Dec. 17, 1929. J. C. BOERTLEIN 1,740,064

APPARATUS FOR FLAKING MOLTEN SOLIDS

Filed March 5, 1928

Fig. 1.

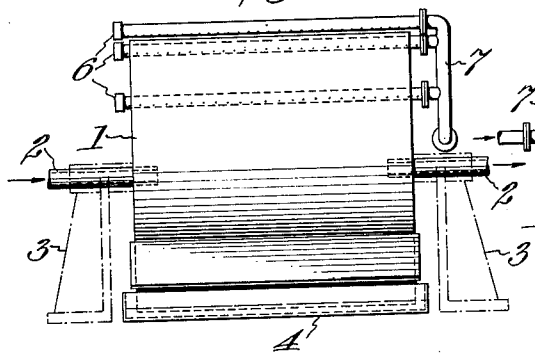


Fig. 2.

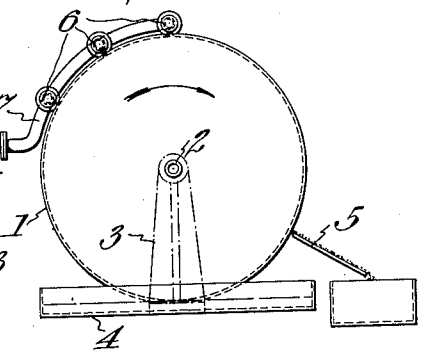


Fig. 3.

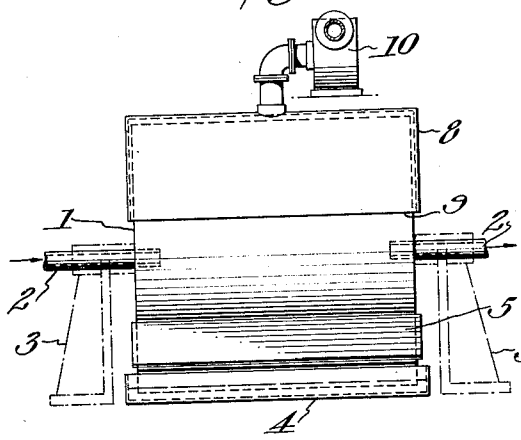
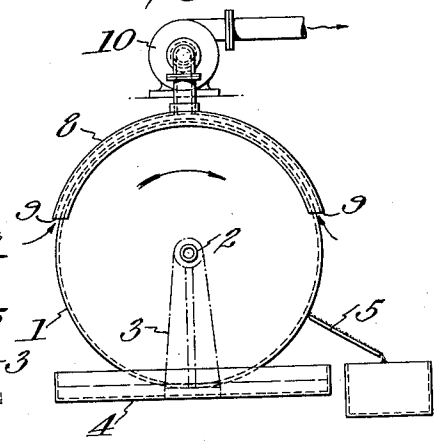


Fig. 4.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR FLAKING MOLTEN SOLIDS

Application filed March 5, 1928. Serial No. 259,357.

The present invention relates to apparatus for producing solid materials in the form of flakes, and particularly to drum flakers wherein the film of material being flaked is subjected to bilateral cooling.

It has been proposed to congeal molten solid materials, such as, for example, caustic soda, soap, sodium sulfide, niter cake, normally solid aromatic hydrocarbons and the like, by means of a rotating drum mounted to rotate with a small portion of its peripheral surface dipping into the molten material, and to scrape the resulting coating of congealed material from the periphery of the drum in the form of flakes. The flaked product possesses the advantages of being homogeneous in composition and, because of its physical form (being in the form of thin, flat pieces of laminæ), of presenting a large surface to the action of a solvent. It is easy to handle, and can be readily packaged and removed from containers.

In order to expedite the production of flaked material and to increase the capacity of the flaking apparatus it has been further proposed to cool the flaking drum internally by circulating cooling fluids through the interior of the drum. This cooling is commonly effected with water, brine or the like.

I have now found that the flaking operation may be greatly expedited and some of its disadvantages overcome by submitting the exterior surface of the film of congealing material to the cooling action of a current of air in addition to the internal cooling of the drum.

This additional cooling of the external surface of the film ensures that this surface will be sufficiently hard when scraped off so that the flakes will not adhere to each other or clump together into lumps. It also facilitates the breaking of the film into uniform flat laminæ when it is scraped off.

This external cooling of the congealing film can be effected, for instance, by blowing a current of air through one or more perforated pipes arranged about the periphery of the drum parallel to its axis. The perforations in the pipes are directed toward the surface of the drum and the force of the air current is so regulated that the film of solid material, when scraped off, breaks up into uniform, substantially flat laminæ, which will not stick to each other or clump together.

Another method of cooling the film externally is to blow or suck a current of air over a more or less extended portion of the peripheral surface of the drum. This may advantageously be done by arranging a hood over the portion of the peripheral surface of the drum to be subjected to the cooling action of the current of air, and connecting this hood with means for creating an air current such as a fan.

The manner in which the present invention may be advantageously carried out is shown by way of example in the annexed illustrations of which:

Figs. 1 and 2 are a front and a side elevation, respectively, of one embodiment of the invention; and

Figs. 3 and 4 are a front and a side elevation, respectively, of a second embodiment of the invention.

In the figures the drum 1 is revolvably supported by hollow bearing shafts 2, resting on the brackets 3, in such a way that a small portion of the lower peripheral surface of the drum dips into the pan 4; containing molten material to be flaked. The solidified film is removed from the drum by the scraper 5. A cooling fluid, such as water, is circulated through the interior of the drum by means of the hollow bearing shafts 2, the fluid entering by one shaft and leaving by the other. If desired, the shaft through which the water enters may be constructed in such a manner that the entering cold water is directed to any portion of the periphery which it is advantageous to subject to the greatest cooling effect.

In Figs. 1 and 2 the external cooling is obtained by means of three perforated pipes 6, connected by a common header 7 to a source of air under pressure (not shown). The pipes may be advantageously $\frac{3}{8}$ inch in diameter and are perforated, for instance, with $\frac{5}{16}$ inch holes spaced 2 inches from center to center. The air issuing under pressure from the holes sprays the surface of the film of con-

gealing material, and aids in cooling the film and hardens its external surface. The expansion of the air issuing from the perforations tends to lower the temperature of the air and to increase its cooling effect.

Another means of effecting the external cooling of the film is illustrated by Figs. 3 and 4. A hood is arranged over a portion of the surface of the drum. The hood is preferably constructed so that it comes into rubbing contact with the lateral sides of the drum so that no passage is left for the air, and apertures 9 are left across the periphery of the drum for the entrance or exit of the air current. The hood is connected with a fan or other means for sucking or blowing air.

It will be apparent that the present invention comprises a novel apparatus for the production of solid materials in the form of flakes, and comprises a flaking drum having in combination therewith means for positively cooling both the inner and outer surfaces of the congealing film of material, and especially a flaking drum in combination with means for subjecting the interior of the drum to the cooling action of a cooling fluid such as water and means for subjecting the exterior periphery of the drum to the cooling action of a current of air or other gaseous medium.

I claim:

An apparatus for flaking molten solids, comprising a rotatable drum, means for depositing a coating of molten solid on the peripheral surface of said drum, means for subjecting the interior of the drum to the action of a cooling fluid, means for subjecting the external surface of said coating to the cooling action of a current of air, said means comprising a plurality of pipes extending parallel to the axis of said drum, in the vicinity of the peripheral surface thereof, and perforated adjacent to said surface, and means associated with said drum for removing the congealed coating therefrom.

In testimony whereof, I affix my signature.

JOHN C. BOERTLEIN.