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T. A. EDISON.
CEMENT KILN.

Fig. 2

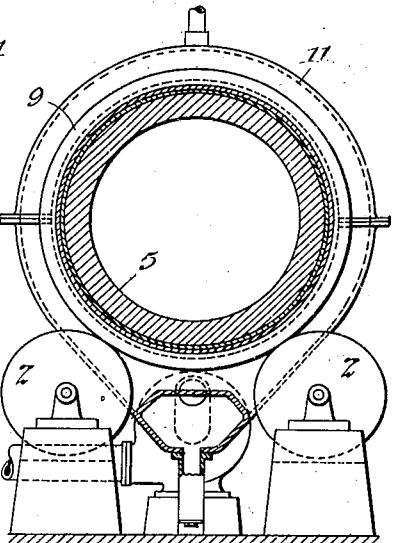
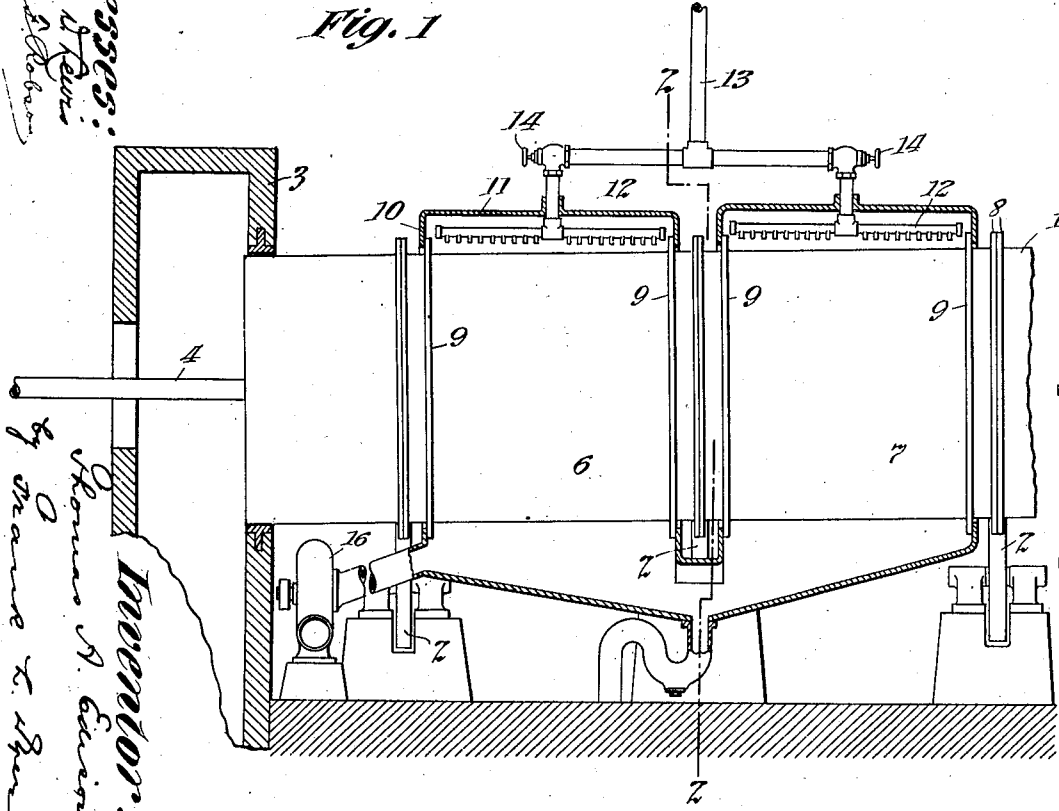


Fig. 1



Witnesses:
Hunt & Peck
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Att.

UNITED STATES PATENT OFFICE.

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CEMENT-KILN.

939,817.

Specification of Letters Patent.

Patented Nov. 9, 1909.

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To all whom it may concern:

Be it known that I, THOMAS ALVA EDISON, a citizen of the United States, residing at Llewellyn Park, Orange, in the county of Essex and State of New Jersey, have, invented certain new and useful Improvements in Cement-Kilns, of which the following is a description.

My invention relates to improvements in rotary cement kilns of the type burning powdered fuel and my object is to provide a kiln for the purpose in which very large amounts of material may be successfully burned.

In order to increase the output of clinker in a cement kiln, it is necessary to augment the quantity of fuel burned or to direct the flame upon the walls at a sharper angle than is now practiced, but to adopt either of these expedients would be objectionable under existing conditions as it would tend to burn out the kiln lining.

My improved kiln is substantially water-cooled at its hottest part so that it compares favorably with the blast furnace, permits very much greater quantities of fuel to be effectively burned, and the lining is in a measure self-regenerating like the lining of a blast furnace.

