

(No Model.)

3 Sheets—Sheet 1.

J. M. DODGE.

PROCESS OF PILING COAL OR ANALOGOUS MATERIAL.

No. 409,636.

Patented Aug. 20, 1889.

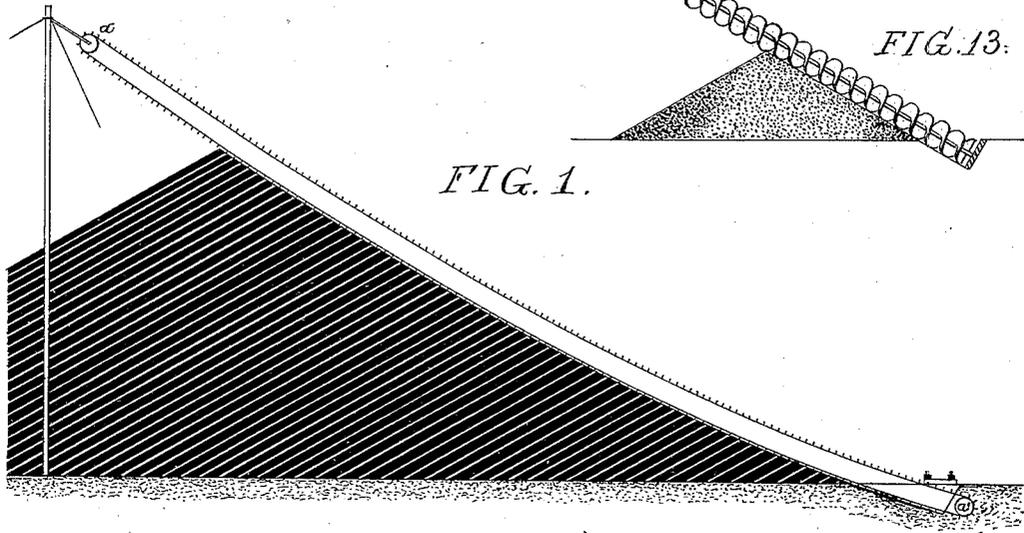


FIG. 1.

FIG. 13.

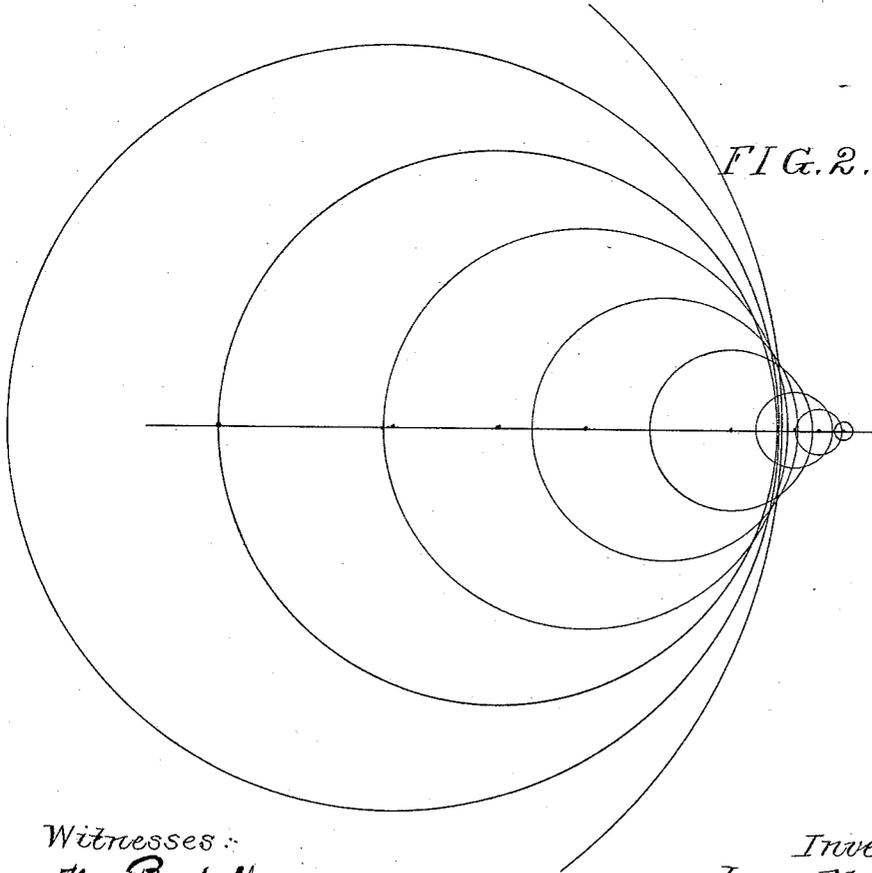


FIG. 2.

