The present invention relates to improvements in rotating sintering apparatus of the kind in which the grate is in the form of a truncated cone which rotates about an inclined axis. An apparatus of this kind is described in U. S. Patent No. 2,193,988.

According to the said patent the cone opens downward and the material is placed on the exterior surface of the grate in the upper, approximately horizontal portion thereof and is removed in its lower portion where the grate surface is steeper or approximately vertical.

According to the present invention an improvement may be obtained especially in larger apparatus by arranging the truncated cone inversely, i.e. opening upward with the interior surface thereof as the grate surface, the material being supplied in the lower and removed in the upper portion. With this arrangement a substantially better utilization of the space may be obtained as the distributing and mixing device will wholly or in part be located within the vertical extent of the sintering apparatus, and as the material is removed at a higher level than that at which it is supplied, it is possible to use considerably smaller lifting devices for the sintered material when part of the same has to pass through the mixing and distributing device anew in order to be returned to the grate.

For the rest the construction of the grate itself and the grate bars may in all substantial respects be as specified in the above mentioned patent. But as in the present case the outer ends of the bars attain the highest level during rotation, it is recommended, if the grate bars are constituted by tubes which connect annular inlet and outlet chambers for cooling liquid, to provide the supply chamber at the inner and the outlet chamber at the outer end of the grate bars, so that also in this case the cooling liquid can always flow away at the top.

A further improvement in connection with tubular liquid-cooled grate bars consists in forming the same with obtuse angular bends at each end, the bent portions running in a radial direction at the inner end and in a direction parallel to the axis of the grate at the outer end, as a result the bars give away for heat stresses so that it is unnecessary to use special devices such as stuffing boxes etc. in order to permit heat expansion of the tubes, and at the same time conical walls for the annular inlet and outlet chambers may be dispensed with.

The apparatus is illustrated partly in axial cross section in the diagrammatic drawing.

The rotating apparatus forms an annular space 1, the cross section of which is substantially in the form of a rectangle, one corner of which is cut away at the grate bars in such a manner that the grate forms a truncated cone opening upwards and with its axis arranged at an angle of 45° to the horizontal plane in the case illustrated. The apparatus is supported by a frame 3 of section iron attached on a cast iron ring 4. This ring is provided at the periphery and at the under side with rolling surfaces with which it runs on rollers 5 and 6 respectively, provided on brackets distributed in a suitable number around the apparatus. Further it has on the periphery a toothed rim 7, which is engaged by a driving device, not shown, for the rotation of the apparatus.

8 indicates diagrammatically a distributing device from which the material is delivered to the grate in the lower approximately horizontal portion thereof. Then during the rotation of the grate it passes under a suitable heating device, and the sintering proceeds at the same time as the grate moves the material upward. In the upper portion of the apparatus the sintered material is removed from the grate for example by a rotating jagged roll and is carried away, for example through a throwing channel 9 or the like.

It is not necessary that the supply takes place exactly at the lowestmost and the removal of the material exactly at the uppermost portion of the grate; thus it may often be convenient to use a greater fraction of a revolution for the sintering by supplying the material somewhat ahead of the lowermost point and removing it somewhat behind the uppermost point.

In a similar manner to that described in U. S. Patent No. 2,193,988 the grate may downward draught, and the angular space 1 may be provided with radial dividing walls which are each provided with a man-hole 10 and from which the air proceeds through radial tubes 11. Hence the air passes through chambers 12 to a stationary suction head 13 and dust separator 14 and further to a conduit 15 with fan. The tubes 11 have branches 16 in which material which may be entrained from the grate can accumulate and fall down into a sluice 18 through controlled valves 17. Dust which falls down from the suction head 13 and from the dust separator 14 accumulates in sluices 19 and 20 respectively. In the suction head 13 the rotating apparatus is guided by a central tube 31. By making the chambers 12 communicate with the suction head 13 only during a fraction of the revolution or by
using suitable valves (or the like), it may be arranged that only that part of the grate on which the sintering takes place is subjected to suction, and if desired also that the suction is more intense during the first part of the sintering where the material affords the greatest resistance to the current of air.

Cooling liquid, for example water, is supplied to the rotating apparatus centrally from the under side by a conduit 21 from a stationary conduit 22 through stuffing box 23 and passes through radial conduits 24 to an annular channel 25 provided at the inner ends of the grate bars 2. These bars are tubular and conduct the cooling liquid further to an annular channel 26 provided at their outer ends. The grate bars 2 are formed with obtuse angular bends at each end, the bent portion running in a radial direction at the inner end and in a direction parallel to the axis of the grate at the outer ends so that the adjacent walls of the channel 25 and of the channel 26 may be made cylindrical and plane respectively, and the tubes can yield to heat stresses.

On both sides the grate is flanked by cast iron rims 27 and 28 adjacent to the channels 25 and 26 respectively at a small distance in order to avoid unnecessary cooling of the material. From the periphery of the channel 26 suitably spaced bent tubes 29 project, which may be provided with control valves which are open only when the tubes in question are traversing the uppermost portion of their course from which the water escapes through a tubular channel 30, which is traversed by the tubes 29.

1 claim:

1. Sintering apparatus comprising a grate in the form of a truncated cone which rotates about its axis which is arranged obliquely to a horizontal plane, characterized by the fact that the truncated cone is arranged with its larger opening upward, the inner surface thereof forming the grate surface, means for supplying the material at the lower portion and means for removing material from the upper portion thereof.

2. Sintering apparatus according to claim 1, having tubular grate bars which connect annular inlet and outlet chambers for a cooling liquid, characterized by the fact that an inlet chamber is provided at the inner of the grate bars and an outlet chamber is provided at the outer end of the grate bars.

3. Sintering apparatus comprising a grate in the form of a truncated cone which rotates about its axis which is arranged obliquely and having tubular grate bars which connect annular inlet and outlet chambers for a cooling liquid, characterized by the fact that the grate bars are formed with obtuse angular bends at each end, the bent portion running in a radial direction at the inner end and in a direction parallel to the axis of the grate at the outer end.

OLE ROLFSEN.

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