

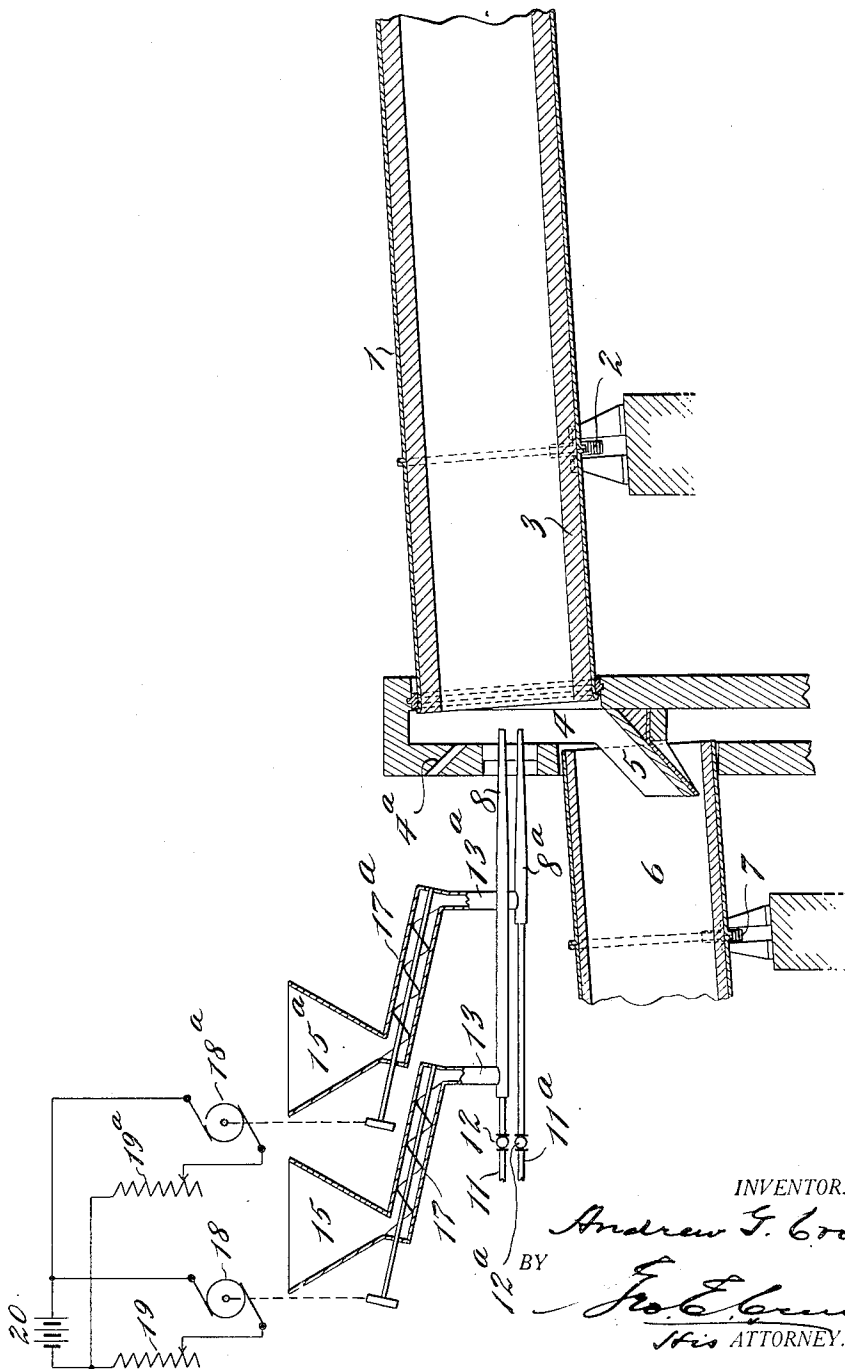
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CEMENT FURNACE

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INVENTOR.

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UNITED STATES PATENT OFFICE.

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CEMENT FURNACE.

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To all whom it may concern:

Be it known that I, ANDREW G. CROLL, a citizen of the United States, residing in Allentown, county of Lehigh, and State of Pennsylvania, have invented certain new and useful Improvements in Cement Furnaces, of which the following is a specification.

My invention relates to cement furnaces, and has for an object the provision of improved means for supplying heat to such furnaces whereby the cost of operation may be materially reduced.

I will describe one form of furnace embodying my invention, and will then point out the novel features thereof in the annexed claims.

The accompanying drawing is a view showing in side elevation, partly sectioned, one form of furnace embodying my invention.

