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W. A. OGG

2,157,268

COAL DRIER

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3 Sheets-Sheet 1

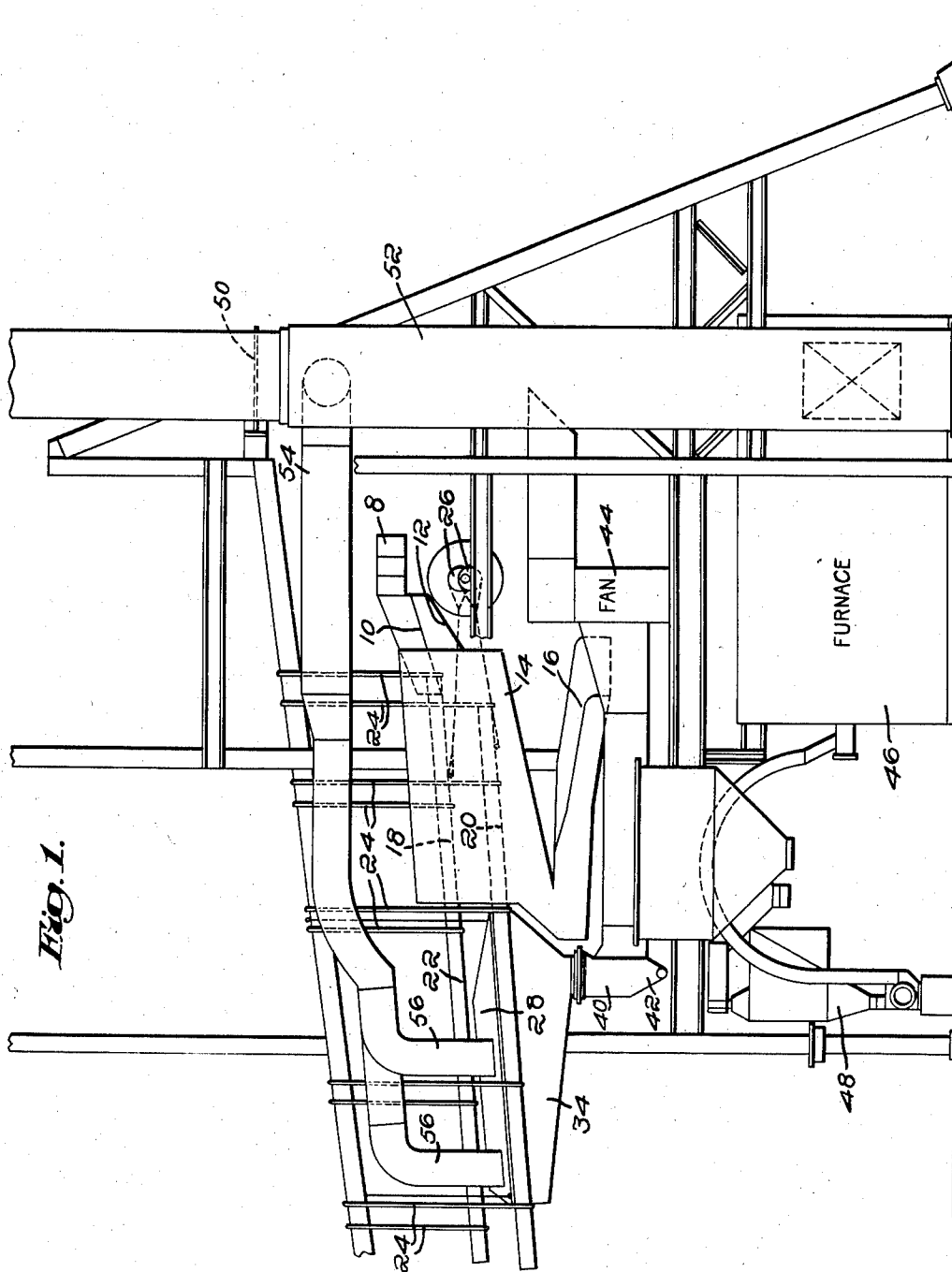


Fig. 1.

