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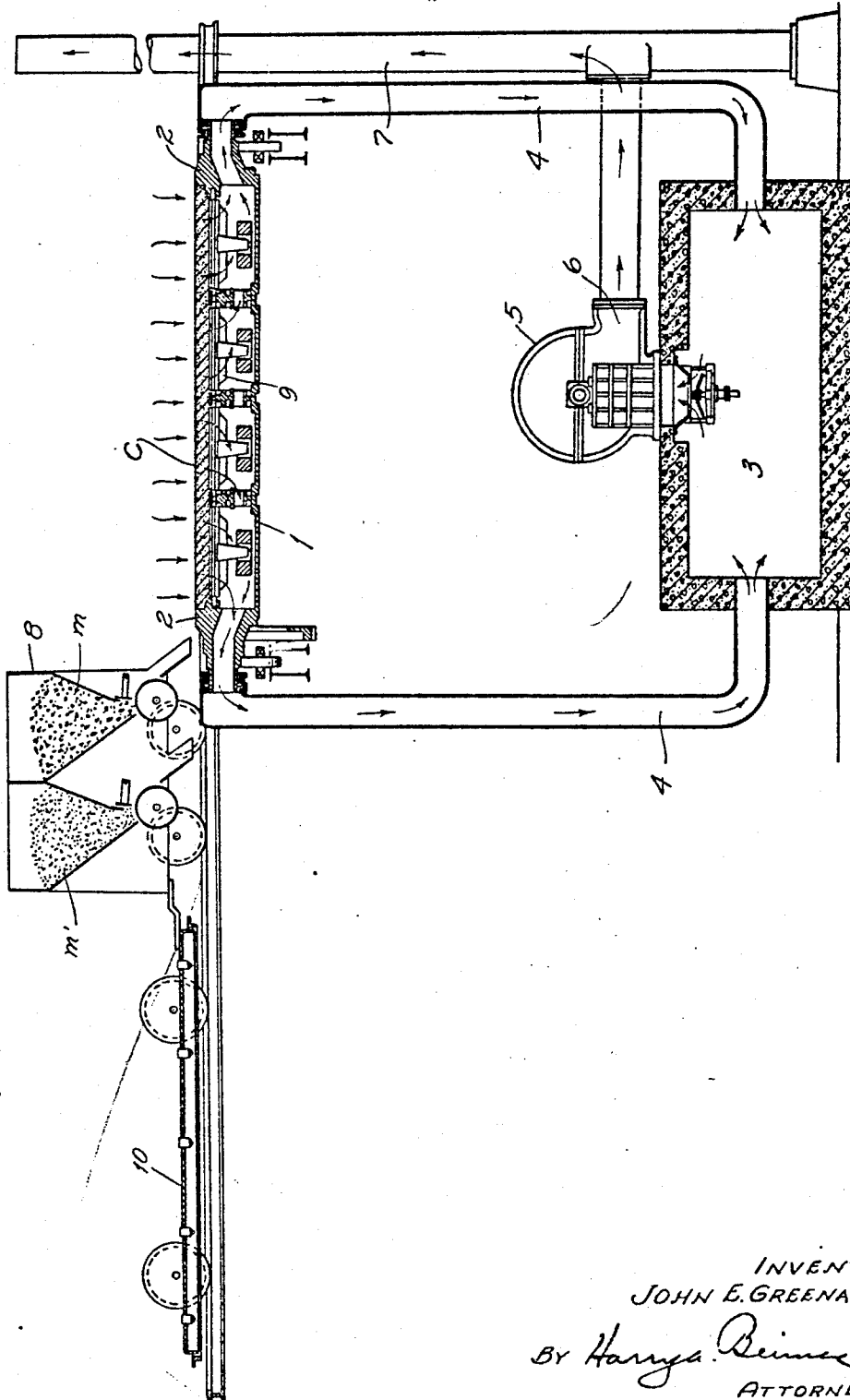
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METHOD OF MANUFACTURING ARTIFICIAL AGGREGATE FOR MORTARS AND CONCRETES

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METHOD OF MANUFACTURING ARTIFICIAL AGGREGATE FOR MORTARS AND CONCRETES

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My invention relates to an improved process of making artificial aggregate for concrete or building blocks and it consists in the novel features more fully set forth in the specification and pointed out in the claims.

The present invention is more particularly directed to the heat treatment of clay, preferably by sintering, to convert the clay into a hard, porous, homogeneous product that is especially suitable when crushed, for use as a concrete aggregate, either en masse or in blocks.

