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F. RAITHEL.

GYPSUM BURNING KILN.

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Fig. 1.

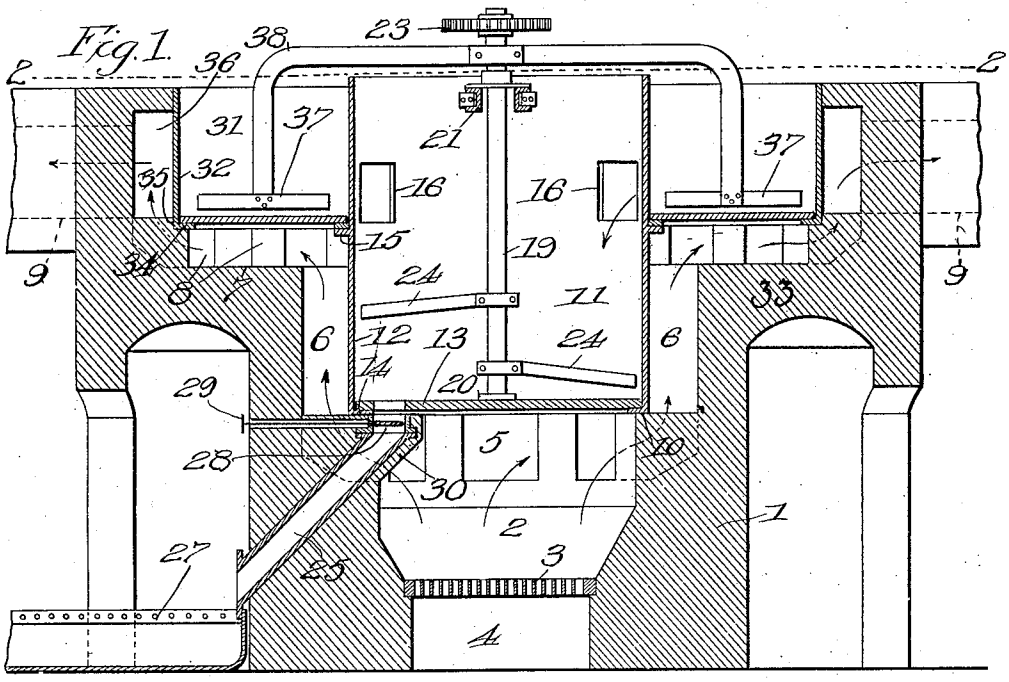
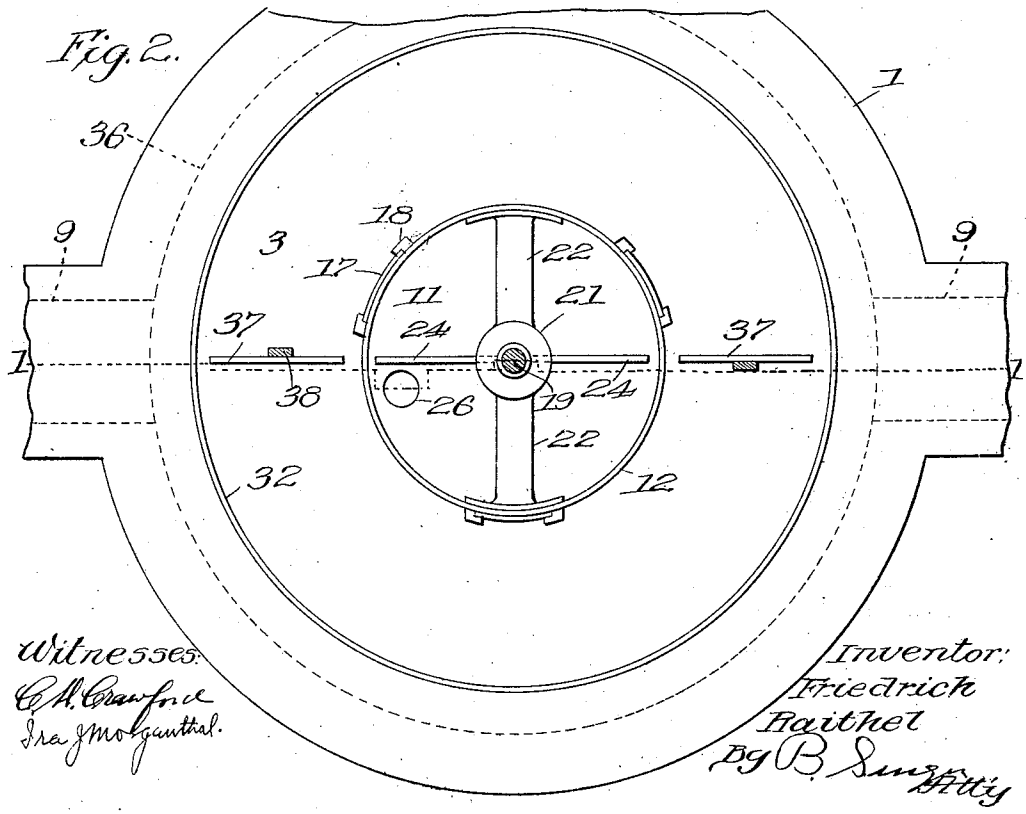


Fig. 2.



