W. E. SNYDER.

PROCESS OF AND APPARATUS FOR BURNING CEMENTS.

APPLICATION FILED MAY 25, 1920.

1,381,026. Patented June 7, 1921.

2 SHEETS—SHEET 1.

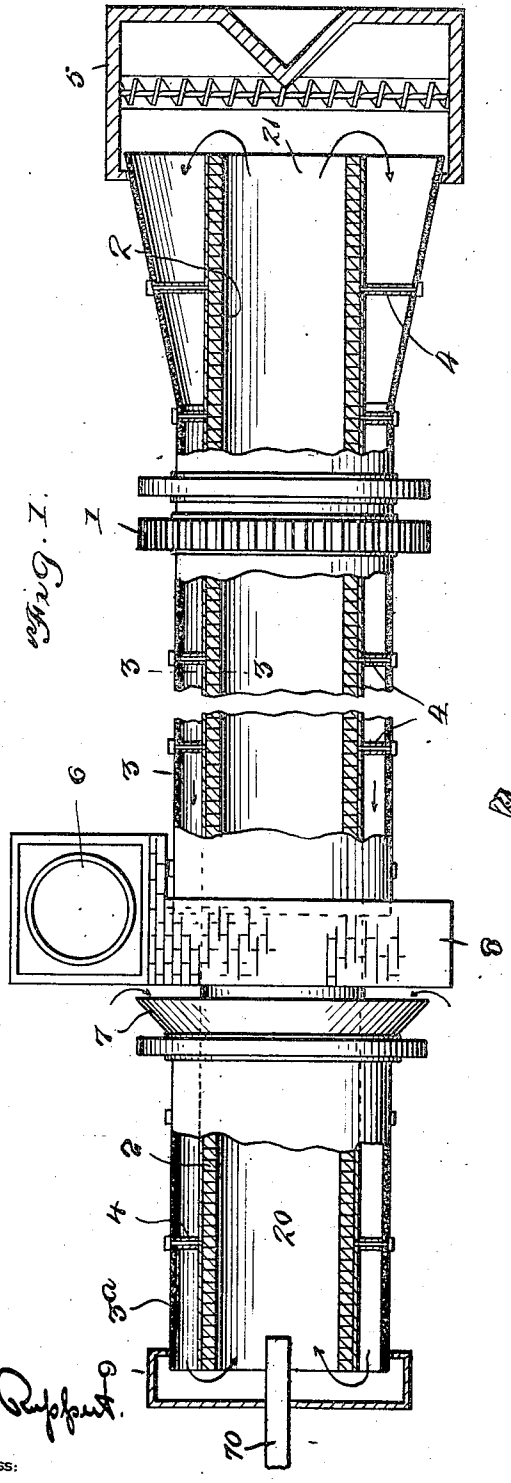

Fig. 1.

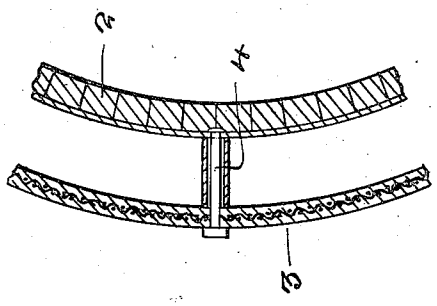

Fig. 2.

E. R. Ruppert.

WITNESS:

