June 9, 1953 N. F. FONER 2,641,064

ROTARY COOLING APPARATUS

Filed Dec. 26, 1951 2 Sheets-Sheet 1

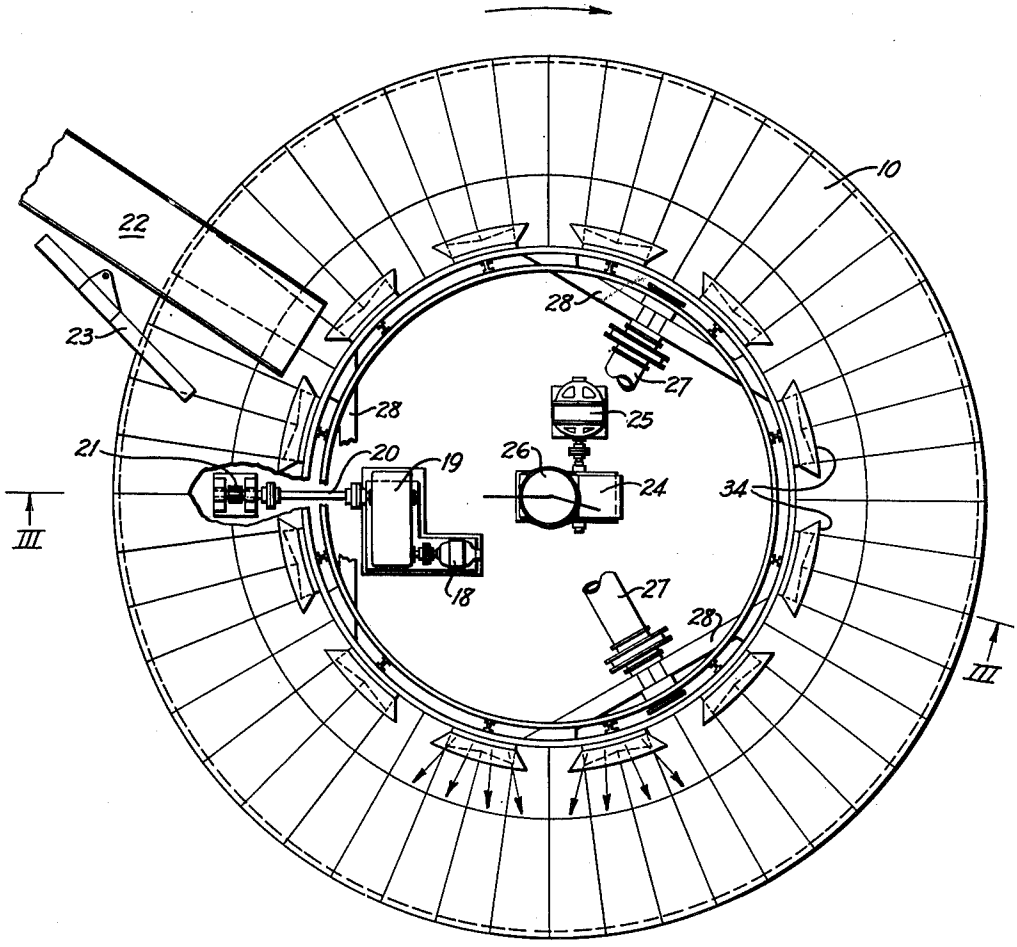


Fig. 1

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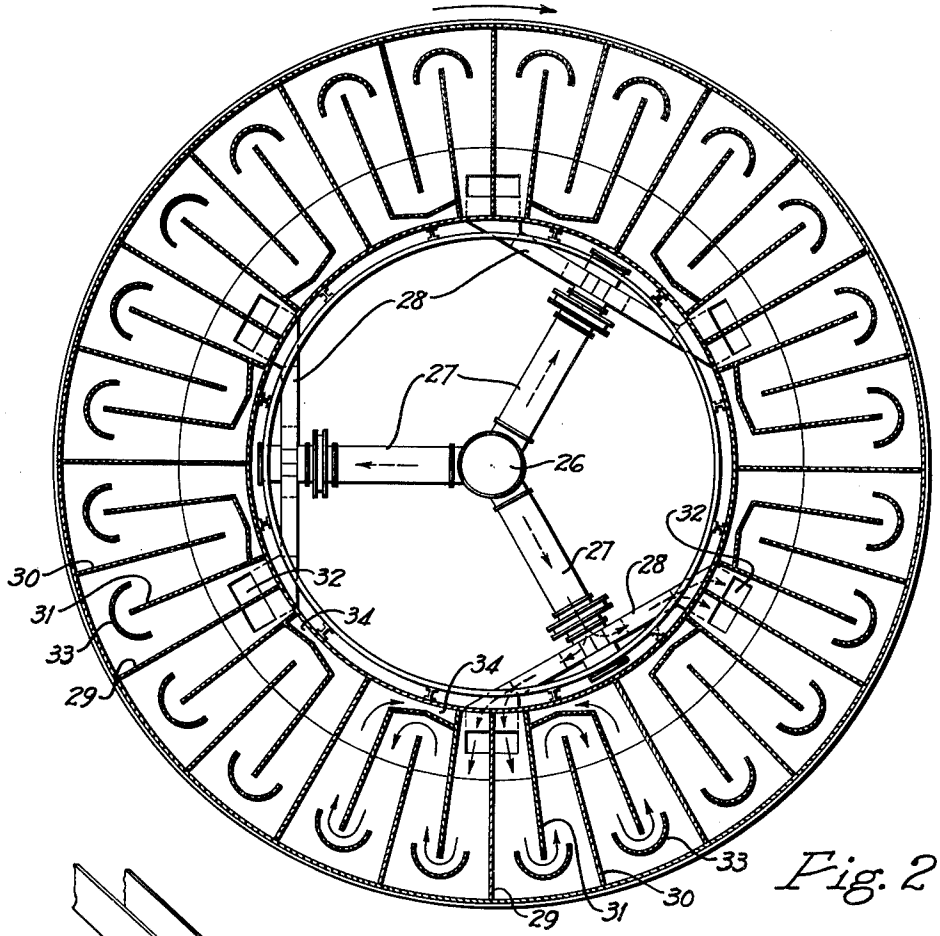


Fig. 2

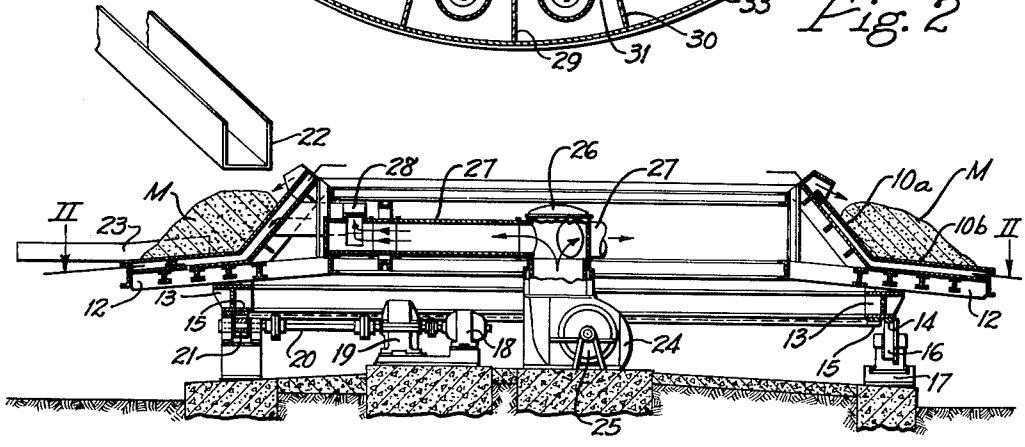


Fig. 3

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ROTARY COOLING APPARATUS

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4 Claims. (Cl. 34—185)

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This invention relates to improvements in rotary cooling apparatus, such as are used for cooling sintered materials and the like.

An object of the invention is to provide an improved rotary cooling apparatus which has means for circulating air around the mass of material cooling thereon, thereby furnishing more effective heat extraction.

A further object is to provide an improved rotary cooling apparatus which has sloping support means for the mass of material, thereby promoting uniformity of cooling and facilitating discharge of the cooled mass.

A further object is to provide an improved rotary cooling apparatus in which the rotary element adapted to carry the mass of material is supported directly beneath the load carrying portion.

In accomplishing these and other objects of the invention, I have provided improved details of structure, a single form of which is shown in the accompanying drawings, in which:

Figure 1 is a top plan view with parts broken away of an improved rotary cooling apparatus embodying features of the present invention;

Figure 2 is a horizontal sectional view of the apparatus, taken on line II—II of Figure 3; and

Figure 3 is a vertical sectional view taken substantially on line III—III of Figure 1.

