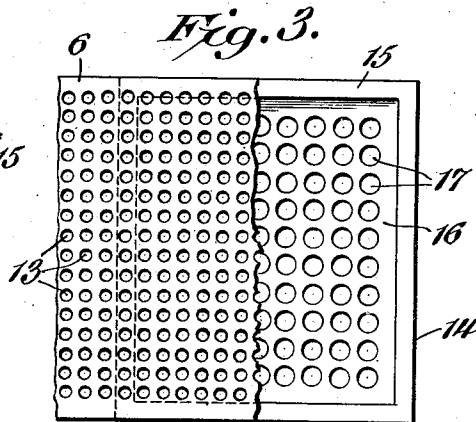
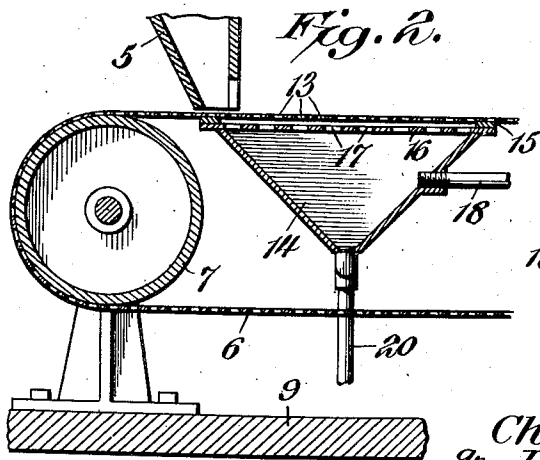
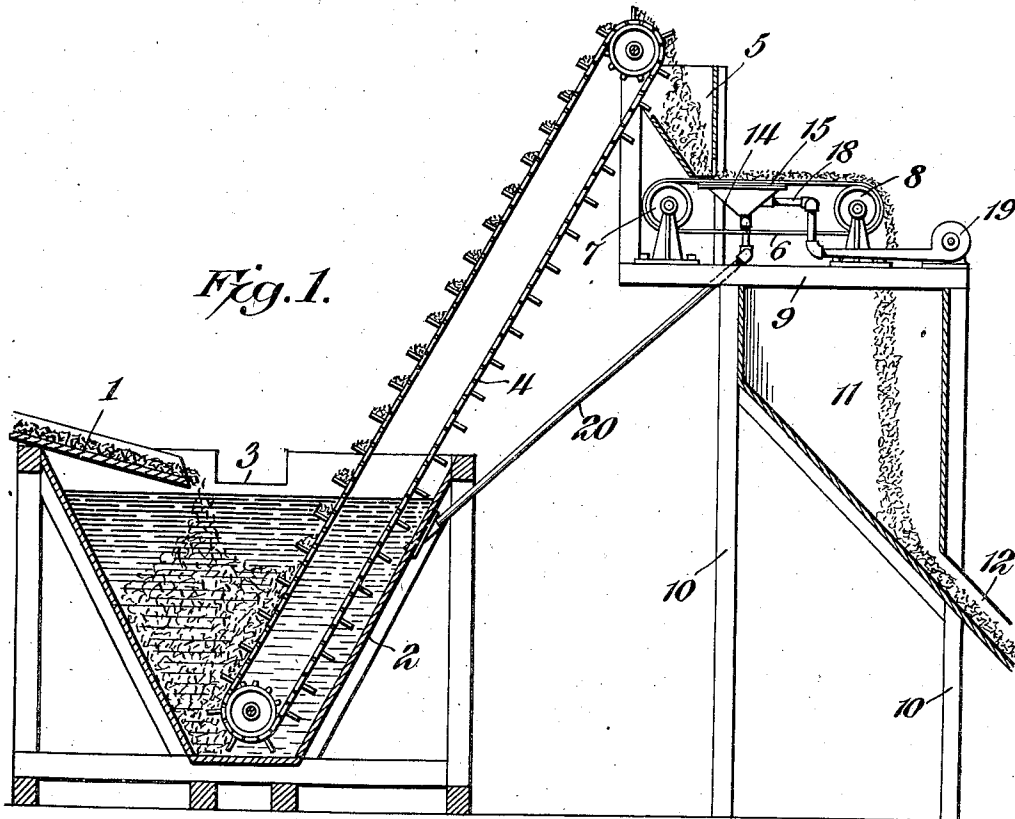


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 APPARATUS FOR DRYING WASHED COAL AND OTHER MATERIAL.
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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, CHARLES CATLETT and DAVID HANCOCK, citizens of the United States, residing, respectively, at Staunton and Birmingham, in the respective counties of Augusta and Jefferson and respective States of Virginia and Alabama, have invented a new and useful Apparatus for Drying Washed Coal and other Material, of which the following is a specification.

