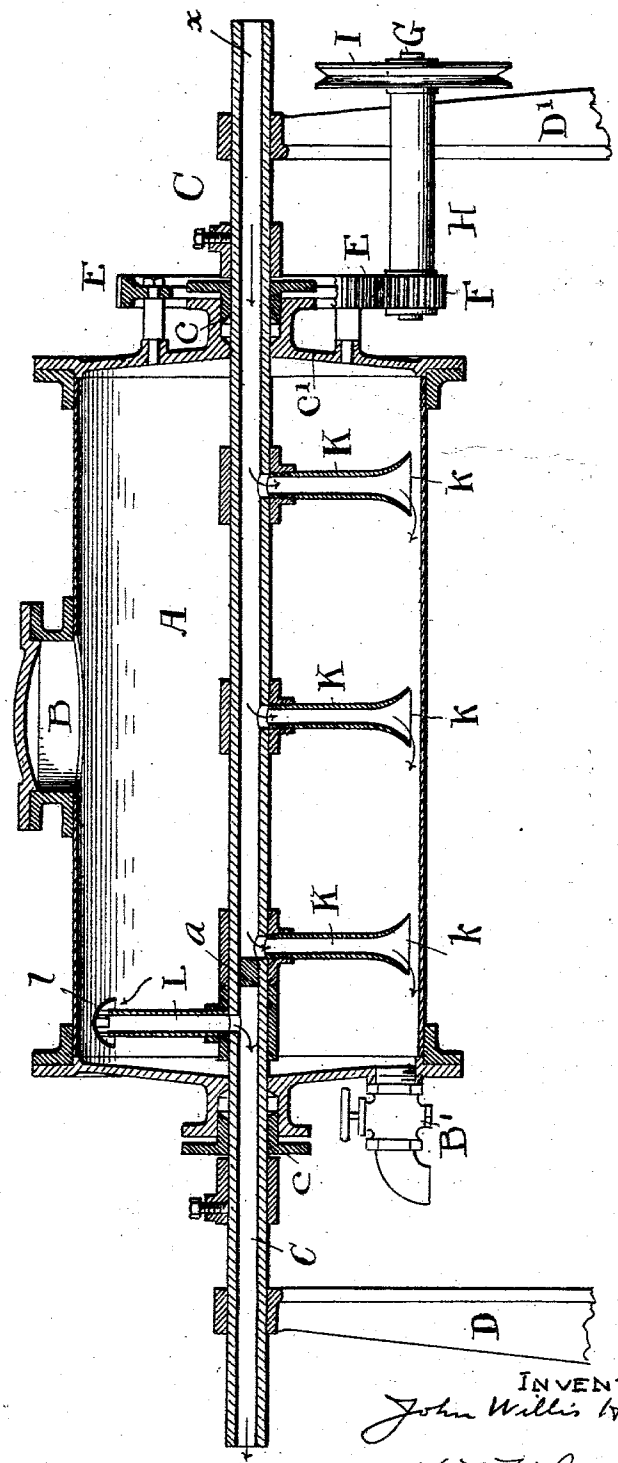
No. 634,818. Patented Oct. 10, 1899.

J. W. HAYWARD.

ART OF MANUFACTURING ASPHALT FROM PETROLEUM RESIDUE.

(Application filed Aug. 18, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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ART OF MANUFACTURING ASPHALT FROM PETROLEUM RESIDUE.

SPECIFICATION forming part of Letters Patent No. 634,818, dated October 10, 1899.

Application filed August 18, 1898. Serial No. 688,865. (No specimens.)

To all whom it may concern:

Be it known that I, JOHN WILLIS HAYWARD, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in the Art of Manufacturing Asphalt from Petroleum Residue; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in the manufacture of artificial asphalt from petroleum residue and in apparatus employed therein.