The apparatus comprises an annular table 10 which has a rather steeply sloping inner portion 10*a* and a less steeply sloping outer portion 10*b*, both of which slope outwardly from the center. The table has double walls, between which are mounted a system of partitions and baffles hereinafter described. Beneath said walls the table has a framework 12 and a sub-framework 13 (Figure 3). The underside of the latter carries a track 14 and a ring gear 15 which encircle the bottom of the table. Track 14 rides on and is supported by a series of rollers 16 which are mounted on fixed pedestals 17. Thus the supporting means is situated directly under the load supporting portion of the table. The apparatus has a drive motor 18, speed reducing gears 19, a line shaft 20, and a pinion 21 which meshes with ring gear 15 for rotating the table (Figures 1 and 3).

Hot material M, such as sinter, which is to be cooled is fed to the table from a chute 22 and subsequently is removed by a scraper or plow 23. In the present example rotation of the table is clockwise as viewed from above, although it is apparent that rotation could be the other way if the positions of the chute and scraper were

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reversed. The material remains on the table for about 330° of its rotation. The sloping top of the table furnishes ample support for the material and yet enables it to be removed by a simple scraper as illustrated. The arrangement also promotes cooling by furnishing maximum exposure of the material to the surrounding atmosphere.

A blower 24 and a drive motor 25 therefor are situated within the open central region of table 10. Said blower discharges air into a swivel duct 26 which is concentric with the table (Figure 2). A plurality of radial ducts 27, in this instance three, extend from duct 26 and are connected to transverse ducts 28 on the table. The space between the double walls of the table contains radial partitions 29 that extend the full width and thus divide this space into separate cooling compartments, in this instance twelve in number. Each cooling compartment is shown as containing a baffle 30 which extends inwardly from the outer circumference of the table and a pair of baffles 31 which extend outwardly from adjacent the inner circumference and thus define a sinuous path, although obviously the exact baffle arrangement can vary. Each of the transverse ducts 28 has at its ends inlet fittings 32 leading to two of the cooling compartments. To assist the air flow through the compartments, the table can be equipped with arcuate baffles 33 spaced from the ends of the baffles 31.

The mid-portion of each cooling compartment has an outlet fitting 34. These fittings are situated adjacent the inner circumference of the table at the top of the steeply sloping inner portion 10*a*. They direct air downwardly over the top of the mass of material M.

In operation, the table 10 is rotated at a relatively slow speed by the drive motor 18 through the associated shafts and gearing. Material M is fed continuously to the table through chute 22 and subsequently removed by scraper 23. The table is supported on rollers 16 which are situated directly beneath the mass of material. The blower 24 continuously blows air for cooling the material through ducts 26, 27 and 28 and inlets 32 into the cooling compartments defined by the double walls of the table and the partitions 29. Within the compartments this air travels through the sinuous course which baffles 30 and 31 define and thus extracts heat from the underside of the material. The air discharges through the outlet fittings 34 and thus further extracts heat from the top of the material. The material is

effectively cooled by the time it reaches the scraper 23.

While I have shown and described only a single embodiment of the invention, it is apparent that modifications may arise. Therefore, I do not wish to be limited to the disclosure set forth but only by the scope of the appended claims.

I claim:

1. A rotary cooling apparatus comprising an annular double-walled sloping table adapted to support a mass of material for cooling, means rotatably supporting said table, drive means for rotating said table, a system of partitions and baffles between the double walls of said table defining air courses having inlets and outlets, a swivel duct concentric with said table, ducts connecting said swivel duct with the inlets to said air courses, and means for supplying air to said swivel duct, the outlets from said air courses being situated adjacent the inner circumference of said table and arranged to direct the air downwardly over the table top.

2. An apparatus as defined in claim 1 in which said partitions divide the space between the double walls of the table into a plurality of separate cooling compartments and said baffles define air courses within said compartments.

3. A rotary cooling apparatus comprising a double-walled table adapted to support a mass of material for cooling, means rotatably supporting said table, drive means for rotating said table, a system of partitions and baffles between the double walls of said table defining air courses, inlets and outlets connected to said air courses, and means for supplying air to the inlets of said air courses, the outlets from said air courses being situated above the top of said table and directed downwardly to discharge air against material supported on said table.

4. A rotary cooling apparatus comprising an annular double-walled table having a steeply sloping inner portion and a less steeply sloping outer portion, means for feeding material to be cooled to the top of said table, a scraper spaced from said feeding means for removing the material from the table, means rotatably supporting said table directly under the portion which supports the material, drive means for rotating said table, partitions between the double walls of said tabe dividing the space therebetween into a plurality of compartments, baffles in said compartments defining sinuous air courses having inlets and outlets, a swivel duct concentric with said table, ducts connecting said swivel duct with the inlets to said air courses, and means for supplying air to said swivel duct, the outlets from said air courses being situated adjacent the inner circumference of said table and being adapted to direct air downwardly over the table top.

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