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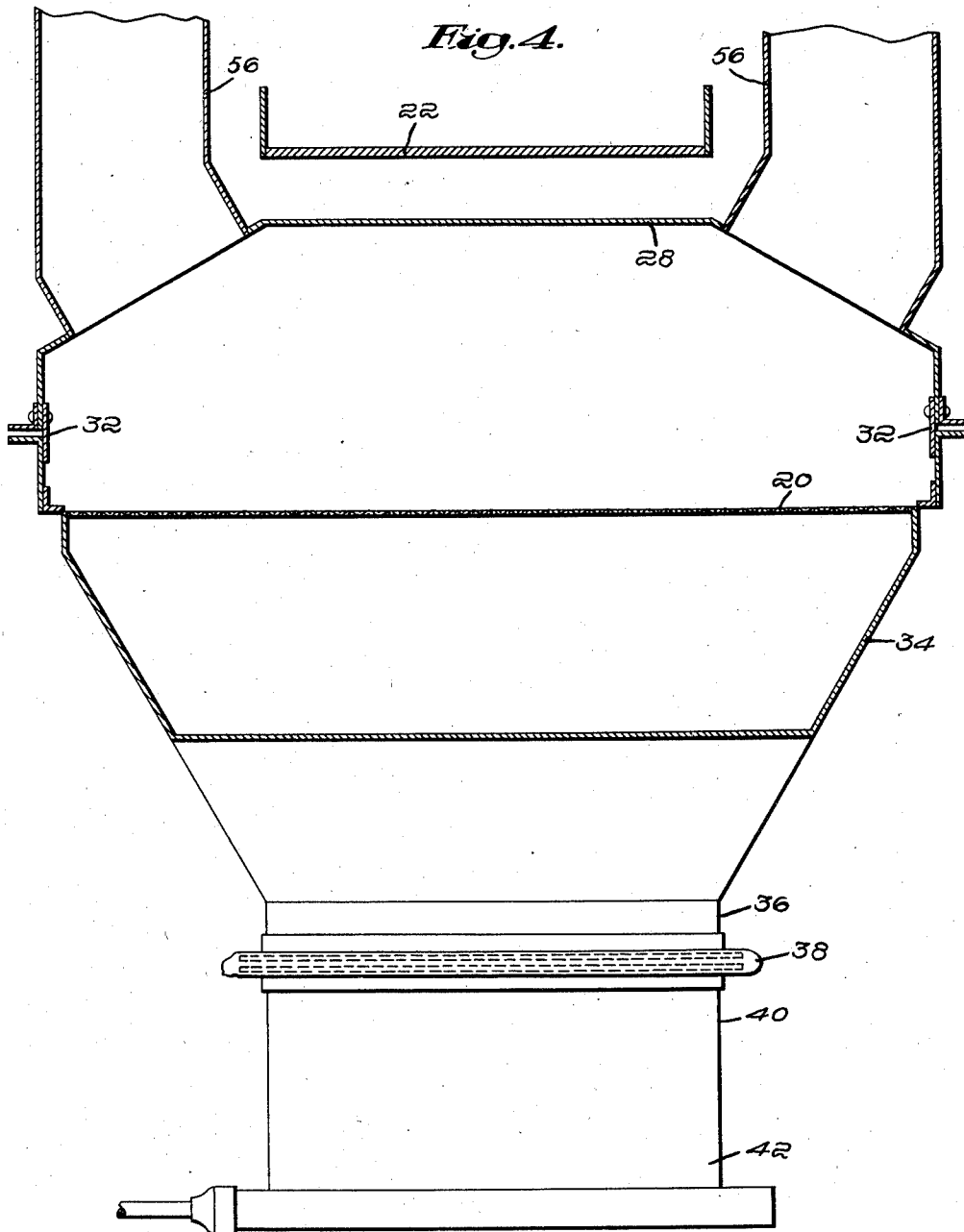
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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COAL DRIER

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2 Claims. (Cl. 34—38)

This invention relates to drying mechanisms and the object is to provide a simple and efficient mechanism suitable for drying coal after it has been washed. It is applicable in particular to coal in pieces of a size corresponding to the so-called domestic sizes.

My invention will be well understood by reference to the following description of the illustrative embodiment thereof shown by way of example in the accompanying drawings, wherein:

Fig. 1 is a side elevation with parts omitted of a portion of a coal tippie embodying in its construction a drying mechanism illustrative of my invention;

Fig. 2 is a plan of a portion of Fig. 1;

Fig. 3 is a central longitudinal section through a portion of the mechanism on a larger scale; and

Fig. 4 is a section on the line 4—4 of Fig. 3 on a still larger scale.

The construction illustrated by way of example in the drawings is adapted to operate in range with a coal washing mechanism in which coal from which the fine granular particles, such as would pass through a screen having a $\frac{1}{4}$ " mesh, have previously been removed and is designed to dry the coal which is of a size to pass through a screen having $1\frac{1}{4}$ " holes, in other words, what is commonly termed $1\frac{1}{4} \times \frac{1}{4}$ " coal, and the installation illustrated in Fig. 1 provides for separating this coal to be dried from the coal coming from the washer.