This invention has reference to improvements in apparatus for treating washed coal and the like, and its object is to provide an apparatus whereby the drying of the coal may be expeditiously and economically performed.

In the preparation of coal for coking it is customary to wash the coal, bituminous coal, to remove slate and certain ash-like accumulations found in the coal, and this washing leaves the cleaned coal with a large quantity of absorbed and adherent water.

It has been proposed to rid the coal of such water which does not readily flow off spontaneously, by subjecting the coal to the action of centrifugal machines; but this has been found to be a costly process and so slow because of the small amount of coal which may be handled at any one time, that it is not adapted for use on a large commercial scale.

With the present invention the coal is washed and cleansed as usual, and is then delivered upon a moving screen which may be in the form of an endless conveyer having numerous passages therethrough, and while on the screen the wet coal is passed over a suction box in such manner that the screen will coact with the box at the margins of the latter to prevent any material loss of power due to the leakage of air, and the screen and box are so proportioned that while large quantities of coal may be readily handled, the time during which the coal is subjected to air currents produced by suction is sufficient to extract from the coal all or most of the absorbed and surface moisture, so that when the coal is finally delivered it is not only clean, but is sufficiently dry for the coking operation.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, with the further under-

standing that the showing of the drawings is not intended to indicate any exact proportions or arrangement of parts, wherefore the invention is not confined to any strict conformity with the showing of the drawings, but may be otherwise embodied so long as the salient features of the invention are retained.

In the drawings:—Figure 1 is a more or less schematic view with parts in section and other parts in elevation of an apparatus for practising the invention. Fig. 2 is a vertical section through a conveyer belt, suction box and delivery hopper used in practising the invention, the showing being also to an extent schematic. Fig. 3 is a plan view of a portion of a conveyer belt and underlying suction box which may be employed in connection with the invention.

Referring to the drawings there is shown a delivery chute 1 discharging into a tank 2 having an overflow opening 3, so that excess of water will flow out of the tank. Entering the tank and rising therefrom is an elevating conveyer 4 of suitable construction, which at the upper end discharges into a hopper 5. The lower end of the hopper is arranged to discharge upon a belt 6 which may be an endless belt supported at the ends upon rollers or drums 7, 8, respectively, and these rollers or drums are mounted upon a platform 9 supported by a framework 10 usually at a sufficient height so that the belt 6 may discharge at one end into a bin 11, from which extends a chute 12 capable of discharging into a car or other vehicle for the transportation of the material treated to the coke ovens. While not so shown, it will be understood that the chute 12 follows the ordinary practice of being provided with the usual controlling means, whereby the outflow from the bin 11 may be regulated to suit circumstances.

The belt 6 is shown as provided with numerous perforations 13, but it will be understood that this is largely indicative, and the belt may be constructed in any manner to provide numerous passages therethrough, these passages being of a size too small to permit lumps of coal from passing therethrough, which lumps it is desired to utilize, and are sufficiently large to prevent clogging with fine coal or coal dust. Arranged in underriding relation to the upper run of the belt 6 is a box 14 having a

rather broad ledge 15 about its upper margins, and below this ledge the box is provided with a perforated cover 16, either as indicated best in Fig. 3, or in any other way

5 to provide large passages, larger than the passages 13, into the box 14. These passages are indicated at 17. Leading from the interior of the box 14 is a pipe 18 connected with a suction device 19 of any approved

10 type capable of exhausting air from the box 14 in desired quantities. The box 14 may be tapered downwardly and has communicating therewith another pipe 20 discharging into the tank 2 at an appropriate point.

