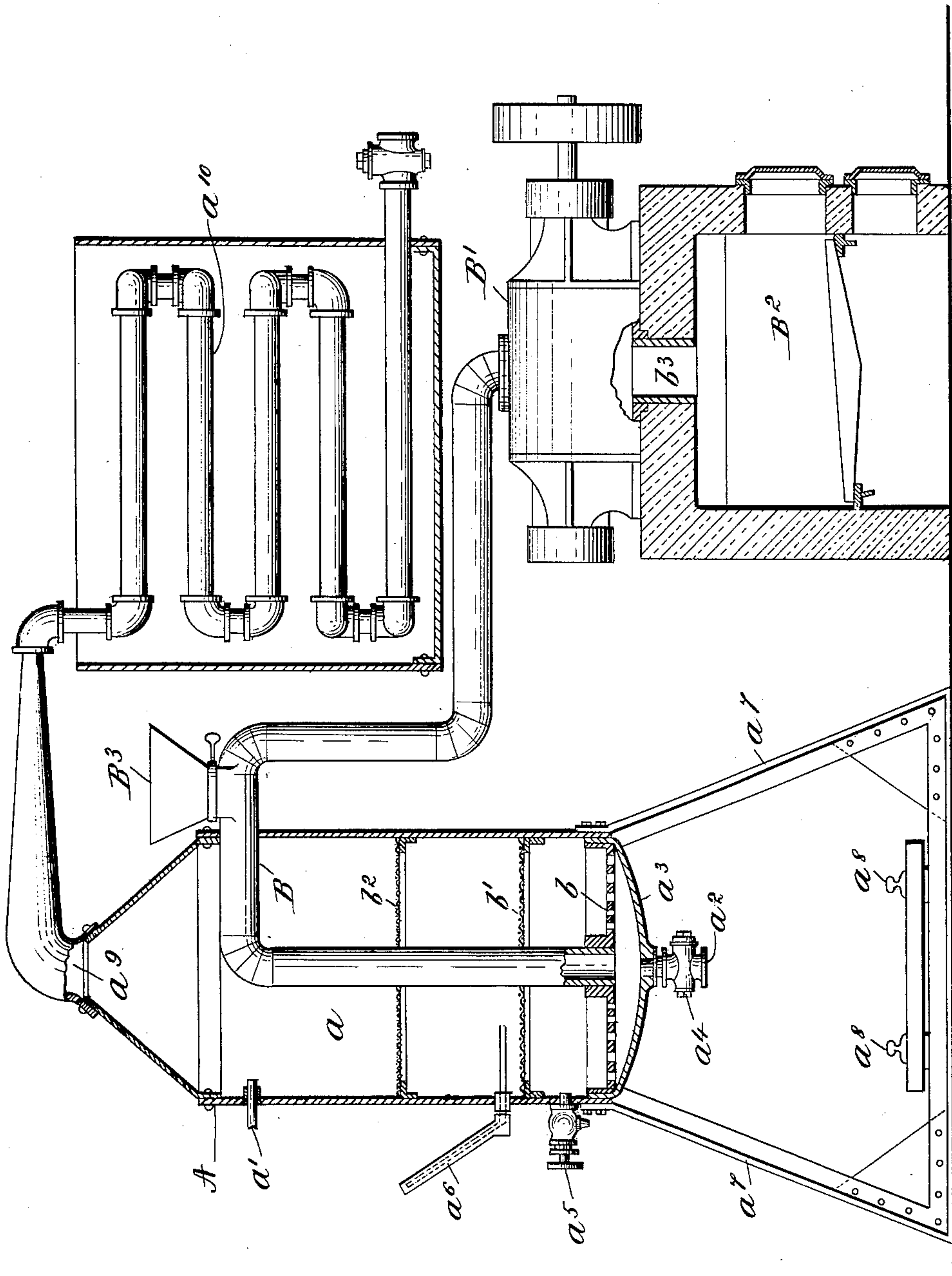


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 STILL FOR DISTILLING CRUDE BITUMINOUS PRODUCTS.  
 APPLICATION FILED JUNE 22, 1903.