Referring to Fig. 1 of the drawings, in the installation shown the coal from which the $\frac{1}{4}$ " $\times$ 0 particles have previously been removed is delivered from the washer along a flume 8 and passes over a primary de-watering screen 10, through which screen a considerable amount of the water drains to the water pan 12, passing hence to water collector 14 to be discharged through sluice 16. The coal is delivered to a sizing screen 18 which, in the installation shown, has $1\frac{1}{4}$ " round holes so that coal passing through and delivered to the screen 20 beneath the same has a size of $1\frac{1}{4} \times \frac{1}{4}$ ". This is the coal which is to be dried. The coarser coal which cannot pass through the holes of screen 18 continues along the same and along a chute 22, which forms a continuation of the same, to be delivered at the left of Fig. 1. The screen 20 on which the coal to be dried falls has holes less than $\frac{1}{4}$ " in diameter so that the coal cannot fall through it but water is permitted to drain off to the water collector 14.

The screens 18 and 20 are of the shaking type

and are here shown as suspended by flexible wooden hangers 24 and are vibrated longitudinally, viewing Fig. 1, by means of the eccentrics 26 operating on suitable connecting rods as shown. The screens 18 and 20 slope somewhat downwardly from right to left, viewing Fig. 1, and as they are vibrated the layer of coal deposited thereon is caused to travel in the same direction with concomitant relative movement of the various pieces or fragments.

In practice the coal at the right-hand portion of the screen 20, viewing Fig. 1, carries about 5% or 6% surface moisture. In accordance with the invention this moisture is removed by means of a current of hot gases passed downwardly through the coal on the screen as it travels along the same. Part of the moisture is removed mechanically by the action of the gases in scrubbing off a part of the water films on the surface of the pieces of coal and part is evaporated. To permit the application of the hot gases to the coal a portion of the upper face of the shaking screen 20 is covered by a stationary hood 28 suspended from structural members of the tippie and having a generally frustro-pyramidal form, to the interior of which hood hot gases are supplied in the manner hereafter to be more fully described. At either end of the hood 28 (see Fig. 3) flap gates 30, conveniently formed of sections of rubber belting, cooperate with the upper surface of the body of coal travelling along the screen to "seal" the entrance of and discharge from the hood, while sealing plates 32 (Fig. 3) along the sides of the hood 28 lie in close proximity to the side frame of the screen 20 to reduce leakage of cold air to a minimum.

Opposing the hood 28 is a wind box 34 which in the embodiment of the invention shown is suspended from the shaking screen. Its open upper end is of substantially the same area as the lower end of the hood 28 and it tapers downwardly to a discharge extension 36 which opposes with a sliding joint 38 the upwardly presented end of a discharge conduit 40. This conduit has a depending water trap 42 and extends laterally, as shown in Fig. 1, and an exhaust fan, the position of which is indicated by its casing 44, may be provided in the conduit, which fan serves to set up unbalanced pressure conditions as between the wind box 34 and hood 28 to cause the gases delivered to the former to pass downwardly through the layer of coal on the screen 20 as it moves along the screen beneath the hood.

The hot gases utilized in the present installation are combustion gases from a furnace 46 in

which is burned pulverized coal delivered from a hopper 48. A damper 50 in the stack 52 of the furnace serves, when properly positioned, to divert the gases to an intake duct 54 leading to the hood 28. In many drying mechanisms with which I am familiar it has been customary to deliver gases centrally to an upwardly tapering hood. Contrary to this practice and as best illustrated in Figs. 2 and 4, herein the intake duct 54 is subdivided into branch pipes 56 which deliver at a plurality of points in the length of the hood through the sloping sides thereof in inwardly converging paths at an angle to the horizontal surface of the layer of coal on the screen 20 to impinge with substantially uniform distribution over the entire surface of the same.

As seen in Fig. 1, the screen 20 extends beyond the hood 28 to the left of Fig. 1 and the coal, after being dried by the passage of the hot gases there-through as they are delivered from the hood 28 to the wind box 34, continues to the left along the screen and may be discharged in any suitable manner for further disposition.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive; reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

I claim:

1. A mechanism for drying coal comprising an inclined screen having means for vibrating it lon-

gitudinally for forwarding a layer of coal along the same with concomitant relative movement of the various pieces or fragments, a hood opposing the upper surface of the screen and having means for substantially sealing the edges thereof relatively to the screen and its burden whereby exit for gases therefrom is constrained substantially to a path through the coal and screen, means to supply hot gases to the hood, a wind box beneath the screen opposite the hood and exhaust means connected to the wind box for creating a downward flow of gases from the hood through the screen and its burden.

2. A mechanism for drying coal comprising an inclined screen having means for vibrating it longitudinally for forwarding a layer of coal along the same with concomitant relative movement of the various pieces or fragments, a hood opposing the upper surface of the screen and having means for substantially sealing the edges thereof relatively to the screen and its burden whereby exit for gases therefrom is constrained substantially to a path through the coal and screen, means to supply hot gases to the hood comprising delivery ducts opening to the hood at either side thereof and diagonally directed to deliver streams impinging with substantially uniform distribution over the horizontal surface of the coal on the screen, a wind box beneath the screen opposite the hood and exhaust means connected to the wind box for creating a downward flow of gases from the hood through the screen and its burden.

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