I am aware that clay has been heat treated in kilns and in heaps for the purpose of forming a hard, inert substance having desirable properties as an aggregate; but such treatment is extremely wasteful in the amount of fuel required. I am also familiar with the efforts that have been made to sinter clay to produce a desirable building product. However, as far as I know, the sintering, as heretofore attempted, consisted in mixing finely ground clay and fuel and moistening with water, in which condition the mixture was charged onto a downdraft sintering apparatus for treatment. I have found that satisfactory results cannot be obtained with a mere mixture of fuel (such as powdered coke) and ground clay, owing to the tendency of the clay to pack and the moist particles thereof to adhere, which closes the voids in the charge and prevents the free passage of air therethrough. If sufficient fuel is used to prevent packing the temperature during the treatment becomes too high and results in excessive fusion, as well as prohibitive cost of operation.

My invention contemplates the sintering of a charge made up of finely crushed clay and ordinary furnace cinders in the proportion of from 25% to 50% cinders. The cinders used contain all the original substance as they come from the grate, that is ashes, clinkers, unburned coal and coke, the coal and coke being present in sufficient quantity to furnish the necessary fuel for sintering. These cinders are finely crushed and mixed with the crushed clay in the proportions mentioned, and the charge thus made up then moistened slightly with water. If de-

sired, the moistening may be done while the cinders and clay are being mixed. This charge is then placed on a sintering apparatus of either the Greenawalt or Dwight & Lloyd type, care being taken not to compact the charge as it is important that the voids therein be preserved.

In the drawings, a Greenawalt sintering apparatus is shown, the same comprising a rotatable pan, 1, to the hollow trunnions 2, 2 of which is connected a dust chamber 3 by means of conduits 4, 4. A suitable exhaust-er 5 serves to create suction in the chamber 3, and of course through the pan, and has its outlet 6 connected to a stack 7. A charge car 8 may be used to feed the material *m*, *m'* onto the grate 9 of the sintering pan, said material being preferably fed with the component *m* of the coarser particles directly onto the grate and the component *m'* of the finer particles on the coarser particles. Thus the two components, after being placed in the pan 1, constitute the charge that is to be sintered.

An igniter 10 is now moved into position over the charge C and the exhauster 5 set into operation after which the fuel in the igniter is kindled to immediately fill the igniter with flame, which is sucked into the charge by the action of the exhauster and ignites the combustibles therein.

After ignition the combustion of the fuel contained in the cinders continues downwardly through the charge under the influence of the exhauster which causes a downward flow of air through the voids in the charge.

The particles of clinker and ash in the charge not only preserve its voids and permit the passage of air therethrough, but also supply silica which fuses readily and unites with the expanded and partially fused clay particles. Thus, at the completion of the sintering operation there has resulted a cake or slab of substantially uniformly porous burnt clay, the expanded particles of which are thoroughly fused together by the fusible elements in the charge. This product is not only extremely light of weight, (on account of its porosity) but is also remarkably strong in structure. The slab of sintered clay,

after having cooled, is crushed to the proper size for the use to which it is to be put. If concrete blocks are to be made both the fine and the coarse particles are used in a mixture with cement in any desired proportion, and
5 molded into shape.

The terms "sintering" and "sinter", as used herein, have substantially the same meaning that they have in the metallurgical art:
10 to wit, "sintering" in the process of treating materials (generally metalliferous) by subjecting a charge of finely crushed material containing a combustible to the heat generated by the internal combustion of said fuel
15 supported by a blast of air passing through the charge. Ignition is effected by the momentary action of a flame at one surface of the charge, the combustion being carried on through the charge under the influence of
20 the air blast. A "sinter" is the hard, cellular or porous, product of comparative light weight produced by this sintering action.

The granular nature of crushed ore, and its non-plasticity when wet makes it adaptable
25 to the sintering process, while the ease with which dry clay pulverizes and its plasticity when wet makes clay difficult to handle. The present method of treatment overcomes these difficulties.

30 Having described my invention I claim:

1. The process of manufacturing a concrete aggregate which comprises mixing finely crushed clay and cinders, charging said mixture in a suitable vessel, passing a combustion supporting gas therethrough, igniting
35 the charge at its surface, and continuing to pass the combustion supporting gas through the charge until the same is sintered.

40 2. The process of manufacturing a concrete aggregate, which comprises mixing finely crushed clay and cinders to form a charge, and sintering said charge to form a hard cellular cake.

45 3. The process of manufacturing a concrete aggregate, which comprises mixing finely crushed clay and cinders in the proportion of not less than 25% cinders, moistening said mixture, and sintering the same
50 to form a hard cellular cake.

4. The process of manufacturing a concrete aggregate which comprises mixing finely crushed clay and cinders, charging said mixture in a suitable vessel without pressure to preserve the voids therein, passing
55 a combustion supporting gas therethrough, igniting the charge at its surface, and continuing to pass the combustion supporting gas through the charge until the same is
60 sintered.

In testimony whereof I hereunto affix my signature.

JOHN E. GREENAWALT.