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GYPSUM-BURNING KILN.

No. 852,616. Specification of Letters Patent. Patented May 7, 1907.

Application filed December 15, 1906. Serial No. 347,974.

To all whom it may concern:

Be it known that I, FRIEDRICH RAITHEL, a subject of the Emperor of Germany, residing at Windsheim, Bavaria, Germany, have invented new and useful Improvements in Gypsum-Burning Kilns, of which the following is a specification.

This invention relates to improvements in gypsum burning kilns and has to do with that class of kilns which comprise a plurality of heating receptacles for progressively heating the material or in other words gradually bringing it up to the desired temperature.

The invention consists broadly in the provision of preliminary and final heating receptacles, the former being laterally disposed or adapted to surround the latter, and in the further provision of a furnace structure or other means for supplying a heating medium whereby the products of combustion are caused to play upon the receptacles progressively.

The invention will be more fully described in connection with the accompanying drawing and will be more fully and particularly pointed out and ascertained in and by the appended claims.

In the drawing:—Figure 1 is a sectional view taken on line 1—1 of Fig. 2 of a kiln embodying the main features of my invention. Fig. 2 is a sectional view on line 2—2 of Fig. 1.

Like characters of reference designate similar parts throughout the different figures of the drawing.

As shown in the drawing a furnace structure is indicated as a whole by the numeral 1 and is provided with a fire-box 2 having a grate 3 which delivers to a suitable ash-pit 4. The products of combustion are conveyed from the fire box 2 in horizontal and vertical directions by a plurality of flues 5 and 6 preferably formed in the furnace structure. The flues 6 terminate at their upper ends and deliver to a combustion or heating chamber 7 from which the products of combustion are conveyed by flues 8 to main outlets 9 preferably located at diametrically opposite points of the furnace structure.

At 10 the furnace structure is enlarged laterally to form a support and to receive a final heating receptacle indicated as a whole by 11, the lower wall of which receptacle is located directly above the firebox in a manner to afford a highly efficient and advantageous use of the products of combustion upon said wall. As shown in the drawing said receptacle is so disposed that it may derive the greatest possible benefit from the fire-box and be heated and maintained at the required temperature by a minimum use of fuel. In the preferred construction the receptacle 11 is composed of a main body portion 12 preferably cylindrical in form and is provided with a removable bottom wall 13. Flanges 14 at the lower extremity of said body portion 12 serve as a support for said bottom wall and flanges 15 serve as a support for a preliminary heating receptacle hereinafter described. 16 designates openings in the body portion 12 suitably provided with closures 17 which as shown operate in guides 18.

Any desired form of closure may of course be substituted for the type shown as the particular construction thereof does not constitute a feature of the invention. Said openings 16 are preferably so located that their lower margins are substantially flush with the bottom of the preliminary receptacle hereinafter referred to to permit the contents of the latter to be discharged through said openings into the final receptacle.

Suitable stirring or agitating apparatus is provided for the final heating receptacle which as shown consists of a vertically disposed shaft 19 having a bearing at 20 in the bottom wall 13 and a bearing 21 near its upper end. If desired said bearing 21 may be anchored in place by arms or brackets 22 secured to the body portion 12 of the final receptacle as shown. A gear pinion 23 or equivalent means may be disposed upon the upper end of the shaft and operatively connected with a suitable source of power to afford requisite movement or rotation for paddles or agitators 24. A suitable outlet for the final heating receptacle is shown in the form of a pipe 25 leading from an opening 26 in the bottom wall 13 through a portion of the furnace structure 1 to a suitable receiver 27. A gate valve 28 adapted to be operated by a handle 29 may be employed for opening and closing the outlet 25. As shown in the accompanying drawing the outlet 25 projects into the fire-box 2 and is provided with a suitable covering or jacket 30 to protect the pipe forming the outlet 25 from direct contact with the products of combustion.

