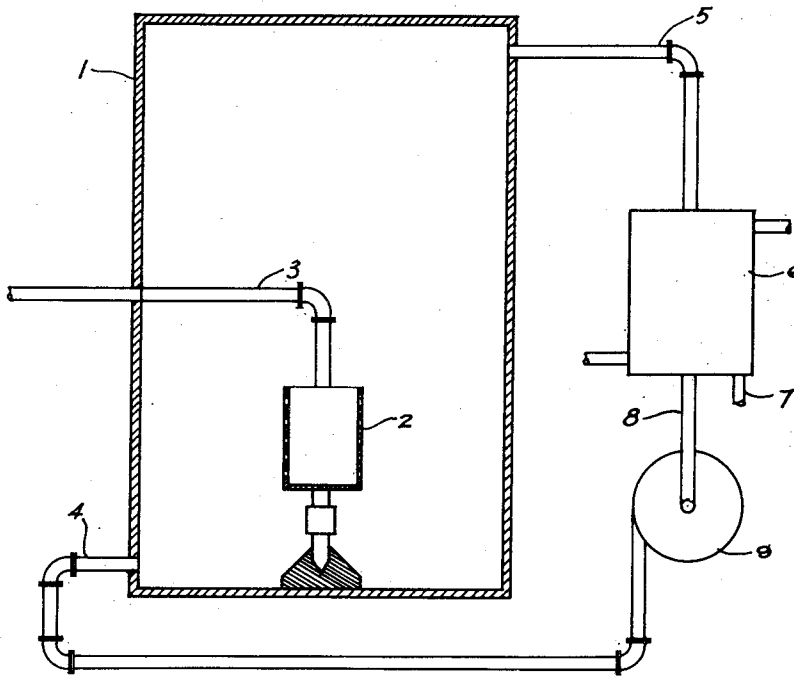


K. B. HOWELL.
REMOVING FUMES FROM MATERIALS.
APPLICATION FILED DEC. 23, 1918.

1,348,140.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, KENNETH B. HOWELL, a citizen of the United States, residing at 4 Rawley Place, Millburn, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Removing Fumes from Materials, of which the following is a specification.

This invention relates to a process of circulating air or gas in contact with materials which are giving off fumes or vapors whereby said fumes or vapors are carried off and disposed of in a suitable manner. It relates more particularly to the circulation of air or gas in a closed system so that said air or gas absorbs and acts as a vehicle or carrier for removing fumes or vapors from hot materials that are undergoing the process of disintegration or comminution. The fumes or vapors are abstracted from the air or gas at one point of its travel and a fresh supply is taken up at another point.

The invention relates especially to the removal of obnoxious fumes or vapors from hot bituminous material as it is being comminuted to form shot or filaments, and the condensation of such fumes or vapors whereby the valuable constituents contained therein may be recovered instead of being diffused in the atmosphere and lost and also creating objectionable odors.

In the process of comminuting fusible material by heating it until it assumes a liquid form and then passing it through a perforated centrifugal machine it has been found that with certain materials, fumes or vapors are given off which sometimes pollute the atmosphere and are *per se* valuable when collected. The escape of such fumes or vapors may result in a considerable loss of valuable materials, or may produce other undesirable effects especially when such fusible products as pitch, asphalt, caustic soda, etc., are being treated.

The object of this invention is to collect the valuable products which usually escape and also to provide a more favorable environment in which the comminuting operation can be performed.

The invention will be understood by reference to the accompanying drawings and description in which is set forth a convenient method of practising this invention.

In the figure, which is a somewhat diagrammatic view, partly in section, showing

an arrangement of apparatus by which this process can be carried out, the reference character 1 refers to a closed housing in which is placed a perforated centrifugal machine 2 which is driven in any convenient manner. A feed pipe 3 leads to the centrifugal machine 2 and inlet and outlet pipes 4 and 5 are provided for the housing 1. The outlet pipe 5 leads to a condenser 6 of any suitable type by means of which the condensable constituents passing into it can be condensed and drawn off through pipe 7 while the uncondensed portions escape through pipe 8 and are forced by pump 9 through pipe 4 into housing 1.

