws it in an even coating upon the straining-jackets of the filter-beds. The steam passes through the filtering-earths and straining-jackets on the outer cylinders *o* and through perforated supporting central tube *m* to the receiver *h*, from whence it is drawn off by way of the delivery-pipe *h'*, as shown by the arrow. Terebene may be added when deodorizing the steam through the cup *l*. To clean the filter-beds, the cap-nuts *p'* may be unscrewed and the outer cylinders *o* removed to wash off the dirty filtering-earth, or the filter-beds may be washed *in situ* by a reversed current of clean water delivered through the receiver *h*, which throws off the deposit of dirty filtering-earths, the deposit being removed from the casing *g* by way of the flush-pipe *r*. In Fig. 4 I show to an enlarged scale a portion of the filter-bed.

I declare that what I claim is—

1. The herein-described method of filtering steam consisting in depositing a thin coating of agalite on a suitable bed, and passing the steam therethrough, substantially as described.

2. The herein-described method of filtering and deodorizing steam consisting in depositing a mixture of agalite and a basic metallic oxid with an admixture of terebene upon a suitable support, and passing the steam there-through.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM HENRY BARR.

Witnesses:

JOSHUA ENTWISLE,
ALFRED YATES.