

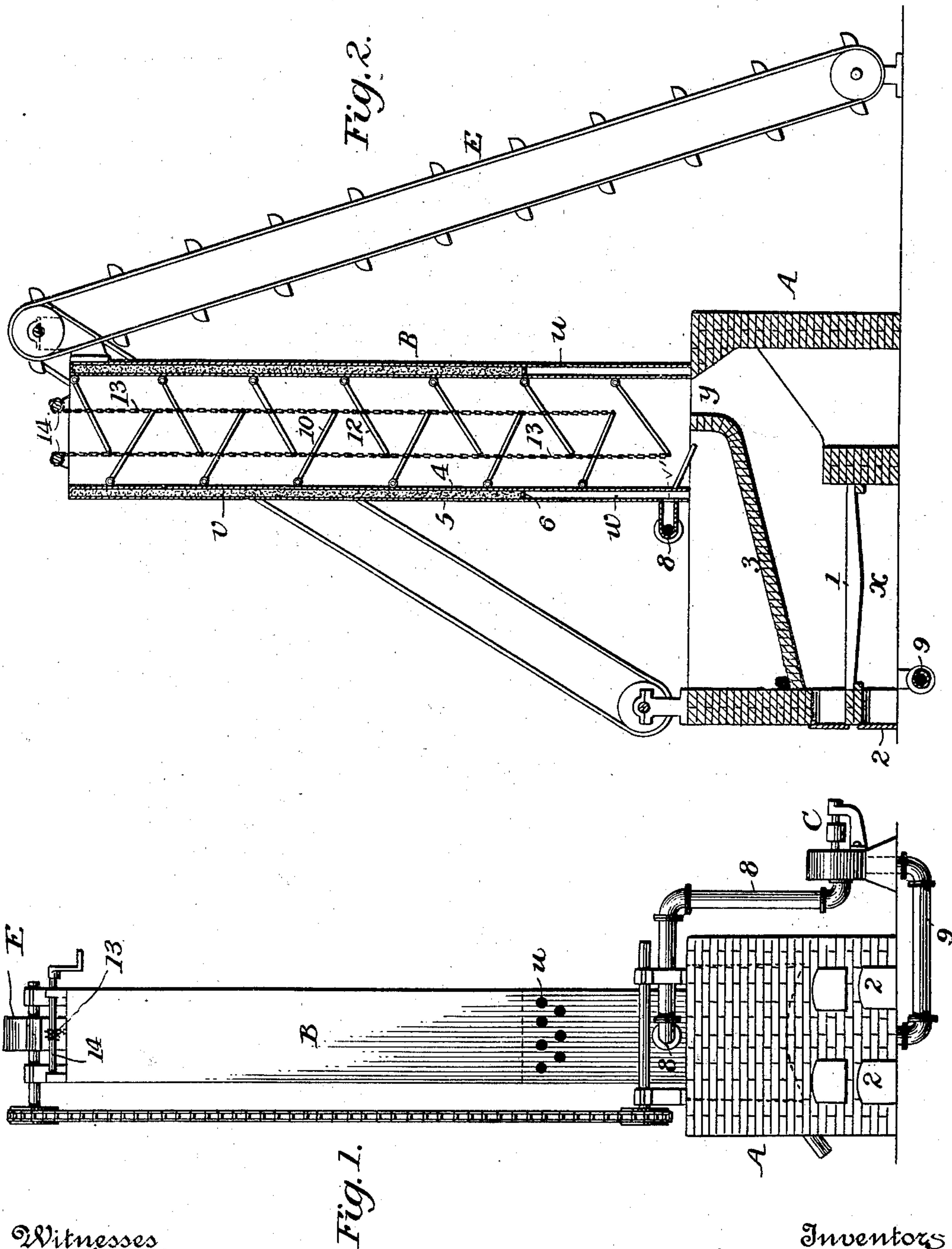
No. 692,199.

Patented Jan. 28, 1902.

C. GREENE & W. M. DOLLAR.
APPARATUS FOR HEATING GRANULAR SUBSTANCES.

(Application filed May 2, 1896.)

(No Model.)



Witnesses
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UNITED STATES PATENT OFFICE.

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APPARATUS FOR HEATING GRANULAR SUBSTANCES.

SPECIFICATION forming part of Letters Patent No. 692,199, dated January 28, 1902.

Application filed May 2, 1896. Serial No. 590,011. (No model.)

To all whom it may concern:

Be it known that we, CARLETON GREENE and WILLIAM M. DOLLAR, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Apparatus for Heating Granular Substances, of which the following is a specification.