917,702.

Patented Apr. 6, 1909.



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# UNITED STATES PATENT OFFICE.

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## STILL FOR DISTILLING CRUDE BITUMINOUS PRODUCTS.

No. 917,702.

Specification of Letters Patent.

Patented April 6, 1909.

Original application filed April 17, 1902, Serial No. 103,346. Divided and this application filed June 22, 1903. Serial No. 162,562.

*To all whom it may concern:*

Be it known that I, HORACE W. ASH, of Cambridge, in the county of Middlesex and State of Massachusetts, a citizen of the United States, have invented a new and useful Improvement in Stills for Distilling Crude Bituminous Products, of which the following, being a division of my copending application, Serial No. 103,346, filed April 17, 1902, is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

I shall describe the invention as employed for distilling bituminous material for the purpose of producing a refined bituminous product especially adapted for use in the manufacture of bituminous pavements. The bituminous material which I prefer to use for obtaining this product is a crude tar obtained from gas works and petroleum oils having an asphalt base.

The object of the invention is to provide an apparatus for shortening the time of distillation.

The distillation is quickened according as the aeration of the distilling product may be increased.

My invention relates to heat to the exterior of the still, and it consists of a still of such a nature that the bituminous material therein may be subjected to a volume of heated air or steam introduced into the bottom of the still whereby the material is not only heated, but is aerated by the passage through it of large quantities of air in the form of small globules or bubbles. I prefer to use in the still means whereby the air is disseminated and brought into intimate relation with all parts of the product as it rises from the bottom of the still through the material to the top, and I have shown for accomplishing this purpose a perforated grating or gauze extending across the still in a number of places below the intended level of the bituminous material against which the globules or bubbles of air rise and by which they are subdivided into smaller globules or bubbles and thus made to more thoroughly and completely permeate the material.

When desired lampblack or other impalpable powder may be introduced into the still with this body of heated air or steam.

When lampblack is used it may wholly or in part be obtained from the products of combustion used in heating the air or steam, or it may be introduced by any suitable feeding mechanism into the pipe by which the heated air is conducted to the still.

I will now describe the invention in conjunction with the drawings where the figure is a view in a somewhat conventional form of the still.

Referring to the drawings:—A represents an upright metal shell preferably cylindrical in section, forming a distilling chamber a having an inlet  $a^1$  by which the crude material is fed to it from a reservoir, an outlet  $a^2$  in its bottom  $a^3$  closed by a valve  $a^4$  through which the refined product is drawn, one or more gage cocks  $a^5$  and a thermometer  $a^6$ . It is represented upon a frame or legs  $a^7$  in a manner to provide room for tracks  $a^8$  beneath the outlet and for a car (not shown) adapted to receive the product or to hold barrels or hogsheads for receiving it, whereby ease in handling the product is secured.

The still preferably has its bottom  $a^3$  rounded outwardly or downwardly. It also has the usual outlet  $a^9$  at its top connecting with a condenser  $a^{10}$  which may be of the usual character. It further has a supply pipe B which enters its side near the top to about its center and then extends downward and opens in the bottom of the still below the diaphragm  $b$ . This pipe upon the outside of the still extends from a hot air chamber  $B^1$  in which is a blower for blowing hot air of any desired temperature and at any required pressure through the air pipe into the still. The perforations of the diaphragm  $b$  may be of any desired size and they may be of any desired arrangement, smaller near the center and larger near the outer edge for the better distribution of the air if required. Above the diaphragm  $b$  are the diaphragms  $b^1$ ,  $b^2$ . These are placed at convenient distances apart, extend across the still and provide perforations which are preferably small, but may be of any size or arrangement. The perforations in the diaphragm  $b^2$  may be somewhat smaller than those in the diaphragm  $b^1$ . I have shown two diaphragms, but as many may be used as desired. Their purpose is to cause the bubbles, which tend to increase in size as the air rises through the distilling material, to be divided into smaller



