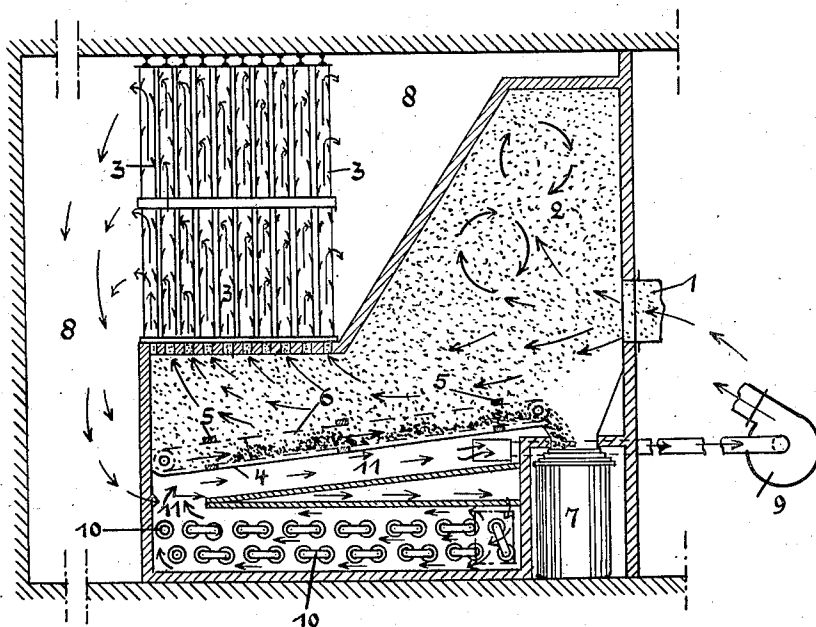


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APPARATUS FOR SIMULTANEOUSLY SEPARATING AND
COOLING FINE PULVERULENT MATERIALS
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APPARATUS FOR SIMULTANEOUSLY SEPARATING AND COOLING FINE PULVERULENT MATERIALS

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2 Claims. (Cl. 183—32)

The invention relates to apparatus for simultaneously separating and cooling fine pulverulent materials entrained by an air current, incorporating a depositing chamber with a built-in set of filter tubes, and with means for cooling the working air issuing from the filter and maintained in circulation.

Apparatuses of this type are known, one form of the said known apparatus comprising, primarily, a depositing chamber with a deeply set floor, leading to a discharge conveyor screw. For cooling the working air required there is provided externally of the depositing chamber a separate cooling chamber or box. The set of filter tubes is in many cases so arranged that after traversing the depositing chamber the cooling air passes through a separate tubular conduit into an independent filtering device with its own actuating means and having its own discharging means. In other constructions the depositing chamber is divided longitudinally by a partition, the filter device being arranged in one half while the other half serves as the depositing chamber proper. In such last named constructions the partition does not extend to the bottom of the depositing chamber. Consequently the air entering the depositing chamber is partly short circuited on its way to the filter tubes. In winnowers or sifters with two concentrically arranged sifting or separating chambers, in the outer of which filter tubes are arranged vertically, the cooling device consists of individual vertically arranged tubes presenting a cylindrical grating and traversed by a cooling medium.

There are associated with the known constructions several drawbacks which are avoided by the invention according to which the cooling device is formed as a system of cooling tubes arranged beneath the floor of the depositing chamber in the space otherwise unoccupied and determined by the height of the collecting receptacle. On the cooling floor is arranged a conveyor known per se extending the entire length of the floor and provided with scrapers, the function of which conveyor is to ensure that the material deposited on the floor will be in a thin layer, as nearly uniform as possible, and so be thoroughly cooled, and at the same time to effect continuous removal of the cooled material. According to a further feature of the invention the set of filter tubes is arranged above the part of the floor of the depositing chamber which is first traversed by the conveyor, in order that the floor may be completely utilized as a cooling floor. As a result the air laden with the material to be cooled will trav-

