

UNITED STATES PATENT OFFICE.

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METHOD OF FEEDING CEMENT-KILNS.

SPECIFICATION forming part of Letters Patent No. 434,830, dated August 19, 1890.

Application filed December 27, 1888. Serial No. 294,818. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM JOY, of Northfleet, England, a subject of the Queen of Great Britain, have invented certain new and
5 useful Improvements in the Method of Feeding or Charging Cement-Kilns, of which the following is a specification.

My invention consists of the improvements hereinafter described in the method of feeding
10 cement-kilns when partly charged and while the portion of the charge therein is burning; and my said improvements consist in so feeding the kiln partly with a mixture of slurry and fuel and partly with slurry un-
15 mixed with fuel.

In order to prepare for the carrying out of my invention I prefer to start the kiln as follows: I partly charge the lower part of the kiln by placing a layer of bavins or fagots
20 on the fire-bars and on this a layer of coke about eight inches deep, and on the coke a layer of slurry and fuel in admixture of about the same depth, the mixture being either wet or dry, and I then ignite the bavins or fagots,
25 and when the fire begins to break through the upper part of the charge I feed the kiln as described in the specification of Letters Patent of the United States of America granted to me, No. 331,243—that is to say, I
30 throw wet slurry mixed with small coal or coke-breeze or other suitable fuel onto that part or those parts of the charge where the fire is breaking through; or I throw quantities of dried or partially dried slurry and
35 quantities of coke-breeze or other suitable fuel in powder or small pieces separately onto the said parts of the charge. In either case, after throwing on a sufficient quantity to partially check the draft at the said part or
40 parts, I discontinue feeding the kiln until the fire again breaks through at the same or at another part or other parts of the surface of the charge, when I repeat the operation, and I continue feeding the kiln in this manner
45 until the lower portion of the charge is by the action of the heat converted into a “clinker” or mass of uniform density or compactness. The formation of clinker in the lower part of the charge ordinarily takes place by the time
50 the quantity of matter in the kiln, when fed

as hereinbefore described, is two or three feet in depth; but the condition of the said part of the charge may be ascertained by its appearance when viewed through the spaces between the fire-bars, or by driving an iron
55 rod down into the charge, the passage of which rod is very forcibly resisted when it comes into contact with a portion of the charge which has been converted into clinker. When the burning charge has been brought to this
60 condition, I proceed with the further feeding of the kiln according to my present invention—that is to say, I further feed the kiln partly with a mixture of slurry and fuel and partly with neat slurry, (*i. e.*, slurry unmixed with fuel.)
65 The manner in which I prefer to charge the said matters into the kiln and the proportions in which I prefer to use the mixture of slurry and fuel and the neat slurry in thus feeding the kiln are hereinafter particularly described.
70 As soon as the fire rises near enough to the surface at any part or parts of the charge to cause a dull red glow to appear at such part or parts I throw thereon, by means of a shovel or otherwise, a quantity of either the mixture
75 or neat slurry sufficient to obscure the said glow, taking care to distribute the said matter as evenly and equally as possible over the said part or parts, and I continue thus feeding the kiln with either the mixture or the
80 neat slurry by depositing a sufficient quantity on any part or parts where from time to time the dull red glow appears. Where the said glow reappears at a part or parts where the mixture has been thus deposited, I de-
85 posit neat slurry thereon; and where the said glow reappears at a part or parts where neat slurry has been deposited, as hereinbefore described, I deposit a quantity of the mixture thereon. In this way I proceed until the kiln
90 is full; but as the heat in the kiln increases as the mass of burning charge increases I use a less quantity of the mixture in proportion to the neat slurry as the charge accumulates than at starting. Thus on starting the
95 feeding of the kiln according to my present invention I use the mixture and the neat slurry in the proportions of about three parts, by bulk, of the former and one part, by bulk, of the latter, and after feeding with these pro-
100

portions for about six or eight hours I use the mixture and the neat slurry in the proportions of about two parts, by bulk, of the former and one part, by bulk, of the latter, 5 and after feeding with these proportions for about the same length of time I use the mixture and the neat slurry in about equal proportions by bulk, and after feeding with these proportions for a further period of six or eight 10 hours I use the mixture and the neat slurry in the proportion of about two parts, by bulk, of the former to three parts, by bulk, of the latter.

If at any time during the operation of feeding the kiln according to my present invention the burning of the charge should proceed irregularly—that is, if the fire break through the surface at any part, or if at any time the feeding should be delayed until the 20 upper layers of the charge be burned through—the feeding with neat slurry must be discontinued until the charge has been again brought to the condition of a compact and uniformly-burning mass, which effect may be 25 produced by feeding the kiln for a time solely with a mixture of slurry and fuel, as described in the specification of my aforesaid patent, No. 331,243. The fuel for mixing with the slurry may be either coke-breeze or small 30 coal or dust-coal. The proportions of the slurry and the fuel in the mixture of slurry and fuel may be equal where coke-breeze is used. Where small coal or dust-coal is used, the proportions of slurry and fuel in the mixture may be five of the former to four of the 35 latter.

Both the mixture and the neat slurry may be fed into the kiln in a wet or moist or dry or partially dried state; or the mixture may 40 be wet or moist and the neat slurry dry or partially dried; or the mixture may be dry or partially dried and the neat slurry wet or moist. Where I use the mixture or the slurry or both in a wet state, I prefer that they shall not be 45 liquid, or so wet that they cannot readily be thrown into the kiln by means of a shovel with sufficient precision to cause the portions so thrown in to be lodged where required, in order that the several layers may be of sufficiently even or uniform depth or thickness. 50

In feeding a kiln as hereinbefore described I throw the matters into it through the “loading-eye” or opening in the dome or conical roof thereof. When a kiln has been fully or

sufficiently charged by feeding it, as hereinbefore described, the charge may be allowed 55 to burn out and be then drawn and the kiln restarted and again fed, as hereinbefore described; or after the kiln has been fully or sufficiently charged, as hereinbefore described, a 60 portion of the burned charge may be drawn from the lower part and the feeding, as hereinbefore described, then resumed, the kiln being thus worked continuously.

Instead of charging the lower part of the 65 kiln, as hereinbefore described, preparatory to starting, it may be charged to a sufficient depth in the ordinary way or in any other convenient way.

I wish it to be understood that I make no 70 claim to the use, *per se*, of a mixture of slurry and fuel in the feeding or loading or charging of cement-kilns, and that I make no claim to the use of neat slurry in the said operation otherwise than in conjunction with the use of 75 a mixture of slurry and fuel; and I further wish it to be understood that although I have described in detail the manner in which I prefer to operate in carrying out my said invention, yet my claim, which is hereinafter 80 stated, is not restricted to the loading or feeding or charging of cement-kilns precisely in the manner I have described, as the details of the operation hereinbefore described may be considerably varied without departing from the 85 nature of my said invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is— 90

1. The improvement herein described in the manufacture of cement, which consists in separately depositing at different times quantities of a mixture of slurry and fuel and quantities of neat slurry on the burning mass 95 in a partly-charged cement-kiln as the burning proceeds, substantially as set forth.

2. In the manufacture of cement, the improvement herein described of feeding the cement-kiln, which consists in depositing neat 100 slurry and slurry and fuel in admixture on the burning charge as the burning progresses, substantially as set forth.

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