bubbles or globules in order to produce larger aerating surfaces from the quantity of air used and also for the purpose of reducing the speed with which the air passes through the distilling material, and also to more uniformly disseminate it throughout the mass as it is passing. This air acts as a vaporizer or liberating agency by means of which the distilling product is freed by volatilization from the oils which it is necessary to distil off to produce a bituminous product of the desired consistency. In such a still complete distillation is very quick taking ordinarily not more than seven hours and it is carried on at a temperature of about 300 degrees Fahrenheit, instead of 700, which is ordinarily considered necessary for the purpose, so far at least as I have knowledge.

The air may be heated and forced through the air supply pipe by any desired means. I have represented a furnace B<sup>2</sup> adapted to burn either soft coal or oil or both. This furnace is supplied with the usual air draft in any suitable way and is represented as connected with the chamber B<sup>1</sup> by a flue b<sup>3</sup> through which the heat and all the products of combustion enter the chamber B<sup>1</sup>. The air forcing means in the chamber B<sup>1</sup> provides an inducing draft for the furnace and force all the products of combustion as well as the heat through the air supply pipe into the still. Any lampblack therefore which is produced in the furnace is fed into the still. The blower in the hot air chamber (not shown) is provided with a shaft pulley and is operated by a belt in the usual way.

When it is desired that the bituminous product shall contain lampblack it may be produced in the furnace and hot air chamber by imperfect combustion of the coal or preferably of oil therein, the combustion of the oil being so regulated as to produce lampblack or carbon, and which with the heated air is blown through the supply pipe into the still and there intimately mingled by means of the heated aeration with the heated distilling material. Where lampblack taken from other sources or other impalpable powder is used it is fed into the air supply pipe through a supply hopper B<sup>3</sup> through a suitable feeding valve and is by the heated air conveyed to the still and by it intimately associated or mingled with the distilling product. The lampblack or impalpable powder is usually not introduced into the distilling product until near the end of its distillation. The temperature of the heated air is, of course, dependent upon the fire. It is varied at will by the admission of cool air which may be done by opening the furnace door. It is thus possible to hasten the cool-

ing of the product remaining in the still, and of the still itself after distillation by forcing through the said product and the still cool or cold air, rather than heated air, the fire in the furnace, of course, then being lessened or checked.

In use, the still is filled to the desired extent with the crude tar or oil and the hot air is then blown into the bottom of the still beneath it at about the temperature of 300 degrees F. and about the pressure of about five pounds to the square inch, and this causes the crude tar or oil to be heated and thus to become more fluid and at the same time introduces into it, a means for agitating and aerating it which serves to combine with the gases of distillation at the same time that it serves to heat the mass throughout; the hot air bubbles or globules gradually rising through the mass permeating it and escaping with the gas into the condenser. The hot air supply pipe is led down through the center of the still thus utilizing the radiation of heat from the pipe and at the same time retaining in the pipe to a considerable extent the air heating values arising from surrounding the pipe with the heated material.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States:—

1. The combination of a still for distilling crude bituminous material, means for generating a blast, an inlet in the still for said blast, means for directing the blast through the inlet, and means whereby solid foreign matter may be introduced in the said directing means at a point between the still and said generating means and thereby conducted to the still.

2. The combination of a still for distilling crude bituminous material, means for generating a blast, an inlet in the still for said blast, means for directing the blast through the inlet, and a receptacle for foreign matter opening into said directing means at a point between the still and said generating means whereby the passage of the foreign matter may be regulated.

3. The combination of a still for distilling crude bituminous material, means for generating the heat blast, an inlet in the still for said blast, means for directing the blast through the inlet, and a receptacle for foreign matter opening into said directing means at a point between the still and said generating means.

HORACE W. ASH.

In presence of—

J. E. R. HAYES,  
SAUL SIPPSTEIN.