The foregoing structure is very advantageous inasmuch as it prevents clogging of the

cooled product at points adjacent the valve 28. This feature avoids the necessity of inserting an implement and cleaning the outlet adjacent the valve subsequent to cooling of the kiln for purposes of repairs and other causes. It will be noted that the body portion 12 of the final heating receptacle forms the inner wall of the flues 6 while the bottom 13 forms the upper wall of the firebox 2 this construction rendering all parts of the furnace structure readily accessible upon removal of the receptacle.

A preliminary heating receptacle is provided which is preferably located laterally of the final receptacle and may as shown surround the latter. Said preliminary receptacle which is indicated as a whole by the numeral 31 is composed of an outer wall 32 preferably cylindrical in form and a bottom wall 33 adapted to be supported upon the flange 15 and a flange 34 formed as shown integral with the wall 32. The outer wall 32 seats in and is supported upon the furnace structure 1 by a recessed portion 35. The bottom wall 33 constitutes as shown the top wall of the heating chamber 7 and the outer wall 32 of the preliminary receptacle constitutes the inner wall of an outlet passage 36 which may if desired extend completely around the receptacle 31 in order to expose the same more efficiently to the products of combustion delivered by flues 8. As shown the inner wall of the receptacle 31 is formed by the main body portion 12 of the final heating receptacle. In order to obtain requisite agitation of the contents of the preliminary receptacle 31 agitators 37 are provided and if desired said agitators may be connected by arms 38 with the shaft 19 and be operated in unison with the agitators of the final receptacle.

The products of combustion discharging from the fire-box play effectively upon the bottom wall of the final receptacle and by means of flues 6 engage the side wall portions thereof a distance equal to the depth of the normal containing capacity of said final receptacle from which construction it will be seen that all of the area of the final receptacle is subjected to the action of the products of combustion on all sides and is a sufficient distance vertically to act upon the contents in a very efficient manner. After the products of combustion have expended a certain amount of their heat units upon the final receptacle they are directed upon the entire area of the bottom wall of the preliminary receptacle by means of the heating chamber 7. Said products are thence directed to the passage 36 wherein they are brought into contact with substantially the entire area of the wall 32 or to a sufficient extent to engage said wall 32 at its upper points in a manner to come in contact therewith at heights equal to the normal containing capacity of said receptacle. After the contents of the preliminary receptacle have been brought to the desired temperature the closures 17 are opened and the contents are discharged by gravity and also by the aid of agitators 37 into the final receptacle 11.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. A gypsum burning-kiln, characterized by the kiln being constituted by two heaters, of which the main heater arranged directly over the combustion chamber is deeper than the other or auxiliary heater and passes through the latter in such manner that the auxiliary heater with which the escaping combustion gases come into contact, forms an annular chamber round the main heater.

2. A gypsum burning kiln comprising in combination, a furnace having a centrally disposed fire-box, a final heating receptacle disposed above said fire-box, a circular preliminary heating receptacle surrounding said first mentioned receptacle, means for subjecting the preliminary receptacle to the products of combustion of the furnace, and means permitting the contents of said preliminary receptacle to discharge into said final receptacle.

3. A gypsum burning kiln comprising in combination, a furnace having a centrally disposed fire-box, a final heating receptacle disposed above said fire-box, a circular preliminary heating receptacle surrounding said first mentioned receptacle and disposed above the bottom of said first mentioned receptacle, means for subjecting the preliminary receptacle to the products of combustion of the furnace, and means permitting the contents of said preliminary receptacle to discharge into said final receptacle.

4. A gypsum burning kiln comprising in combination, a furnace having a centrally disposed fire-box, a final heating receptacle disposed above said fire-box, a circular preliminary heating receptacle surrounding said first mentioned receptacle and disposed above the bottom of said first mentioned receptacle, and means for subjecting the preliminary receptacle to the products of combustion of the furnace.

5. A gypsum burning kiln comprising in combination, a furnace, a final heating receptacle disposed above the same, and a preliminary heating receptacle surrounding said final receptacle.

6. A gypsum burning kiln comprising in combination, a furnace, a final heating receptacle disposed above the same, and a preliminary heating receptacle surrounding said final receptacle and elevated with respect to the bottom thereof.

7. A gypsum burning kiln comprising in combination, a furnace, a final heating recep-

tacle disposed above the same, a preliminary heating receptacle surrounding said final receptacle and elevated with respect to the bottom thereof, and means permitting the contents of said preliminary receptacle to discharge into said final receptacle.

8. A gypsum burning kiln comprising in combination, a final heating receptacle, a preliminary receptacle surrounding said final receptacle, and means for heating said receptacles.

In testimony whereof I affix my signature in presence of two witnesses.

FRIEDRICH RAITHEL.

Witnesses:
HEINRICH FIETH,
WILHELM WERNER.