According to this invention ground limestone or like mineral or equivalent substance in the necessary proportion—say twenty to sixty per cent., according to the condition or quality of the residue or the product to be made—is added to the petroleum residue, preferably before the oxidizing process, whereby the said mineral substance is more intimately mixed with the said residue and an increased surface of the residue is presented to the action of the air and the oxidation of the material is more rapidly effected. The retort containing the mixture of petroleum residue and limestone is heated to the required temperature and while the mixture is in a heated condition air, preferably under pressure, is admitted to the retort and efficiently diffused through the material, so as to rapidly oxidize the material and bring it to the required degree of consistency. In carrying out this process the retort in which the mixture of the petroleum residue and ground limestone or the like is heated and oxidized is caused to rotate on a stationary hollow shaft, through which the air is forced or caused to pass, the said hollow shaft being provided with hollow branches or arms through which the air passes from the said shaft into the material, the said arms also serving as agitators and scrapers to disintegrate or break up the mass of material and so facilitate the diffusion of the air therethrough. To further facilitate the oxidation of the material, ozonized air may be forced thereinto while in a heated condition. When ozonized air is employed to effect the oxidation of the petroleum residue, it may be introduced into the residue before adding the ground limestone or the like.

The accompanying drawing illustrates in longitudinal vertical section a convenient arrangement of apparatus for carrying out this invention, but the invention is not restricted thereto and any suitable apparatus may be adopted without departing from the spirit of the invention.

A is a retort in which the mixture of petroleum residue and ground limestone or the like is effected, the said retort being provided with a manhole B, through which the materials are fed into the same, and at one end with an outlet B′, through which the product is discharged. The retort may be heated by any convenient means—as, for instance, by an arrangement of gas-jets or the like capable of being brought into position beneath the retort temporarily or permanently or by a furnace or other available means, according to local conditions or circumstances. The retort is shown here as mounted on a non-rotating horizontal hollow shaft or tube C, carried in standards D and D′ and provided with stuffing-boxes at *c*. Fixed to one of the ends *c*′ of the retort is a spur-wheel E, with which gears a pinion F, fast on a shaft G, mounted in a bearing H in the standard D′ and carrying a driving-pulley I, around which passes a driving-band from any suitable motor and transmits through the gearing F and E motion of rotation to the retort A on the stationary hollow shaft C.

Projecting downward from the hollow shaft C are branch pipes or arms K, extending to within a short distance from the interior surface of the retort and having their ends *k* flattened or spread out, so as to form a fan-shaped outlet for the air from the hollow shaft C. In the interior of the hollow shaft C, just beyond the last branch pipe or arm K farthest from the end *c*′ of the retort, is a plug, block, or stop *a* to prevent the air admitted to the hollow shaft from passing direct through and out of the opposite end thereof, and beyond this stop *a* is a branch pipe or passage L, through which air from the interior of the retort can escape into the hollow shaft C behind the stop *a* and pass away through the outlet end of the said shaft.

The retort having been charged with the petroleum residue and ground limestone or equivalent mineral, the heat is applied to heat the retort, and the said retort being slowly rotated by means of the gearing hereinbefore described air, which may be ozonized, is forced by any suitable air-forcing device into the hollow shaft at the end *x*, which air is prevented by the plug *a* from passing directly through the said hollow shaft and caused to pass through the branches K into the material contained in the retort, the said air being efficiently diffused through the mass of material by reason of the fan-like shape of the ends of the branch pipes, which serve to agitate and disintegrate the material as the retort rotates, whereby the material is efficiently and rapidly oxidized. The air which percolates through the heated material rises to the upper part of the retort and passes down the branch pipe or passage L and away through the hollow shaft C, as indicated by the arrows. The entrance to the air-outlet pipe or passage L is covered by a hood or cap *l*, which will allow the air to escape, but prevent the material from entering the said pipe.

What I claim is—

In the manufacture of artificial asphalt from petroleum residue, the method of manufacture consisting in mixing pulverized limestone with the petroleum residue while it is in a heated state, and in this state oxidizing the mixture by subjecting it to the diffusion of air, substantially as described.

Witness my hand to the foregoing specification this 12th day of August, 1898.

JOHN WILLIS HAYWARD.

Witnesses:

H. T. FISHER,

R. B. MOSER.