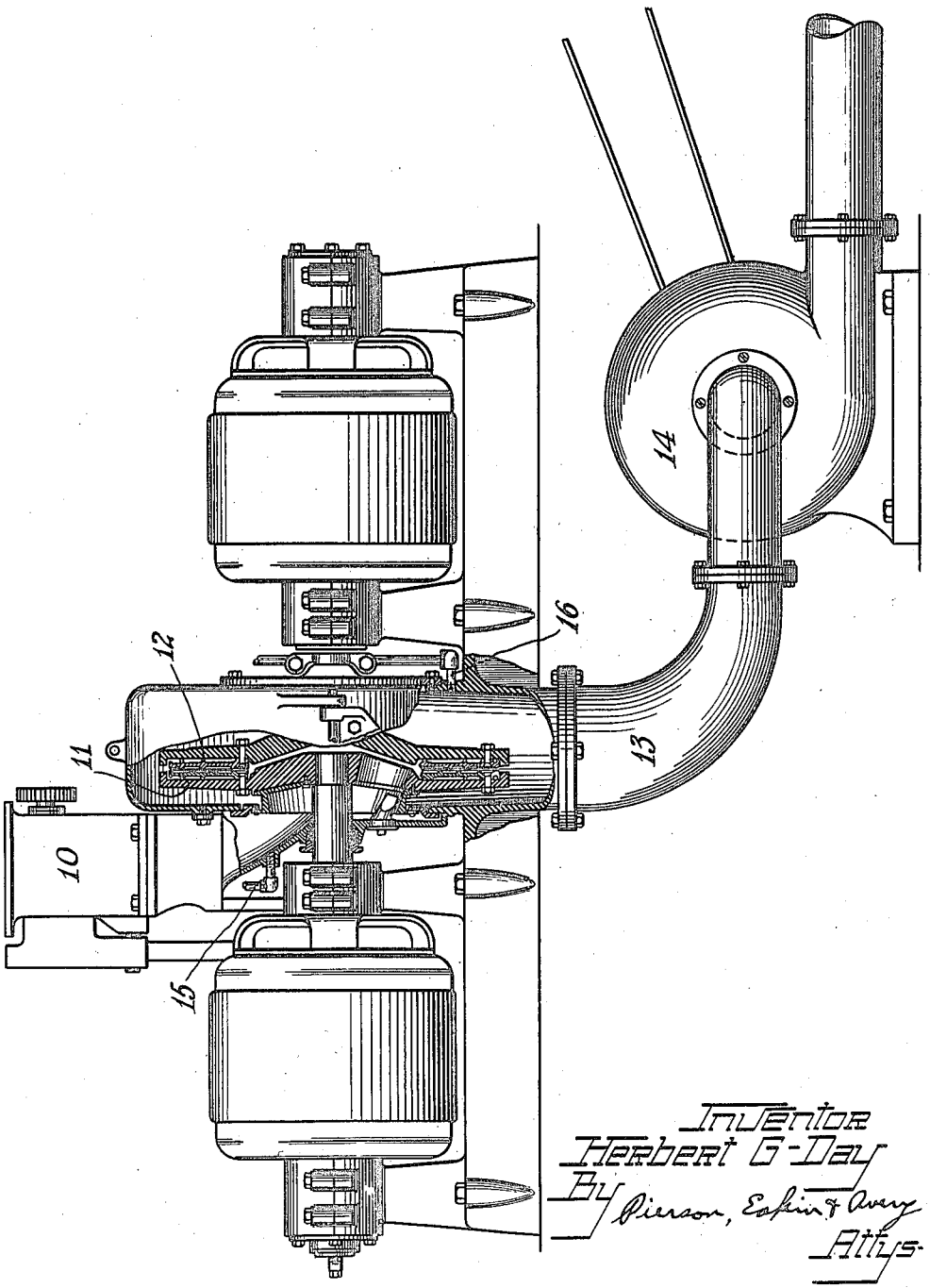
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METHOD AND APPARATUS FOR GRINDING FIBROUS RUBBER SCRAP OR THE LIKE

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UNITED STATES PATENT OFFICE.

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METHOD AND APPARATUS FOR GRINDING FIBROUS RUBBER SCRAP OR THE LIKE.

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This invention relates to the grinding of inflammable materials such as scrapped pneumatic tires, and especially to the grinding of such materials in a high speed mill, wherein the frictional heat of the mill and sparks created by contact of the grinding elements with occasional pieces of metal in the stock frequently results in ignition of the fibrous stock in the absence of suitable precaution against it.