Referring to the drawing, the furnace comprises a rotary kiln 1 mounted on rollers 2 and provided with a lining 3 of suitable heat-resisting material such as fire brick. In accordance with usual practice, this kiln is slowly rotated by means not shown in the drawing. The exit or lower end of the kiln 1 opens into a combustion chamber 4 provided with a chute 5 by which the burned material is directed into a cooling cylinder 6 which is inclined as shown and is mounted on rollers 7 so that it may be rotated by mechanism not illustrated in the drawing.

Projecting into the combustion chamber 4 are two nozzles or burners 8 and 8^a, and opening into the rear ends of said burners are two pipes 11 and 11^a for supplying compressed air or steam thereto, said pipes being provided with hand valves 12 and 12^a respectively, for controlling the pressure at the will of the attendant. Leading into the burners 8 and 8^a are fuel pipes 13 and 13^a respectively, through which coal in pulverized or powdered form may be introduced into the burners so as to be blown by the compressed air or steam into chamber 4 and kiln 1. Coal is supplied to the fuel pipe 13 from a hopper 15 through a screw conveyer 17, driven by an electric motor 18, and coal is similarly supplied to fuel pipe 13^a from a hopper 15^a through a second screw conveyer 17^a driven by a second electric motor 18^a. The two motors 18 and 18^a are

supplied with current from a suitable source such as a battery 20, and the circuit for each motor includes a hand operated adjustable rheostat 19 or 19^a whereby the speed of each individual motor may be varied at will by the attendant.

The two hoppers 15 and 15^a are supplied with anthracite coal and bituminous coal respectively, so that anthracite coal is furnished to the upper burner 8 and bituminous coal is furnished to the lower burner 8^a.

The preferred method of operating a furnace embodying my invention is as follows:

To start the furnace, the attendant starts motor 18^a which operates the conveyer 17^a and so supplies bituminous coal to the lower burner 8^a, which coal is ignited in the usual way. As soon as this coal is thoroughly ignited, the attendant starts the other motor 18 which then operates conveyer 17 to supply anthracite coal to the upper burner 8. The burning bituminous coal ignites the anthracite coal, and, as soon as such ignition occurs, the speed of the motor 18^a may be reduced to reduce the rate of supply of bituminous coal to burner 8^a. The rheostats 19 and 19^a are then so adjusted as to secure the proper temperature and to produce clean and complete combustion without smoke or soot. The combustion chamber 4 is preferably provided with a peep hole 4^a to permit the attendant to observe the condition of the flames emitted by burners 8 and 8^a. I have found that the best results are secured by using approximately 40% of anthracite and 60% of bituminous coal, although this proportion may be radically varied under different conditions and in furnaces of different designs and proportions. It is necessary to supply only enough bituminous coal to keep the anthracite coal burning.

The most economical operation of a cement furnace is secured by burning anthracite coal, but it has heretofore been found impractical to use this kind of coal because ignition was too slow and the flame was obscured by the smoke which collected in front of the peep-hole 4^a due to the unburnt coal. By means of my invention, however, complete combustion of the anthracite coal is attained by the supply of a comparatively small amount of bituminous coal, and so the operation of the furnace is much more economical than when bituminous coal alone is

used. In case of emergency, it is, of course, possible to operate the furnace on either anthracite or bituminous coal alone.

Although I have herein shown and described only one form of furnace embodying my invention, it is understood that various changes and modifications may be made therein within the scope of the appended claims without departing from the spirit and scope of my invention.

Having thus described my invention, what I claim is:

1. The method of burning fuel for cement kilns and the like which consists in admitting into a common combustion zone from separate sources finely divided fuels mixed with air, such fuels comprising one of a higher degree of combustibility such as bituminous coal and another of a lower degree of combustibility such as anthracite coal; and continuing combustion by so proportioning the relative amounts of such fuels admitted to the combustion zone that there is a sufficient proportion amount of the

more inflammable material to maintain the combustion of the less inflammable material and sufficient of the less inflammable material to supply a substantial portion of the heat.

2. The method of burning fuel for cement kilns and the like which comprises admitting into a combustion zone from a jet, finely divided and relatively inflammable fuel such as bituminous coal admixed with air, igniting such fuel, heating the combustion zone with it, and thereafter admitting into the combustion zone from a jet positioned above such first-mentioned jet, finely divided fuel less inflammable than such first-mentioned fuel such as anthracite coal and reducing the amount of the first-mentioned fuel admitted, so that more of the less inflammable fuel is burned than the more inflammable fuel that is burned.

ANDREW G. CROLL.

Witnesses:

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