

M. Hanford.

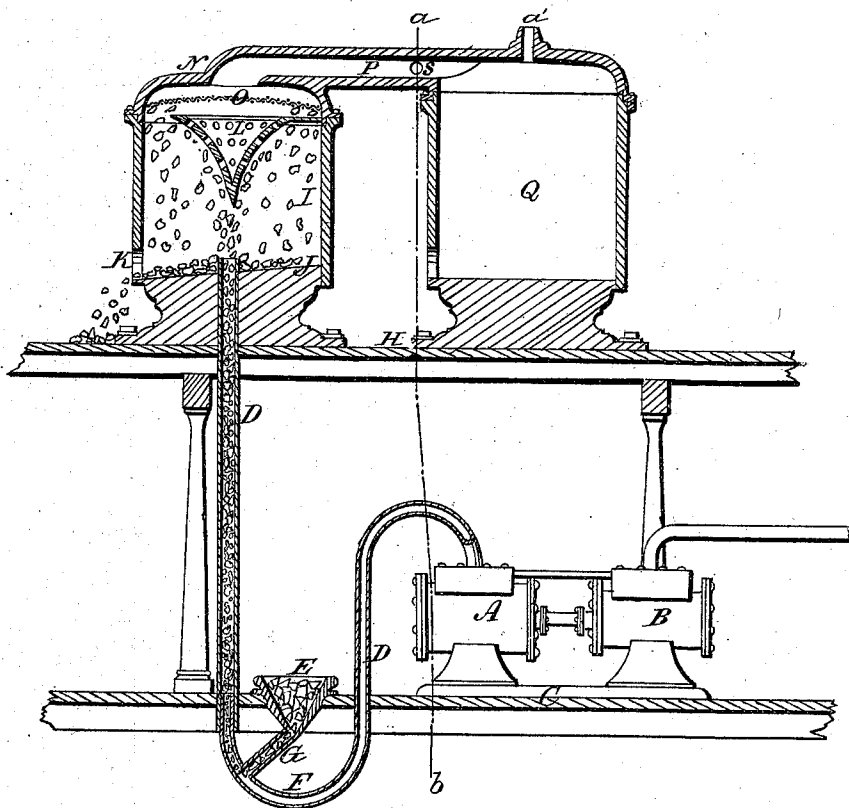
Sheet 1 of 2 Sheets.

Purifying Coal.

N^o 90,097.

Patented May 18, 1869.

Fig. 1.



Witnesses.
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Edmund H. Hewins

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Sheet 2-2 Sheets.

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Fig. 3.

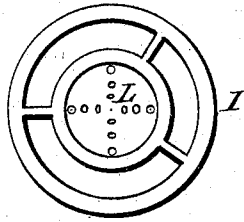
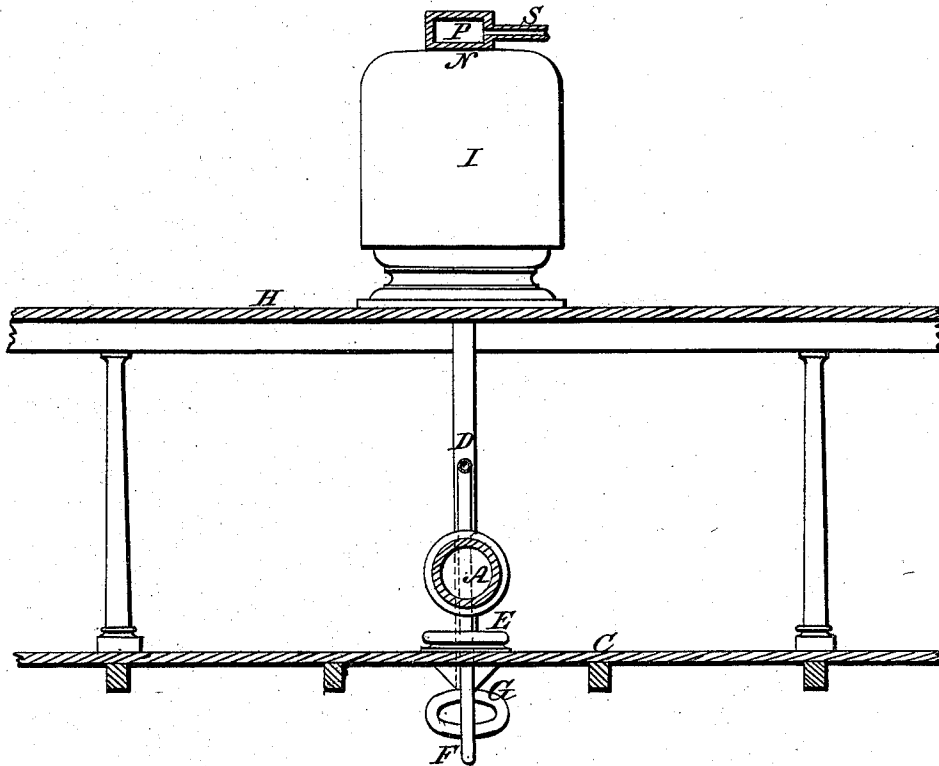