W. E. Snyder

INVENTOR

BY Victor J. Evans

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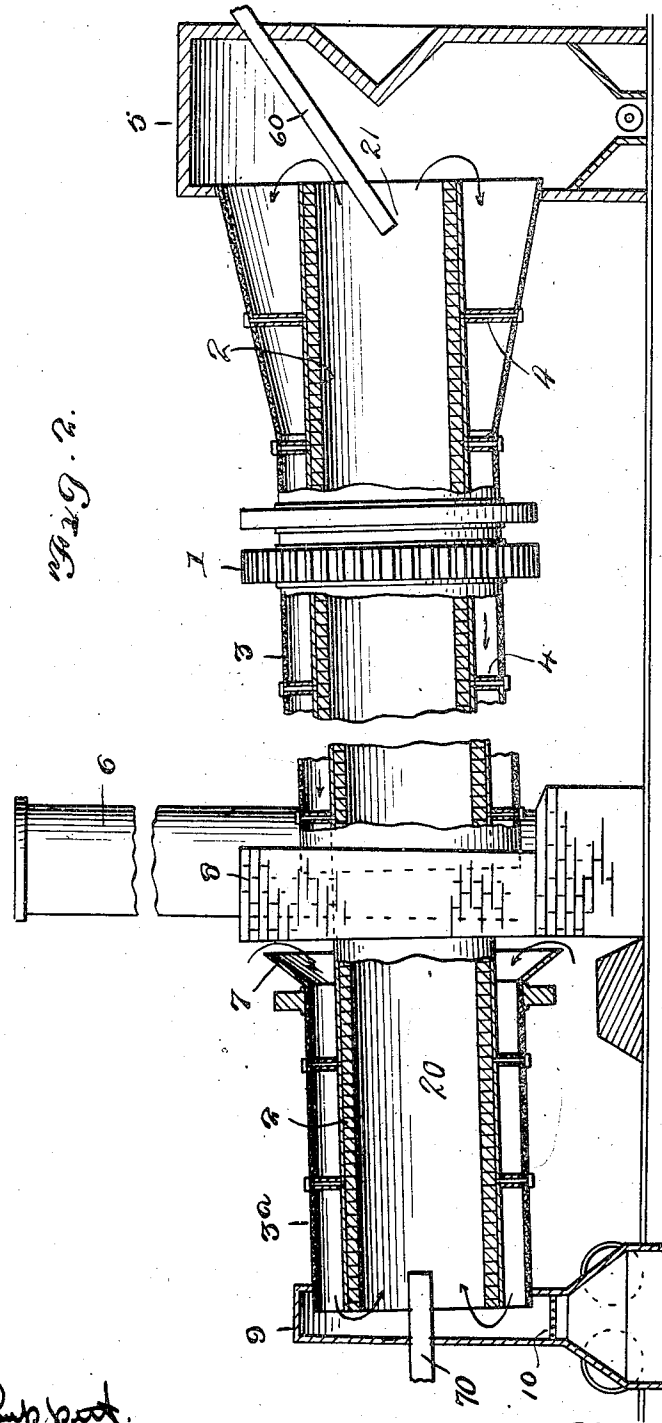

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UNITED STATES PATENT OFFICE.

WILLOUGHBY ELWOOD SNYDER, OF ALLENTOWN, PENNSYLVANIA.

PROCESS OF AND APPARATUS FOR BURNING CEMENTS.

1,381,026. Specification of Letters Patent. Patented June 7, 1921.

Application filed May 25, 1920. Serial No. 384,055.

To all whom it may concern:

Be it known that I, WILLOUGHBY E. SNYDER, a citizen of the United States, residing at Allentown, in the county of Lehigh and State of Pennsylvania, have invented new and useful Improvements in Processes of and Apparatus for Burning Cements, of which the following is a specification.

One object of my present invention is the provision of a process of burning cements which is highly economical in the consumption of fuel inasmuch as it effectively averts the dissipation and waste of heat.

Another object is the provision of an efficient apparatus for carrying out the process.

To the attainment of the foregoing the invention consists in the improvement as hereinafter described and definitely claimed.

In the accompanying drawings, hereby made a part hereof:—

Figure 1 is a plan view, partly in section, of the apparatus.

Fig. 2 is a longitudinal vertical section of the apparatus, with some parts in elevation.

Fig. 3 is a vertical transverse section taken in the plane indicated by the line 3—3 of Fig. 1.

Similar numerals of reference designate corresponding parts in all of the views of the drawings.

In the apparatus illustrated I utilize a rotary kiln that is adapted to be turned about its axis through the medium of power applied to the exterior gear 1, or in any other manner compatible with the purpose of the invention. The said rotary kiln includes a lining 2 of fire brick or other appropriate refractory material, and a shell 3 surrounding and spaced from the lining 2, and appropriately braced as indicated by 4. The said shell 3 may be of any material suitable to its purpose though I prefer to form it of reticulated metal and an appropriate plastic covering therefor; the reticulated metal being securely fastened to the bracing means 4 which may be and preferably is metal frame work. The outer end of the rotary kiln described is disposed in a dust chamber 5 which may be and preferably is of the well known construction at present in general use though it may be of any other construction compatible with the purpose of my invention without affecting the same. In accordance with my invention the stack or uptake 6 is arranged adjacent to the opposite end of the rotary kiln. From this it follows that in the practice of my invention the kiln gases instead of passing into and directly up the stack or uptake will be reversed and carried in the direction indicated by the arrows in Figs. 1 and 2—*i. e.*, between the lining 2 and the shell or casing 3 and in the same direction as the travel of the feed. By virtue of this the kiln will be effectively insulated by hot gases, and because of the loss of velocity by the traveling gases a dust arresting effect will be brought about. It will also be appreciated that the shell or casing 3 will serve as a flue having the capacity of automatically cleaning itself because of the rotary action of the kiln.