10 In preparing material for laying asphalt pavements it is necessary to make use of large quantities of sand, which is generally received in a damp condition and sometimes is completely saturated with moisture.

15 The object of our invention is to dry the wet sand with rapidity and with the expenditure of as small an amount of fuel as possible, and to this end we make use of the method and means fully set forth hereinafter and illustrated in the accompanying drawings, in which—

20 Figure 1 is a front elevation showing one form of apparatus employed in carrying out our improvement, and Fig. 2 a longitudinal sectional elevation.

25 A closed furnace A of any suitable construction is provided with a grate 1 above an ash-pit x , provided with doors 2, which may be closed to prevent the escape of air from the ash-pit except upward to the grate, and the outlet y of the combustion-chamber communicates with the lower end of a stack B at one side of the center of the said stack, which extends at the upper side to a position above the inclined arch or roof 3 of the combustion-chamber of the furnace.

30 The stack B is of any suitable construction, but, as shown, has an inner wall 4 and an outer wall 5, forming an intermediate space divided by a horizontal partition 6 into two chambers $v w$. The chamber v is filled with any suitable refractory non-conducting material, while the chamber w , which is only at the lower portion of the stack, has an air-inlet opening u near the top and near the bottom has an air-outlet opening, with which communicates a pipe 8, leading to the inlet of a blower C. From the outlet of the blower C a pipe 9 extends to the ash-pit.

Within the stack B is arranged a series of 50 shelves or supports for the sand, which is thrown into the upper end of the stack and which passes downward from one support to the other until it is deposited upon the top of the roof 3. These shelves or supports may be of any suitable character. As shown, they are divided into two series of hinged imperforate plates 10 12, the plates of one series being oppositely inclined with respect to those of the other series and being hinged plates 10 12, arranged alternately therewith, so that the sand falls from one to the other, and with each series of plates is connected a chain 13, extending to a shaft 14 at the top of the stack, which may be turned so as to set the shelves to which it is connected at any desired inclination, irrespective of the inclination of the plates of the other series. The sand is conducted to the top of the stack and is thrown onto the upper shelf thereof by means of any suitable elevator E, a bucket elevator being shown. As the sand falls from one inclined shelf to the other, crossing the spaces between the shelves, it is met by the heated products of combustion, which find their only outlet by passing upward through the stack. Here- 75 tofore where attempts have been made to dry sand by the direct action of products of combustion the presence of any large amount of moisture in the sand has rendered the latter so dense as to materially interfere with the draft and practically put the apparatus out of operation. We have found that by driving the products of combustion forcibly upward through the stack it is possible to break up and separate the masses of sand, even when completely saturated with moisture, and to thereby bring the products of combustion intimately into contact with all of the particles, securing a rapid evaporation, preventing the clogging up of the passages, and imparting such a heat to the plates that under every possible condition the sand is rapidly and thoroughly dried and heated ready for admixture with the other paving materials, while the amount of fuel required for producing the desired effect is greatly reduced. 95

The radiation of heat from the upper part of the stack is prevented by the surrounding chamber filled with non-conducting material, while the air-chamber around the lower portion of the stack serves, in the first instance, to prevent the rapid burning away of the stack at this portion, and, secondly, as a means for heating the air supplied to the blower. This heated air not only secures a more thorough combustion of the fuel, but aids in the drying and heating of the sand.

While we have referred to the apparatus as a drier and heater for sand, it will of course be evident that it may be employed for drying and heating other materials—as, for instance, pulverized ores or any other material where the direct application of the products of combustion will be effective.

Without limiting ourselves to the use of the construction of apparatus shown, we claim as our invention—

1. The combination of a stack having a series of alternating tilting platforms, and means for supporting the same in different positions, a furnace communicating directly with the lower end of the stack, a chamber surrounding the stack and provided with an air-inlet and an air-outlet, and a blower for drawing air through the said chamber from without and forcibly discharging the air into the furnace at the bottom, substantially as shown and for the purpose described.

2. In an apparatus for drying granular substances, the combination with a stack into which the material to be dried is discharged, of a furnace communicating with the lower end of the stack, a hot-air chamber surrounding the lower end of the stack and provided with inlets for cold air, a blower, a pipe leading from the hot-air chamber to the inlet of the blower, and a pipe leading from the blower to the ash-pit below the furnace, whereby the hot air and products of combustion are driven forcibly up the stack, substantially as described.

3. The combination with a combustion-chamber having a receptacle above its roof, and an outlet for the products of combustion, of a stack with its lower end communicating with said outlet and with a discharge-opening leading to the receptacle, a series of alternating imperforate platforms within the stack, and means for forcing the heated products of combustion through the stack, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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Witnesses:

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