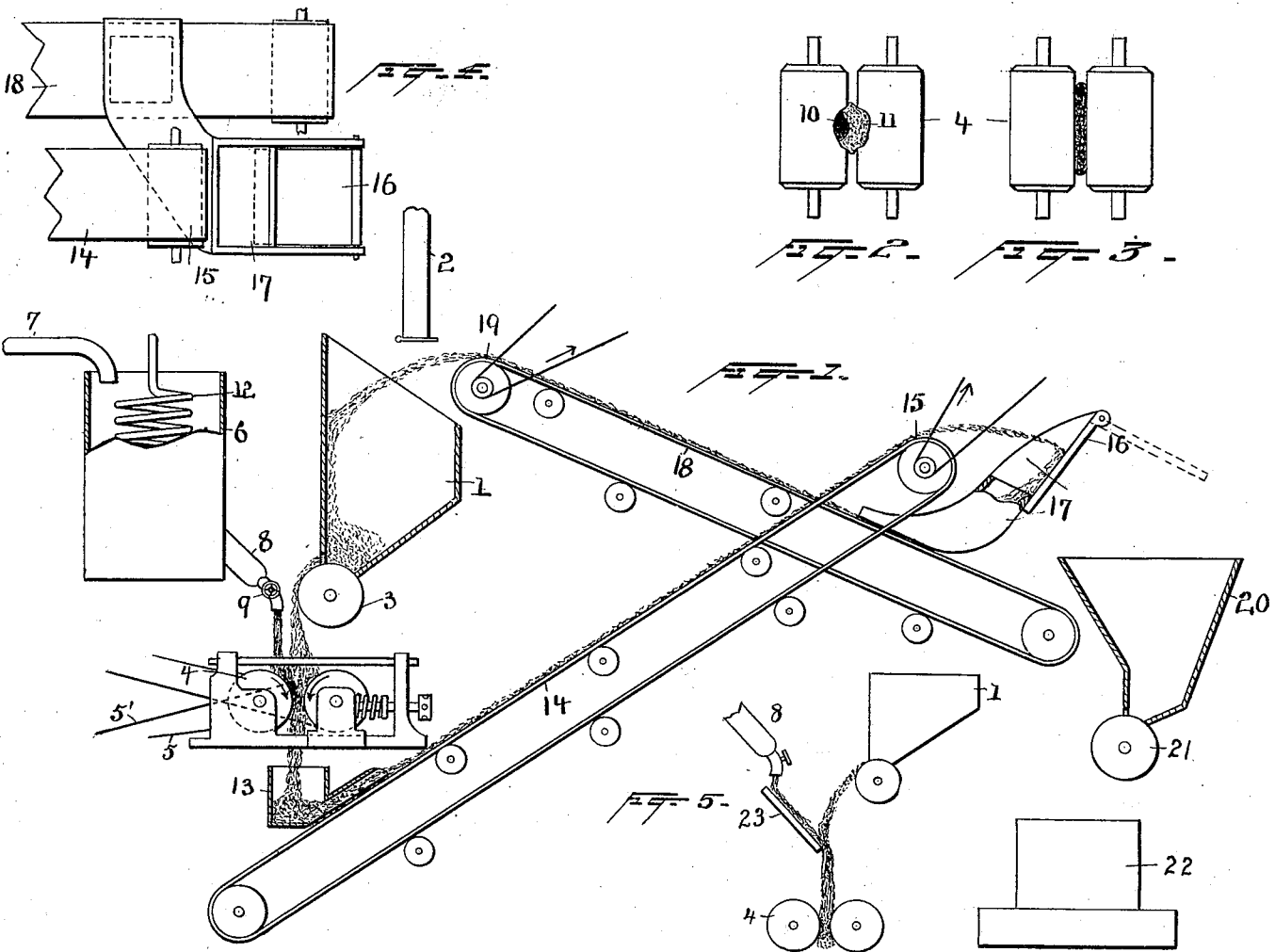


(No Model.)

T. A. EDISON.  
METHOD OF AND APPARATUS FOR MIXING MATERIALS.

No. 513,096.

Patented Jan. 23, 1894.



Witnesses  
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# UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

## METHOD OF AND APPARATUS FOR MIXING MATERIALS.

SPECIFICATION forming part of Letters Patent No. 513,096, dated January 23, 1894.

Application filed August 29, 1892. Serial No. 444,369. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Method of and Apparatus for Mixing Materials, (Case No. 960,) of which the following is a specification.

The object of this invention is to provide an improved method of and apparatus for mixing a binding agent with a pulverized or fine material, such as crushed iron ore, cement or coal, preparatory to forming the same into bricks by suitable machinery. According to this method I mix such materials by passing a quantity of the binding agent and of the fine material through a suitable mixer, such as Cornish rolls, and then automatically pass the whole of the partially mixed materials repeatedly through the mixer until the binding agent is thoroughly and evenly incorporated with the other material. Preferably a definite or measured quantity of binding agent is placed in one receptacle, and a definite or measured quantity of the ore or pulverized material in another receptacle, the two being fed to the mixer as rapidly as practicable and together.

In the drawings, Figure 1 is a side view, partly in section, of the preferred form of apparatus. Figs. 2 and 3 are plan and bottom views respectively of the mixing rolls. Fig. 4 is a plan of the hopper for transferring material from one belt to another; and Fig. 5 shows a modification to be described.