Witnesses:
Alex. Barkoff
Jos. H. Klein.

Inventor:
James M. Dodge
by his Attorneys
Howson & Howson

(No Model.)

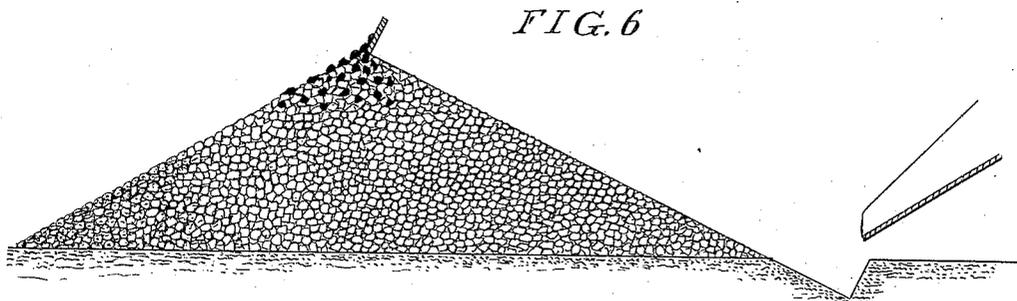
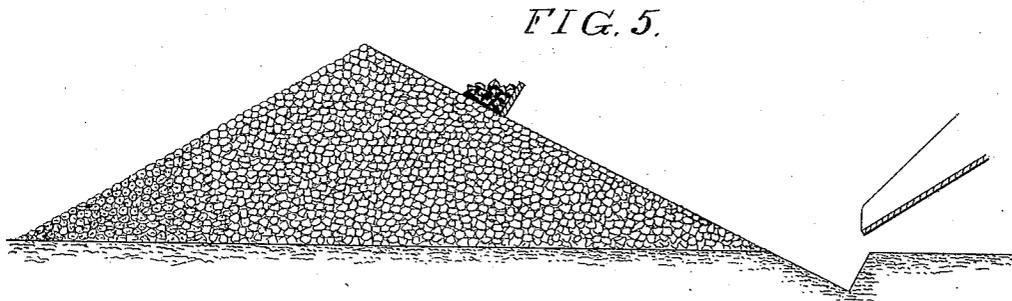
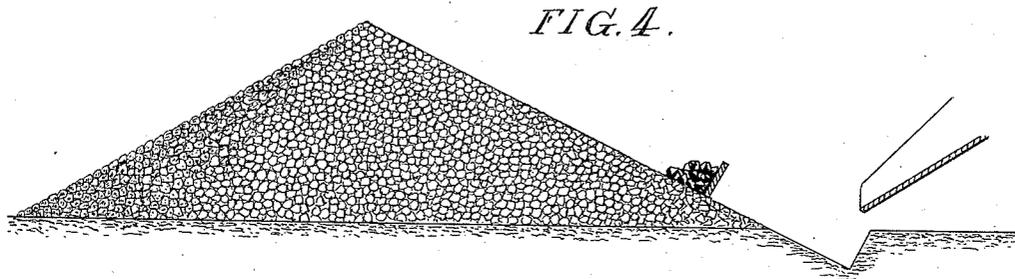
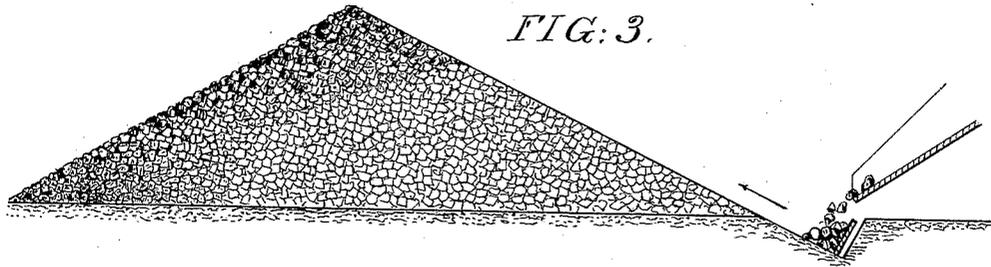
3 Sheets—Sheet 2.

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(No Model.)

3 Sheets—Sheet 3.

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FIG. 10.

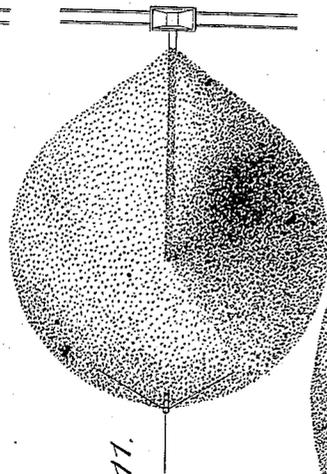


FIG. 11.