15 In the drawings no attempt is made to show any exact proportions, but the parts in practice are proportioned to handle large quantities of coal expeditiously. The volume of coal which it is necessary to handle

20 to make the structure operative as a commercial proposition, is so great that the speed with which the excess water is removed is of the utmost importance. In fact, it is more important to remove ninety per

25 cent. of the water quickly than to remove ninety-five per cent. by a slower process, wherefore the openings in the movable belt or table 6 must be of a size in excess of a very considerable per cent. of the granular

30 material resting upon it, and as this material is of commercial importance, it is returned through the pipe 20 to the settling tank for subsequent reclamation. When the coal is saturated with water the fine particles have little or no tendency to pass

35 through the perforations, but as the coal dries out by the passing of the excess water to the suction box, the action of the suction causes a great deal of this fine material to

40 enter the suction box.

When the coal is lifted by the elevator 4 out of the tank 2, it, of course, carries a great deal of water with it, and the coal is quite wet when it is dumped into the hopper

45 5. This hopper, therefore, is constructed to deliver the coal upon the belt 6 in a wide thin stream and as it is carried over the suction box 14 air is drawn through the thin body of coal, while a certain amount of the

50 water will escape by gravity. The absorbed water and such water as sticks by surface attraction to the coal is rapidly evaporated, and also dislodged by the streams of air produced by the suction, so that by properly

55 proportioning the belt 6 and box 14, together with the travel of the parts as to the time of action and presenting but a comparatively thin layer of coal at any one time by far the larger part of the carried water is

60 removed from the coal and the latter reaches the bin 11 in a sensibly dry condition. In order to cause the proper movement of the belt 6 it is to be understood that suitable power is applied to one or both of the

65 drums or rollers 7 in any appropriate man-

ner which it is not deemed necessary to illustrate.

It is to be observed that the suction box 14 is so disposed with relation to the belt 6 that not only will water gravitate from the 70 coal through the belt 6 and into the suction box, but strong streams of air are drawn into the suction box through the coal, the direction of these streams being prevented from following any other course than 75 through the coal by the contact of the belt about the margins of the box, so that what little leakage may there occur is negligible. Both water and such coal dust or small particles as may find their way into the box 14 80 will ultimately reach the pipe 20 by gravitation and pass by the pipe 20 back to the tank 2.

While the invention has been described more particularly with reference to washed 85 coal it may be employed in connection with washed ore or other similar material.

In the particular arrangement shown the pipe 20 enters the settling tank 2 below the overflow water level, and by locating the 90 suction box 14 at a suitable height no water will be drawn from the tank 2 into the suction box, while at the same time the water within the tank 2 acts as an effective seal against the entrance of air to the suction 95 box by way of the pipe 20.

The belt or conveyer 6 may be made in any manner suitable for the purposes of the invention and may either be a perforated structure preferably sectional to permit its 100 movement about the rollers or drums 7, 8, or it may be a continuous perforated belt or band, or may be made of woven wire, or in any manner in which it is customary to make such belts. The word perforated, 105 therefore, as used with reference to the belt 6 or the top or cover 16 of the box 14, is to be understood as covering in its meaning any kind of openings or passages answering the purpose. 110

What is claimed is:—

1. In an apparatus for drying washed coal and other materials, a traveling belt having perforations therethrough of a size to be traversed by water and small particles 115 of the material being treated, means for depositing the wet material upon the belt, a suction box in underlying relation to the run of the belt receiving the material and having a perforated top with a marginal ledge 120 thereabout arranged to engage the under surface of said run of the belt and hold the same in spaced relation to the perforated top of the box in substantially air tight relation thereto at the ledge, and means connected 125 with the suction box for the conveyance therefrom of water and fine material passing into the box through the belt.

2. An apparatus for drying washed coal and other material comprising a settling 130

5 tank for receiving the washed coal, an elevating conveyer entering said tank, a hopper arranged above the plane of said tank and into which the conveyer discharges, a
10 conveyer belt in position to receive material directed from the hopper and provided with perforations of a size to be traversed by water and finer particles of the material, a suction box in underlying relation to the run of the belt receiving the material, said box having a marginal ledge thereabout rising above the perforated top to form an air seal with the perforated belt, air suction means connected with the suction box, and a duct

leading from the suction box to the settling tank and entering the latter in position to be water sealed by water in said tank. 15

In testimony, that we claim the foregoing as our own, we have hereto affixed our signatures in the presence of two witnesses. 20

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DAVID HANCOCK.

Witnesses for Charles Catlett:

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