The kiln is slightly inclined from the horizontal as is usual, and its lower portion is equipped with a shell 3^a which may be and preferably is of the same character as the before described shell or casing 3. The said supplemental shell or casing 3^a is spaced from the refractory lining 2 and is provided with a flared or funnel-shaped intake 7. This funnel-shaped intake 7 is disposed adjacent to my novel dust chamber 8, and at its end remote from the dust chamber 8 the supplemental shell or casing 3^a is arranged in a hood 9. Manifestly by reason of the construction and arrangement of the supplemental shell or casing 3^a the suction or draft will take air into the kiln at a point in close proximity to the novel dust chamber 8. At such point considerable heat is present due to the radiating action over and around the place of combustion indicated by 20 in Figs. 1 and 2, and in consequence an extremely hot volume of air—*i. e.*, preheated air, will be supplied to the intake 7 of the supplemental shell or casing 3^a. From the said point of intake the air will take the course indicated by arrows before being discharged with the gases to the uptake 6.

The hood 9 is provided with a discharge opening 10, and in order to effectively prevent the induction of cold air at the said opening 10 I provide in combination with the opening a tilting closure 10^x, equipped with a counter-weight 11 and adapted to open under a predetermined weight and discharge the contents of the hood, following which it is promptly closed of itself so as to preclude the entry of air at said point.

In accordance with practice well known in the art, raw cement material is fed by the usual means, indicated by 60 or any other means into the right hand end 21 of the kiln lining 2, and fuel is fed to the place of combustion 20 preferably under pressure through a pipe 70 extended longitudinally inward through the hood 9.

The kiln portion or lining 2 extends through the dust chamber 8 while the shell 3 has its inner end disposed in said dust chamber 7 as clearly shown in Figs. 1 and 2, the annular space between the shell 3 and the lining 2 being in communication with the interior of the chamber 2. Manifestly the kiln gases pass from the place of combustion 20 toward the raw-cement-receiving end 21 of the lining 2 and then in reverse direction between the lining 2 and the shell 3 to the dust chamber 8 from whence the gases pass to the uptake 6. It is essential that the uptake or stack 6 be arranged at one side of the vertical plane of the rotary kiln as clearly brought out in Fig. 1, and that the portion of the shell 3 nearest the stack travel downwardly, this to assure the discharge of the dust at the point most remote from the direct draft of the stock so that the dust will not be picked up and carried out with the gases.

It will be apparent from the foregoing that in the practice of my process and the operation of my apparatus there is no waste of fuel, as in the ordinary well known practice in which losses are due to heat extraction by the hot gases passing from the kiln into and directly up the stack. Moreover, by my process and in my apparatus there is no loss of heat by radiation or by the utilization of heat to preheat the inrush of air caused by the draft necessary to remove the gases.

Having described my invention, what I claim and desire to secure by Letters-Patent, is:—

1. The fuel economizing process described which consists in supplying preheated air, at an intermediate point in the length of a kiln, to a chamber about the kiln and which chamber is in communication with one end of the kiln, and conducting the gases discharged at the opposite end of the kiln through a chamber about the kiln, to a discharge located adjacent to the first-named point.

2. The fuel economizing process described which consists in supplying preheated air, at an intermediate point in the length of a kiln, to a chamber about the kiln and which chamber is in communication with one end of the kiln, and conducting the gases discharged at the opposite end of the kiln through a chamber about the kiln, to a discharge located adjacent to the first-named point; the kiln and chambers being rotated about a longitudinal axis.

3. The fuel economizing process described which consists in supplying preheated air, at an intermediate point in the length of a kiln, to a chamber about the kiln and which chamber is in communication with one end of the kiln, and conducting the gases discharged at the opposite end of the kiln through a chamber about the kiln, to a discharge located adjacent to the first-named point; the kiln and chambers being rotated about a longitudinal axis, and the ends of the kiln and the ends of the second-named chamber being located in hoods or chambers.

4. A kiln rotatable about its axis, hoods or chambers in which the ends of the kiln are disposed, and shells surrounding and spaced from the kiln and arranged with their outer ends in the hoods or chambers and their inner ends adjacent to each other; the inner end of one shell affording an inlet for heated air and the inner end of the other shell being in communication with a discharge conduit.

5. A kiln rotatable about its axis, hoods or chambers in which the ends of the kiln are disposed, shells surrounding and spaced from the kiln and arranged with their outer ends in the hoods or chambers and their inner ends adjacent to each other, the inner end of one shell affording an inlet for heated air and the inner end of the other shell being in communication with a discharge conduit, and one of the hoods or chambers being provided with normally closed, automatically closing means for the discharge of product.

In testimony whereof I affix my signature.

WILLOUGHBY ELWOOD SNYDER.