The operation is as follows: Fusible material which is desired to be comminuted as by dividing it into small filaments or shot is heated until it becomes liquid and is then introduced into machine 2 through pipe 3 where it passes out through the perforations in the periphery thereof in segregated particles. It is desirable that these particles cool and solidify as quickly as possible so that they can be maintained in their segregated state when they fall to the floor. For this reason it is necessary to provide a proper cooling medium into which the particles are projected. It is obvious that these particles have a relatively large surface so that there is a marked tendency for any volatile constituents thereof to evaporate and pass out into the cooling medium. Consequently the machine 2 is entirely inclosed in an air tight housing 1 and air or an inert gas to serve as a cooling agency is caused to circulate continuously through the system and is cooled in its transit by means of the condenser 6.

By operating in this way the following effects and advantages can be produced. Fumes and vapors which might otherwise escape into the atmosphere and be obnoxious are collected; valuable products can be recovered and saved; a cooling medium whose temperature can be controlled is caused to surround the machine; and a cooling medium which will exert no deleterious influence upon the material undergoing treatment can be used and all others excluded.

The invention finds special application in the treatment of pitch, asphalt or caustic soda. In the treatment of pitch, fumes are given off which contain valuable oils but on account of the necessity of supplying a large

amount of cooling air the fumes were not dense enough therein to become condensable by any practicable method. By the process of cooling the air containing the small amounts of fumes which it first takes up and repeatedly passing it through the system, it finally becomes sufficiently saturated so that the fumes will easily condense when the air is cooled. The presence of fumes in the cooling air also has a tendency to prevent as much volatilization of volatile products from the particles of material undergoing treatment as would occur with pure air of the same temperature.

The air may be dried before being introduced into the system. This is desirable where materials, such as caustic soda are being comminuted which would be injured by exposure to the moisture of the air. Even if moist air is first introduced it soon becomes fit for use as the moisture is largely removed in a short time by means of the condenser 6, and as a closed system is used practically no fresh air carrying moisture is admitted. Other suitable cooling and fumes carrying mediums than air may obviously be used in this process, depending upon the particular material that is being comminuted.

What we claim and desire to secure by Letters Patent is:

1. The herein described process which comprises comminuting hot material and circulating a cooling medium around said material which contains constituents that are volatile at the temperature at which said material is being comminuted.
2. The herein described process which comprises comminuting hot liquid material which contains constituents that are volatile at the temperature at which said material is being comminuted and circulating a cooling medium around the comminuted particles.
3. The herein described process which comprises comminuting hot material, circulating a cooling medium around said material which contains constituents that are volatile at the temperature at which said material is being comminuted, and cooling said medium.
4. The herein described process which comprises comminuting hot material, circulating a cooling medium around said material which contains constituents that are volatile at the temperature at which said material is being comminuted, cooling said medium, and collecting the condensates.
5. The herein described process which comprises comminuting hot fusible material which contains constituents that are volatile at the temperature at which said material is being comminuted, collecting and con-

densing the vapors which pass off from the comminuted particles.

6. The herein described process which comprises comminuting hot fusible material which contains constituents that are volatile at the temperature at which said material is being comminuted, collecting and condensing the vapors which pass off from the comminuted particles by circulating a carrying medium around the said particles and cooling said medium.

7. The herein described process which comprises comminuting hot material which contains constituents that are volatile at the temperature at which said material is being comminuted by means of a centrifugal machine and circulating a cooling medium around said material.

8. The herein described process which comprises comminuting hot material and circulating a cool gaseous medium around said material which contains constituents that are volatile at the temperature at which said material is being comminuted.

9. The herein described process which comprises comminuting hot material and circulating air around said material which contains constituents that are volatile at the temperature at which said material is being comminuted, and cooling the circulating air.

10. The herein described process which comprises comminuting hot fusible material which contains constituents that are volatile at the temperature at which said material is being comminuted and recirculating a cooling medium around said fusible material.

11. The herein described process which comprises comminuting hot pitch and recirculating a cooling medium around said pitch.

12. The herein described process which consists in comminuting hot liquid bituminous materials in a chamber, cooling the comminuted particles by passing a fluid through said chamber, cooling the said fluid, and recirculating it through the chamber.

13. The herein described process which comprises comminuting hot bituminous material and circulating a cooling medium around said material, said cooling medium being partially saturated with fumes or vapors from said material.

14. The herein described process which comprises comminuting hot bituminous material and circulating a cooling medium around said material until said medium becomes sufficiently saturated with vapors from said material so that said vapors may be condensed therefrom by cooling.

In testimony whereof I affix my signature.
KENNETH B. HOWELL.