In grinding and separating systems commonly employed for tire scrap it is impractical to employ an inert gas such as carbon-dioxide in the mill and its connections to prevent fire, as such systems are not of the enclosed, return-circuit type, and the use of such a gas would result in excessively diluting or fouling the air of the room.

Excessive moisture in the final, separated rubber and fiber portions of the stock is to be avoided, and this, as well as the effective grinding of the stock and separating of the fiber from the rubber, calls for the grinding and subsequent handling of the stock in an approximately dry condition, which precludes the simple dampening of the stock as a matter of fire prevention.

My chief objects are to provide procedure and apparatus whereby the ignition of the stock may be prevented without the difficulties or disadvantages suggested and to avoid the necessity of expensive equipment or elaborate procedure.

In attaining these objects I find that the heat of the stock in the mill is such that steam may be used, without excessive dampening of the stock, as an inert medium for encompassing the stock and preventing its ignition in its passage through the mill and the adjacent part of the system wherein fires heretofore have frequently occurred; that such slight condensation as does occur results, when the steam is employed in such small quantity as not to exceed a low pressure, in only such moisture upon the stock as will be promptly evaporated by the heat of the stock, leaving the stock substantially dry before it has proceeded far from the mill; and that the steam may be employed in a system which is in open communication with the interior of the room without harmful effects upon the atmosphere of the room.

I simply inject the steam at such points in the system as to insure an atmosphere of steam at low temperature and pressure in such parts of the system as are subject to ignition troubles, and allow the steam continuously to pass forward in the system, from the points of injection, with the charge of stock.

It will be appreciated that if only such steam is admitted into the system as to maintain approximately one atmosphere of steam pressure therein the temperature of the steam will be approximately 212° F. and if the temperature of the stock approximates 212° F. or is higher there will be little or no condensation of moisture upon the stock, and yet the stock will be surrounded by an inert atmosphere such as to prevent ignition, and the moisture represented by the volume of low-pressure steam will not be very great or very harmful, even if all of it should condense upon the stock after the stock has passed the fire-hazard zone in the system. Also, such moisture as is received by the stock is so distributed upon the surface thereof as to continue to serve effectively for prevention of ignition until it again evaporates, although the moisture does not penetrate deeply into the particles of the stock.

The single figure of the accompanying drawing is a side elevation of a mill and associated elements embodying and adapted to carry out my invention in its preferred form.

The mill itself is of a well known type, comprising a hopper 10 and oppositely rotating grinding plates 11, 12 and is associated with a delivery conduit 13 having a blower 14 interposed therein for conveying the ground stock from the mill, usually to suitable sifting or other devices, in the case of grinding fibrous scrap rubber, for separating the different materials of the ground stock.

To provide the atmosphere of steam in the mill and in the portion of the conduit 13 adjacent thereto a steam inlet pipe 15 is mounted in the wall of the hopper 10 near the inlet of the mill, so that steam issuing from the pipe into the hopper will be drawn into the mill by the current maintained by the blower 14, and a steam inlet pipe 16 is mounted in the wall of the mill casing near the mill's outlet to the conduit 13, assuring a sufficient quantity of steam in the gaseous current at that position, where fire frequently occurs when the steam is omitted.

The steam inlets are preferably very small, so that they may lead from a steam line of the usual high pressure without discharging so much steam into the mill as to cause excessive

condensation therein or cause excessive flow of steam therefrom into the atmosphere of the room.

In actual operation the procedure and apparatus described have proven to be very effective for prevention of fire in the stock and at the sifters, to which the stock passes from the conduit 13, the stock is apparently as dry as when the steam is not employed.

Modifications as to the type of mill, position of the steam pipes and so forth are possible within the scope of my invention as defined in the appended claims.

I claim:

1. The method of grinding inflammable material which comprises passing it through a high speed mill in the presence of steam at such low pressure with relation to the temperature of the material as substantially to avoid wetness of the material.

2. The method of grinding inflammable material which comprises passing it through a high speed mill in the presence of steam at approximately atmospheric pressure.

3. Grinding apparatus comprising a high speed mill, means for impelling a gaseous current therethrough at approximately atmospheric pressure, a steam supply, and means for conducting steam from said supply into the said gaseous current.

In witness whereof I have hereunto set my hand this 24th day of December, 1927.

HERBERT G. DAY.