Fig. 2.



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United States Patent Office.

MELANCTHON HANFORD, OF BOSTON, MASSACHUSETTS.

Letters Patent No. 90,097, dated May 18, 1869.

IMPROVED APPARATUS FOR PURIFYING, SCREENING, AND COOLING REBURNT BONE-BLACK.

The Schedule referred to in these Letters Patent and making part of the same.

To all to whom these presents shall come:

Be it known that I, MELANCTHON HANFORD, of Boston, in the county of Suffolk, and State of Massachusetts, have made an invention of a new and useful Combination of Mechanism for Elevating, Cooling, and Screening Renewed Charcoal of Sugar-Refiners; and do hereby declare the following to be a full, clear, and exact description thereof, due reference being had to the accompanying drawings, making part of this specification, and in which—

Figure 1 is a vertical central section, and

Figure 2, a vertical and transverse section of an apparatus or arrangement of devices in which my invention is embodied.

Figure 3 is a plan of the screening-chamber, which will be hereinafter referred to.

The process of refining sugar, and the use to which charcoal is put, or the function it performs in such process, are so well known and understood that extended reference to the same in this specification is considered superfluous and unnecessary. Suffice it to say, that the charcoal, having become saturated or impregnated with the impurities from the sugar, is first subjected to great heat, to destroy and remove these impurities, and is subsequently laid upon an extended flat surface, and raked over and stirred by a workman for an hour or more, until cool, when it is collected and elevated to its destination by a bucket-elevator, so called, or by being hoisted in barrels.

This act of raking and stirring the coal, as well as the character of the device employed for elevating it, mutually tend to granulate and pulverize portions of the charcoal, which, added to the time consumed in stirring the coal, causes a serious loss well understood by sugar-refiners, and which my invention is intended to overcome.

Several incidental advantages result from the adoption of my invention, which will be herein duly explained.

The invention, comprising the subject-matter of this patent, relates to a systematic combination and arrangement of instrumentalities for receiving and elevating, to a desired locality, a mass of revived charcoal in a heated state, of screening the coal in its ascent, and of separating the granulated and pulverized portion from the larger particles, the former being moistened, and conveyed after such separation to a suitable receiver, and the latter being discharged into a proper receptacle for use anew, the coal in its ascent being thoroughly cooled by the same instrumentality which elevates it.

The device for elevating the coal consists in the employment of a suitable air-forcing pump, driven by steam or other enginery, and connected with a tubular chute, which communicates with a suitable screening-device surmounting such pump; a receiving-hop-

per being disposed in close proximity to the pump, and connected with the chute in such manner that a mass of charcoal, in a heated state, being thrown into such hopper, shall be enveloped by and raised with the blast of air flowing through the chute, the circulation of air about the coal during its ascent having the effect, as before observed, of extracting the latent heat therefrom.

The device for screening the mass of coal consists of a suitable closed chest for receiving such mass of coal, and connecting with the terminus of the chute, the interior of such chest being provided at its upper part with an inverted, conical, and foraminous deflector, for deflecting the larger particles of the coal outwardly and downward upon the floor of the chest, which is inclined in order to allow such particles of coal to roll or slide therefrom into a suitable receiver; the cover of the chest being provided with a suitable screen for permitting escape of the pulverized and finely-granulated portions of coal, which are carried by the blast of air through a conduit communicating with the cover of the chest at one extremity, and at its opposite extremity opening into a second closed chest or receiver, wherein it is deposited; the mass of pulverized coal or dust, in its passage through the conduit, being moistened by steam admitted thereto under low pressure, by which its particles are caused to adhere, and its precipitation within the receiver aided and hastened, the whole being as hereinafter explained.

In the drawings, to which allusion has before been made, and which illustrate my invention—

A denotes an air-forcing engine, of any well-known or proper construction, and B, a steam-engine, such devices being constructed and arranged in any of the well-known methods, and disposed upon the floor of an apartment of a sugar-refining establishment, such floor being shown at C.