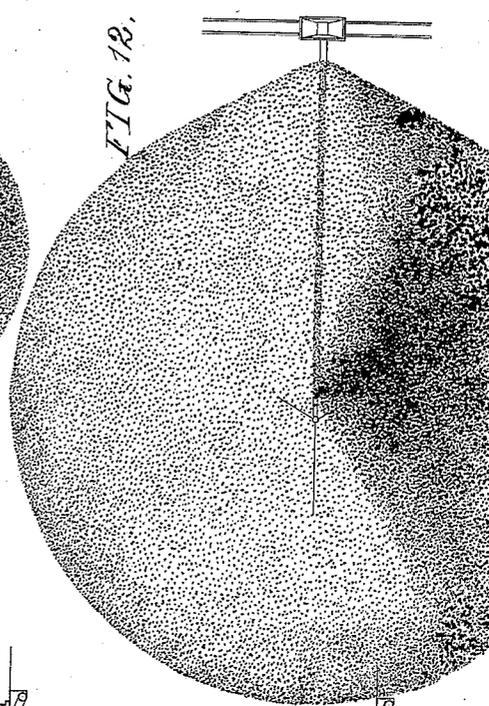


FIG. 12.

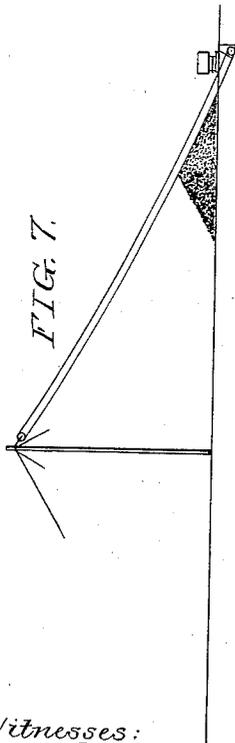


FIG. 7.

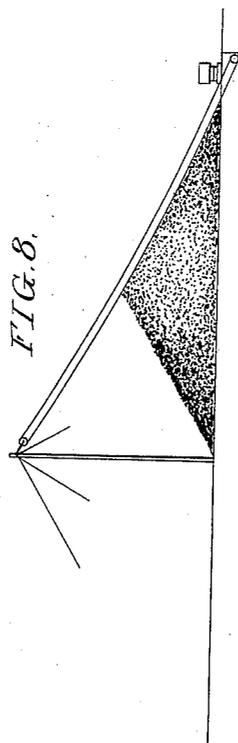


FIG. 8.

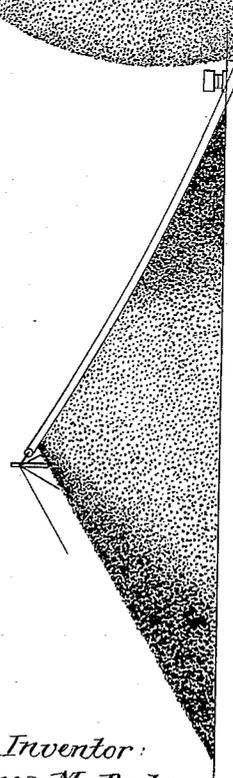


FIG. 9.

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UNITED STATES PATENT OFFICE.

JAMES M. DODGE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE
DODGE COAL STORAGE COMPANY, OF CONNECTICUT.

PROCESS OF PILING COAL OR ANALOGOUS MATERIAL.

SPECIFICATION forming part of Letters Patent No. 409,636, dated August 20, 1889.

Application filed April 12, 1889. Serial No. 306,980. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. DODGE, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented an Improved Process of Piling Coal or Analogous Material, of which the following is a specification.

One object of my invention is to dispense with the trestle-work and bins usually employed in storing large quantities of coal, a further object being to prevent the disintegration or breakage of the coal during the process of storing. These objects I attain by piling the coal in a heap in the manner fully described hereinafter.

It has been customary in storing coal to erect a series of trestles on which the cars are run, and to build under the trestle-work bins, into which the coal is dumped from the cars as it is received at the terminal points from the mines. This trestle-work covers a large area of ground, usually valuable property, close to a railroad or along a water-front, the trestle-work usually being about twenty feet high, so that it is impossible to form the coal naturally into piles exceeding that height. The trestle-work cannot be constructed much more than twenty feet in height, owing to the fact that the initial fall of the coal from the car on the trestle would break the coal into small fragments, and the coal, which is one size in the cars, would have to be screened after being stored in the bins, and separated into several different sizes. Therefore, the lower the trestle-work the less liability there is of the coal being broken; but the storing capacity is correspondingly decreased, whereas if the trestle is a high one the storing capacity is increased, but the percentage of breakage of coal is also increased to an unprofitable extent. The bins, moreover, have to be so formed and located that the coal can be readily removed therefrom for reshipment upon trains or vessels.