erse the depositing chamber for the entire length of the latter, and the material will fall on to the floor substantially beneath the set of filter tubes and will also be propelled by the scrapers of the conveyor over the entire length of the floor. As contrasted with previously known constructions, the construction according to the invention presents the advantage that with a high inlet temperature, which in itself is always desirable, of the material to be cooled a degree of cooling which is not otherwise obtainable but which is absolutely necessary is realized. In many cases, in order to obtain a good colour and a loose or so-called wooly texture, the product, when being ground, must be at a high working temperature. In order that the good qualities of the product obtained by heating the product to a high temperature may not be lost again, the material must be cooled to a minimum temperature and to a certain extent tempered or chilled. Other advantages resulting from the assembly of the cooling chamber, depositing chamber and filter in a single structure are saving of mechanism, economization of connecting ducts, and saving of space.

One embodiment of the invention is illustrated diagrammatically in vertical longitudinal section in the figure of the accompanying drawing.

As appears from the drawing, the warm material enters with the cold current of air through an inlet connection 1 into the depositing chamber 2 in which it deposits on its way to the filter tubes 3, mainly beneath the set of filters, on the floor 4. By means of a conveyor 6 provided with scraper bars 5 the cooled material is scraped continuously over the floor 4 to a collector 7. The air in circulation flowing through the filter tubes 3 and entering a closed compartment 8 is sucked by a fan or blower 9 as shown by the arrows through a cooling chamber 11 provided with a system of cooling tubes 10. The air from passage 8 reaches cooling chamber 11 by passing from passage 8 along before (or behind) the depositing chamber 2 as well as the cooling system 10, and then enters from the front (or back) into the square opening (shown in dotted lines) at the right end of the chamber containing the cooling system 10, in which it passes toward the left hand side along the cooling pipes, turning upward at the left end and then passing toward the right beneath bottom 4, and after being laden with a fresh supply of material is again led back to the inlet connection 1.

It is evident that various changes may be resorted to in the construction, form, and arrangement of the several parts without departing from

the spirit and scope of my invention and hence I do not intend to be limited to the particular embodiment shown and described.

Where in the claims a "gaseous mixture" is referred to it will be understood to include a mixture of solid materials entrained in a current of air so long as the mixture is characterized chiefly by its fluidity.

What I claim is:

- 10 1. In an apparatus for simultaneously separating and cooling fine pulverulent materials entrained in a current of air, the combination with a walled depositing chamber having a gaseous mixture inlet, a floor, and a plurality of outlets, 15 of compartments interconnected for the circulation of air, a set of filter tubes built on the depositing chamber and housed in a compartment, said tubes communicating with said outlets, a collecting receptacle, a conveyor adapted to move 20 the material across said chamber floor and to deposit it in said receptacle, means for guiding the working air issuing from the filters through said interconnected compartments and means for cooling said air, said cooling means being arranged 25 under the depositing chamber floor in one of said compartments, the compartment being in heat exchange relation with the floor across which the material is conveyed.

2. In an apparatus for simultaneously separating and cooling fine pulverulent materials entrained in a current of air, the combination with a walled depositing chamber having a gaseous mixture inlet, a floor adapted to be used as a cooling floor and a plurality of outlets, of a collecting receptacle, a conveyor adapted to move the material across said floor and to deposit it in said receptacle, compartments interconnected for the circulation of air, a set of filter tubes built on the depositing chamber and located in a compartment above that part of the floor which is first traversed by the conveyor, said tubes being in communication with said outlets, means for guiding the working air issuing from the filters through said interconnected compartments and means for cooling said air, said cooling means comprising a system of spaced cooling tubes located in one of the compartments and arranged under the floor of the depositing chamber, said compartment having its height determined by the height of the collecting receptacle and being in heat exchange relation with the floor across which the material is conveyed.

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