D denotes a siphon-shaped tubular chute, one extremity of which is connected with the air-pump A, while its opposite extremity is prolonged, and carried to a higher apartment of the establishment.

Immediately adjacent to and opposite the outer end of the pump A, I place a trumpet-shaped hopper E, extending through the floor C, and over the lower bend F of the siphon, with which it communicates by an annular pipe, G, as represented in the drawings.

The floor of the upper apartment in which the screen is placed, is shown at H, the chute D extending upward through it.

The screening-chest is shown at I as a closed vessel, of a cylindrical or other proper shape, the floor J of the same being inclined at an obtuse angle, and provided with a discharging-orifice, K, for permitting the escape of the larger particles of coal, which descend by their own gravity to such floor.

Within such chest I, and at the upper part there

of, I dispose an inverted, conical, and concave and foraminous deflector L, the disposition of the deflector being such that an annular space interposes between its base and the inner circumference of the chest.

Immediately over the deflector L, and within the cap N of the chest I, I place a horizontal screen O, while to the upper part of such cap, and communicating with the interior of the chest, I affix a horizontal conduit P, the outlet of such conduit communicating, in turn, with the interior of a second closed chest, Q, disposed alongside of the chest I, and which forms a receptacle for the dust and finer portions of the coal. The cover of this latter chest may be provided with an outlet, a', for permitting the escape of the blast of air.

A steam-pipe, shown at S in the drawings, is to be applied to the conduit P, and communicating with its interior.

The above description embraces the mechanical construction and arrangement of the devices, whose combination forms my present invention, the operation of the same being as follows, premising the fact that the air-pump is in effective operation:

A mass of "renewed" charcoal, in a heated state, is thrown into the hopper E, and by means of the annular pipe G, is conducted into the chute D, and the current or blast of air through the same induced by the air-pump A.

The mass of coal is seized and enveloped by the current of air, and elevated by and with it to the receiving-chest I in its passage through the chute D, parting with its latent heat, and being thoroughly cooled.

The mass of coal thus transported impinges against and about the apiculated deflector L, a portion of the dust and finely-granulated particles passing through the interstices of such deflector, and the remainder circulating about its exterior, the dust being carried upward through the screen O, and into the conduit P, the said screen having the effect of entirely preventing the passage of any-sized particles of coal, which may have reached this point in company with the dust.

The particles of coal which are deflected from the surface of the deflector L, as well as those impinging against the screen O, fall by gravitation to the inclined floor of the chest I, from whence the mass is discharged through the orifice K into a proper receptacle, when it is ready to renew its functions.

The dust and fine particles of coal are carried by the current of air through the conduit P, being, in their transit through such conduit, moistened by the steam admitted thereto sufficiently to adhere together, and

acquire thereby sufficient gravity to fall precipitately within the receiver Q, from which the resulting mass may be removed at proper times. The steam also has the effect of preventing escape of the dust with the blast of air from the outlet of the receiver.

The advantages of my invention, as above explained, are several, among which are the following:

First, an economy in labor is effected in proportion to the difference in time required to rake over and disturb the heated mass of coal, and that required to dump it into the hopper E, this economy of time being, in a large establishment, a matter of considerable moment.

Second, by the use of my invention, the particles of coal are, to a much greater degree, saved intact than by the mode now adopted for cooling and elevating them, which tends to pulverize a great amount of the coal; the saving in this respect by my invention being an important matter, as will be apparent when the fact is taken into consideration that the same particles of coal are used and cleaned many times over in the process of refining sugar.

Third, the employment of steam adds in a great degree to the collection and precipitation of the dust arising from the elevation of the mass of coal, the advantage of which will be well understood by experienced persons.

The entire apparatus is compact, and may be produced at small comparative cost.

Claim.

I claim as my invention, and desire to secure by Letters Patent of the United States, as follows:

As a device for elevating, cooling in transition, and screening a mass of renewed charcoal from sugar-refineries, the employment and arrangement of an air-engine, a receiving, elevating, and cooling-chute, and screening and receiving-chests, the chute being connected with the engine, and provided with the filling-hopper, or its equivalent, and the receiving-chest with the apiculated deflector L and screen O, and connected with the receiving-chest Q by the conduit P, the latter being provided with means for admitting steam to its interior, and the whole operating in manner, and to produce results substantially as before shown and described.

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Witnesses:

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