Broadly stated the invention comprises a rotary kiln in combination with devices for spraying water upon the outside of its lower portion where the heat is greatest, and one or more shields surrounding the cooled portion of the kiln so as to prevent the dissipation of steam within the kiln room. Preferably, the lower portion of the kiln, where the cooling effect takes place, is formed with one or more sections of cast-steel so as to effectively withstand the great differences of temperature encountered in practice.

In order that the invention may be better understood, attention is directed to the accompanying drawing forming part of this specification, and in which—

Figure 1 is a side elevation, partly in section, through the lower portion of the kiln, equipped with my improvements in their preferred form, and Fig. 2 is a section on line 2—2 of Fig. 1. In these views similar parts are represented by the same numerals of reference.

The kiln 1 is a long tubular structure as heretofore, maintained at a slight angle from the horizontal, mounted on supporting rollers 2—2, driven by suitable mechanism (not

shown), opening at its lower end within a stationary chamber 3, provided with a nozzle 4 for the injection of powdered fuel, and having a lining 5 of fire brick or similar refractory material. For its greater part the kiln is preferably formed of cast-iron sections but two of the sections, 6 and 7, shown in Fig. 1, within the clinkering zone, are formed preferably of cast-steel. All the sections are provided with flanges 8—8, by which the sections are bolted together and which form tracks for the supporting wheels 2. The sections 6 and 7 are each formed with two flanges 9—9, preferably cast thereon, and engaging the outside of these flanges are the flanges 10 of a casing 11 made of sheet metal. The joints between the flanges 9 and 10 fit as closely as practicable, say within a fraction of an inch, but exact tightness is not necessary, since as will be explained, a circulation of air is maintained inwardly through the joints from the outer atmosphere to the space between the casing 11 and the kiln itself.

Located within the casing 11 are perforated tubes 12—12, forming spraying devices which connect with the water supply pipe 13, having controlling valves 14—14 as shown. By means of these spraying devices a large quantity of water may always be distributed over the sections 6 and 7 of the kiln (which correspond with the hottest part thereof) and will flow off through an ordinary trap 15. The amount of water furnished to the kiln is preferably sufficiently great as to prevent the temperature of the water from rising materially above 175° Fahr., so that it may be used for feed water purposes with important economies. Connected with the casing 11 is an exhaustor or fan 16, maintaining circulation therein and drawing air, as explained, from the atmosphere into the casing through the joints formed between the flanges 9 and 10. By means of this exhaustor any steam which may be generated within the casing will be carried off so as not to be distributed into the atmosphere, as would otherwise be the case. By applying large quantities of water to the outside of the kiln, as explained, in the form of spray, the kiln will be effectively water-cooled, and the temperature of the kiln walls will be kept low enough to prevent the lining from being burned out, even if the flame be sharply impinged thereon. In fact, the construction is practically as effi-

cient as that of a modern blast furnace, and the lining is protected in practically the same way, since, although up to a certain point, the lining may be disintegrated by the heat, chemical action and mechanical attrition, yet, when that point is reached, its temperature will be low enough to permit a layer of the viscous material to congeal thereon and form a protective coating, which will very materially resist disintegration. When this protective coating is, in turn, worn out, it tends to be again replenished by the new deposit, so that the wearing away of the lining proceeds very slowly.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is as follows:

1. In cement burning apparatus, the combination with a rotary cement kiln formed of sections and having outwardly extending flanges near the ends of certain sections, of a stationary casing surrounding the kiln at one or more of said sections and having inwardly extending flanges cooperating with a loose fit with the kiln flanges, means located within the casing for spraying water upon the kiln, and means for leading off the water, substantially as described.

2. In cement burning apparatus, the combination with a rotary cement kiln formed of sections and having outwardly extending flanges near the ends of certain sections, of a stationary casing surrounding the kiln at

one or more of said sections and having inwardly extending flanges cooperating with a loose fit with the kiln flanges, means located within the casing for spraying water upon the kiln, and means for causing the passage of air through the flanged joints into said casing, and means for leading off water, air and steam from said casing, substantially as described.

3. In cement burning apparatus, the combination with a rotary cement kiln formed with flanges, a casing surrounding the kiln and having flanges cooperating with those of the kiln, spraying devices located within the casing for spraying water upon the kiln, and an exhaustor or fan connected with the casing, substantially as and for the purposes set forth.

4. In cement burning apparatus, the combination with a rotary cement kiln formed with flanges, a casing surrounding the kiln and having flanges cooperating with those of the kiln, spraying devices located within the casing for spraying water upon the kiln, and a trap connected with the lower end of the casing for carrying off water therefrom, substantially as and for the purposes set forth.

This specification signed and witnessed this 8th day of February 1907.

THOS. A. EDISON.

Witnesses:

FRANK L. DYER,
FRANK D. LEWIS.