1 is a hopper or receptacle into which a charge of the pulverized material to be bricked, for example a ton of iron ore, can be deposited from the feed pipe 2, and 3 is a roller adapted to feed the material out of the hopper in a continuous stream in such manner that it will fall directly into the mixer, which is shown as an ordinary pair of Cornish rolls 4 which may be rotated by any suitable means, for example by belts 5, 5', the latter being a cross belt. Preferably one roll is driven about twenty-five per cent. faster than the other, since this greatly aids the mixing operation of the rolls. The rolls are mounted so that the distance between them can be varied to provide for mixing materials of dif-

ferent degrees of fineness, and to provide for varying the rapidity with which the materials are passed through the mixer.

6 is a receptacle adapted to contain a quantity of binding material sufficient to brick or bind together the charge in the hopper 1, having an inlet pipe 7, and an outlet 8 which is controlled by a valve 9 and which delivers binding material to the mixer at the same place in the length of the rolls as hopper 1 delivers, but it may deliver onto one of the rolls, as shown, or directly into the falling stream of ore, or onto an inclined board 23 in a thin stream the falling ore wiping it off as indicated in Fig. 5.

As shown in Fig. 2 the binding agent and pulverized material 11 as fed to the rollers form a stream considerably thicker than the space between the rolls, but as this passes through the rolls it will be spread out as indicated in Fig. 3. The action of the rollers serves to press the material out toward the ends of the rolls and this sidewise motion, as well as the difference in the speed of the rolls, is very effective in producing incorporation of the viscous binding agent with the ore.

12 is a steam coil for heating the binding agent.

The binding agent which I prefer is resinate of soda prepared as described in my Patent No. 465,251, dated December 15, 1891. This substance as used is a thick viscous liquid which runs quite slowly when cold but more rapidly when hot and which requires considerable time and mixing to thoroughly incorporate it with the ore. It is for this reason that the ore is passed several times through the mixer.

The stream of partially mixed materials issuing from the mixer falls into a hopper 13 and then moves onto the rapidly traveling belt conveyer 14 and is carried up to the point 15 where it is thrown off against the hinged plate 16 and drops into the hopper 17, after which it moves onto the second rapidly driven conveyer 18 at one side of the first conveyer and extending at an angle thereto. This conveyer carries the material to the point 19 where it throws it off into the hopper 1. The partially mixed materials are then fed out by roll 3, and the passing and re-passing of the

material is continued until the whole is thoroughly mixed. When the mixture is being passed through the mixer for the last time, the hinged plate or door 16 is moved back to its dotted position so that the mixture will not be directed into hopper 17 but will be allowed to fall into hopper 20, which preferably has a capacity about equal to that of hopper 1 so as to serve as a storing tank for the mixed charge.

It will be seen that the plate or door 16 forms a movable guide between the conveyers whereby the material may be either delivered to the second conveyer or diverted therefrom.

21 is a roller adapted to feed the mixed ore and resinate with the proper rapidity into a suitable mold filler 22 of a bricking machine. This mechanism may be of any well known and suitable construction which need not be shown in detail. By feeding the mixed materials into the mold filler of the bricking machine slowly, a great saving of power is effected over that consumed when an entire charge is emptied into such machine. When the mixed materials are thus removed from the mixing apparatus, a fresh measured charge can be given it through pipes 2 and 7, and the operation repeated without loss of time.

The apparatus described is cheap to construct and maintain, and has a very large capacity, at the same time being capable of producing nearly perfect results.

I claim—

1. The method of mixing a binding agent or similar substance and fine ore or other material which consists in causing a quantity of the latter to flow through a mixer simultaneously with a suitable quantity of the former, and then returning the mixed materials again and again to the mixer until the binding agent is thoroughly incorporated with the ore or other material, substantially as described.

2. The combination of receptacles adapted to hold a binding agent and a fine material, outlets for each of said receptacles, a mixer into which both outlets deliver, and automatic means for receiving the materials from the mixer and delivering them again to the mixer, substantially as described.

3. The combination of receptacles adapted to hold a binding agent and a fine material, outlets for each of said receptacles, mixing rolls to which both outlets deliver, and automatic means for receiving the materials from

the rolls and delivering them again to the rolls, substantially as described.

4. The combination of receptacles adapted to hold a binding agent and a fine material, outlets for each of said receptacles, mixing rolls driven at different speeds to which both outlets deliver, and automatic means for receiving the materials from the rolls and delivering them again to the rolls, substantially as described.

5. The combination of receptacles adapted to hold a binding agent and a fine material, outlets for each of said receptacles, mixing rolls to which both outlets deliver, and belt conveyers for conveying the materials from the mixer and delivering them again to the rolls, substantially as described.

6. The combination of receptacles adapted to hold a binding agent and a fine material, outlets for each of said receptacles, a mixer into which both outlets deliver, a driven belt onto which the material may pass from the mixer, and a second driven belt at an angle to the first onto which the material may pass from the first belt, said second belt being located so as to feed the material back into the mixer, substantially as described.

7. The combination of a driven belt conveyer, a hopper into which it delivers material conveyed, a second driven belt conveyer in position to receive material from said hopper, and a movable guide between said conveyers whereby said material may be either delivered to the second conveyer or diverted therefrom as desired, substantially as described.

8. The combination of a conveyer, a hopper into which it delivers, said hopper having a movable door or side, which when open allows the material being conveyed to pass by the hopper, substantially as described.

9. The combination of a mixer for preparing fine material for bricking, a bricking machine, a hopper having a regulated feed opening communicating with said bricking machine, and a conveyer leading from said mixer to said hopper, whereby the mixing apparatus may be emptied rapidly without choking the bricking machine, substantially as set forth.

This specification signed and witnessed this 24th day of August, 1892.

THOS. A. EDISON.

Witnesses:

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THOMAS MAGUIRE.