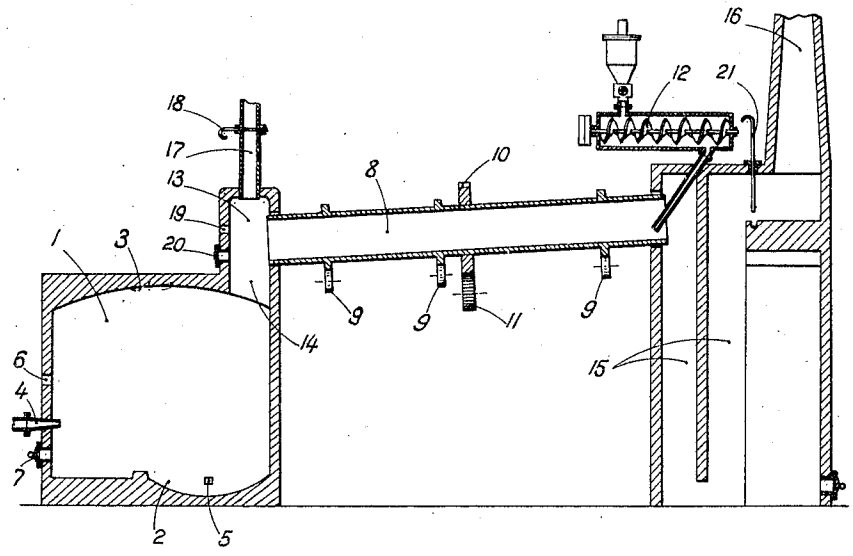
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APPARATUS FOR THE MANUFACTURE OF CEMENT BY FUSION

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# UNITED STATES PATENT OFFICE

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## APPARATUS FOR THE MANUFACTURE OF CEMENT BY FUSION

Application filed January 15, 1924, Serial No. 686,462, and in France September 29, 1923.

In my Patent No. 1,615,260, I have described a new process for the manufacture of cement by continuous fusion on the hearth of a reverberatory furnace heated by injection of a gaseous, liquid or pulverized fuel.

The subject of the present invention is an apparatus by means of which the said manufacture may be brought to the maximum efficiency. It is characterized in that the member intended for feeding in a permanent manner the fusion furnace properly so-called, which may be a reverberatory furnace as in the above mentioned patent application, is itself a continuous kiln heated by the products of combustion issuing from the main furnace and serving therefore at the same time to feed it and to recover heat from it. The combination of the furnace and kiln will work in particularly favourable conditions if the admission of the gases to the kiln is regulated so as to start in this kiln the chemical reactions and thus to prepare the working of the furnace which constitutes the laboratory properly so-called. Most frequently recourse has been had to a rotary kiln to be added to the reverberatory furnace.

The accompanying drawing shows by way of example and in diagrammatic vertical sections a form of the invention.

The numeral 1 indicates a reverberatory furnace with hearth 2 surmounted by an arch 3; 4 shows in section one of several tuyères for injection of the liquid or pulverized fuel combined with sufficient air to constitute either the whole or portion thereof necessary for supporting combustion. A tapping hole 5 located at a suitable height serves for running off the fused cement. Inspection holes 6 and a door 7 are provided so as to be able to follow the progress of the fusion.

8 is a rotary cement kiln of suitable length slightly inclined downwards towards the reverberatory furnace carried on rollers 9 and driven mechanically through its toothed ring 10 by a wheel 11. A mechanical distributor 12 ensures the regular and continuous feeding of the kiln with raw materials suitably measured and mixed. A chamber 13 of refractory material is placed above the passage 14 and constitutes the head of the kiln 8 through which the combustion gases enter the said kiln and then pass into the depositing chambers 15 under the action of the draught produced by the chimney 16 which discharges them into the atmosphere. According to circumstances a part of these hot gases may be taken off by the passage 17, by operating the damper 18, for the purpose of heating the air required for combustion in reheaters, not shown in the drawing. At the front part of the head 13 of the rotary furnace 8 there are arranged inspection holes 19 and a door 20 for the admission of cold air, if there is need for such, and through which it is possible to poke any unexpected clinker. The process of baking in the rotary kiln and of fusion on the hearth is regulated simultaneously by means of the damper 21, the admission of materials at 12 (such as limestone and bauxite, or lime and bauxite, suitably measured and mixed, when manufacturing aluminous cement), the output of the tuyère 4 and by means of the damper 18 as well as by the door 20.

It is self-evident that the head 13 of the kiln 8 may be separable therefrom so that it can be removed in order to facilitate access in case of stoppage or of repairs.

The essential advantage of this new apparatus is to ensure at every moment its continuous feeding of the fusion furnace 1 with a product brought to a fixed degree of preparation by a preliminary and regulated baking of the materials in such manner that clinkering may be avoided in the rotary kiln and that the fusion on the hearth may be instantaneous, as the cement in process of formation is discharged on to the hearth.

Consequently the production of the aggregate of the two furnaces is comparatively very high. Stoppages for incidents of baking are completely avoided and labour is reduced to its most simple expression.

It is to be understood that the above arrangement has only been described by way of example and that the scope of the invention will not be departed from by modifying

certain details so long as the essential characteristics are maintained.

Particularly the substitution may be proposed of any other continuous kiln for the rotary furnace which may serve to feed the main reverberatory furnace and which will be heated by the products escaping from this latter.

Claims:

1. An apparatus for the manufacture of cement, and more particularly of aluminous cement, including a reverberatory furnace provided with a hearth and a tuyère arranged to inject fuel in a substantially horizontal plane onto the said hearth, a preheating kiln adapted to receive hot gases from the furnace and having its lower end located directly above the furnace hearth, a kiln head in the upper portion of the furnace communicating with the lower end of said kiln, the discharge end of the kiln being sufficiently spaced from the hearth to cause the cement forming substances to fall substantially vertical into the furnace upon the hearth thereof and to be spread and fully exposed to the impinging action of the flames.

2. An apparatus for the manufacture of cement, and more particularly of aluminous cement, including a reverberatory furnace provided with a hearth and a tuyère arranged to inject fuel in a substantially horizontal plane onto the said hearth, a rotary inclined preheating kiln adapted to receive hot gases from the furnace and having its lower end located directly above the furnace hearth, a kiln head in the upper portion of the furnace communicating with the lower end of said kiln, the discharge end of the kiln being sufficiently spaced from the hearth to cause the cement forming substances to fall substantially vertical into the furnace upon the hearth thereof and to be spread and fully exposed to the impinging action of the flames.

In testimony whereof I hereunto affix my signature.

GEORGES DUMAS. [L. S.]