In some cases the coal as it is dumped from the cars has been shoveled aside, so as to permit the dumping of more coal from the cars; but this handling of the coal is of course expensive, and is in many cases on that account not resorted to.

By my process I am enabled to dispense

with the usual trestle-work and bins, and store the coal in piles of any desired height, so that a given amount of coal occupies much less space than usual, while, owing to the peculiar formation of the pile, I can readily remove a part or the whole of it and load cars therefrom on the level, as fully described in the pending application filed by me February 8, 1888, Serial No. 263,322, so that it will be seen that the piling can be done away from railroads or wharves on comparatively inexpensive ground.

I will now describe the process and the mechanism which I prefer to use in carrying out my improved process.

Referring to the drawings, Figure 1 is a sectional diagram of a pile of coal and a piler, showing the mode of forming the pile. Fig. 2 is a plan view of Fig. 1, showing the gradually-increasing base-line of the pile. Figs. 3, 4, 5, and 6 are diagrams illustrating the successive stages in the lift of the coal. Figs. 7, 8, and 9 are diagram side views showing the pile of coal in different stages of formation. Figs. 10, 11, and 12 are plan views, respectively, of Figs. 7, 8, and 9; and Fig. 13 is a view illustrating another form of apparatus, which can be used in carrying out my improved process.

The apparatus which I prefer to use is constructed as follows: Suitably planted in the spot on which it is desired to form the pile is a pole—say, for instance, about eighty or ninety feet in height and suitably stayed by guy-ropes, as shown in Fig. 1—and secured to this pole in any suitable manner is a carrier for a wheel *a*, over which passes an endless chain or rope carrying suitable flights, in the present instance in the form of blades. The chain or rope passes around a suitable wheel *a'* at or near the ground, as shown, this wheel being driven in any suitable manner; or the top wheel may be driven in order to give motion to the flighted chain or rope, which forms the conveyer for piling the coal. The coal or analogous material is fed to the conveyer through a suitable hopper or trough situated, by preference, directly under the track on which the car to be unloaded is situated, this hopper or trough guiding the coal to the lower line of flights of the conveyer.

This point, where the flights receive the coal to be carried up over the previously-formed pile of coal, is a fixed point, as it must be remembered that the apparatus which I prefer to use in carrying out the process is merely a conveyer and receives the coal which is to be conveyed to the apex of the pile always at the same point, and does not act as a dredge or digging-machine to cut into the mass of coal to be piled. It will be understood, however, that other styles of apparatus may be used for elevating the coal and forming the pile—for instance, a screw conveyer may be used, as shown in Fig. 13, the flights in this case being continuous.

To better illustrate the formation of the pile, I have shown a series of diagrams, Figs. 7 to 12, Fig. 7 showing the first stage of formation of the pile, Fig. 8 the pile in a more advanced stage of formation, and Fig. 9 the complete pile.

It will be seen that after the pile is once started each successive supply of coal is carried up and over the coal previously piled, which thus supports these successive supplies until they reach the apex of the pile, whence they fall by gravity and aid in the growth or formation of the pile, the mass assuming the angle of repose, and the apex of the cone-shaped pile thus produced being at the point at which the supply of coal is delivered by the conveyer. Thus, as load after load is carried up to the apex, this apex constantly recedes and rises, so that a new cone is practically formed by each load of coal deposited.

During the whole operation of piling the coal is handled carefully, and the percentage

of breakage is infinitesimal as compared with the breakage in the ordinary manner of piling, as the coal is gently fed to the base of the cone and carried therefrom up and over the cone, and allowed to fall by gravity to the angle of repose without the least crushing effect, and consequently the coal is, for commercial purposes, in the same condition as when it left the cars.

It will be seen that by the above-described process I am enabled to pile upon a comparatively small area of ground an enormous quantity of coal.

I claim as my invention—

The process herein described of progressively and continuously forming a pile of coal or analogous material, said process consisting in, first, delivering the material to be piled to a conveyer at a fixed point at or near the ground; secondly, in carrying the said material upward at an inclination not exceeding the natural angle of repose until the material discharges itself to form an initial conical pile, and, thirdly, progressively carrying fresh material along the surface of such previously-formed pile and at the same constant angle of inclination, and leaving such material at the top of the already-formed pile to distribute itself by gravity and form a new, a higher, and a constantly-receding apex for a conical pile or mass.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES M. DODGE.

Witnesses:

ALBERT POPKINS,
HENRY HOWSON.