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2,457,587

MATERIAL RECLAMATION SYSTEM

Filed April 7, 1945

2 Sheets-Sheet 1

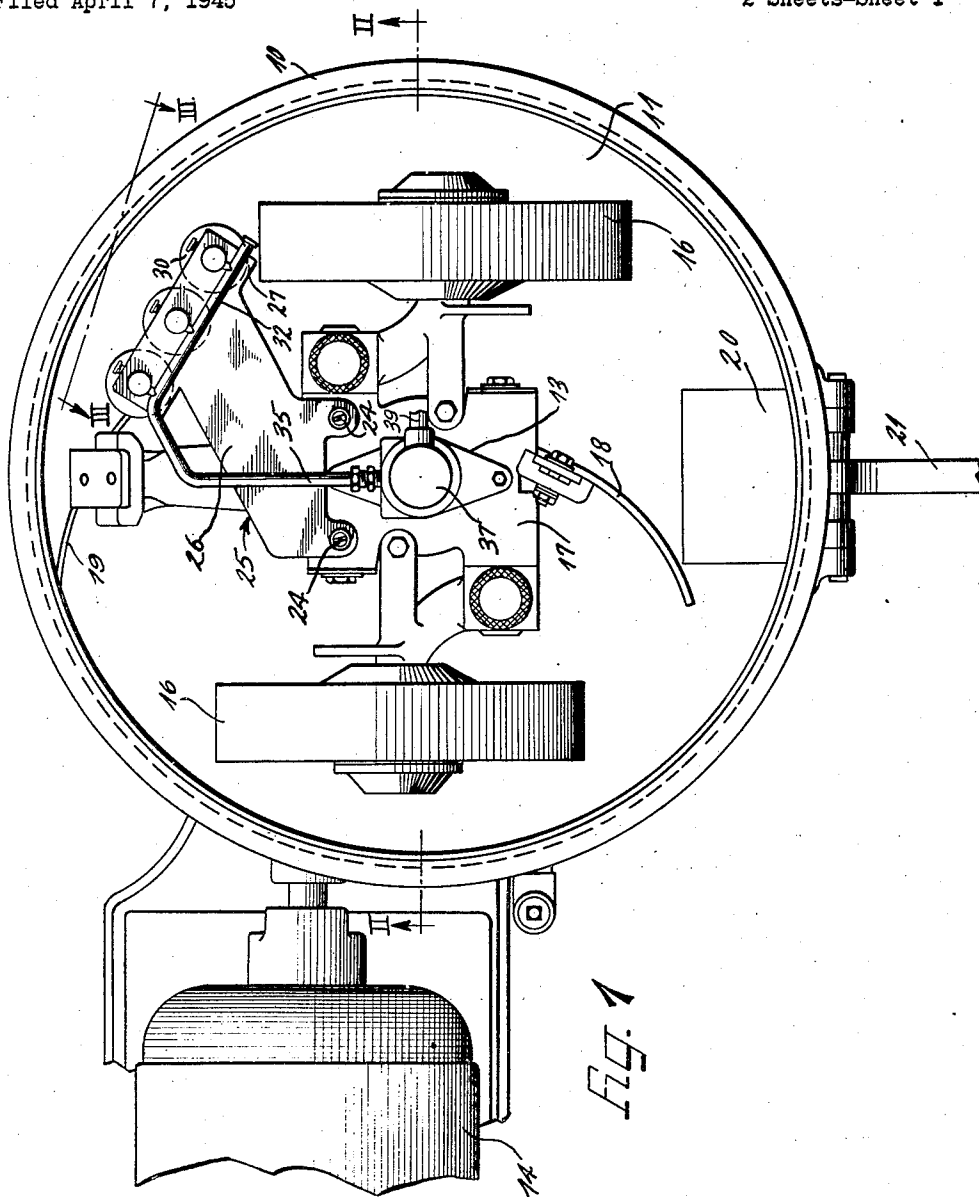


Fig. 1

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Fig. 2

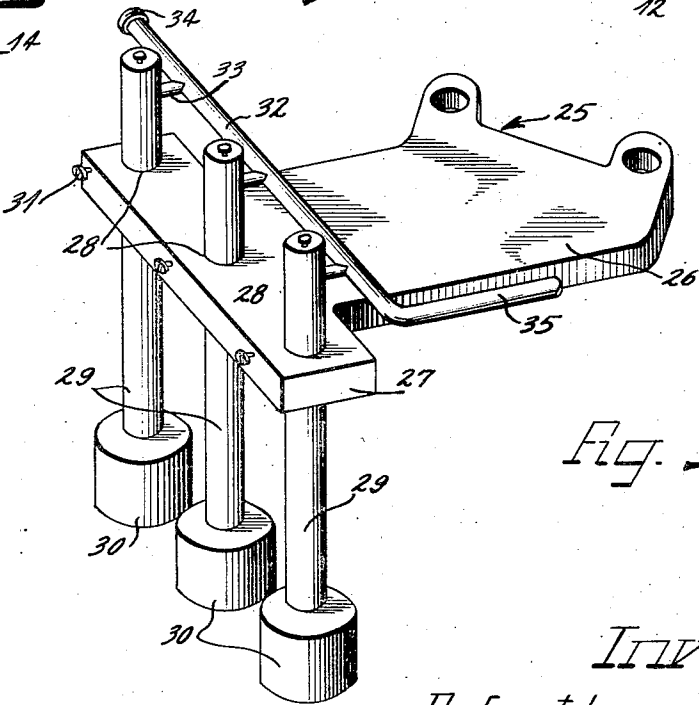
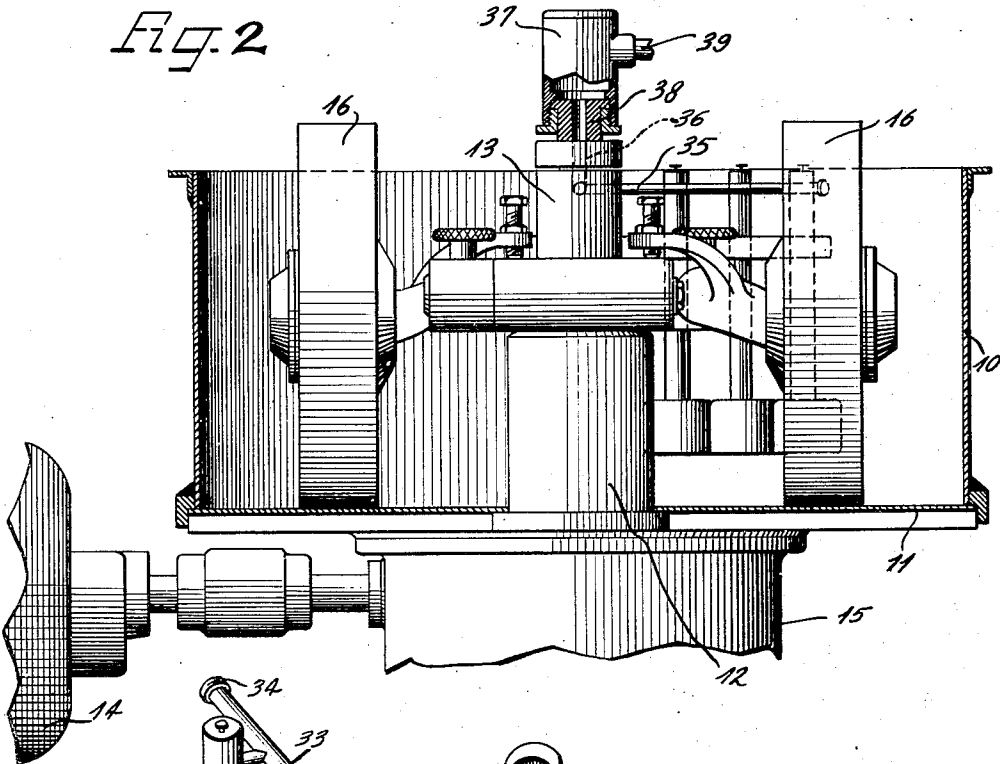


Fig. 3

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UNITED STATES PATENT OFFICE

2,457,587

MATERIAL RECLAMATION SYSTEM

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6 Claims. (Cl. 22—89)

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This invention relates to a material reclamation system and more particularly to a method of and apparatus for reconditioning granular material, such as sand and the like.

An object of this invention is to provide an economical way of quickly and efficiently burning off foreign matter from material being mulled and agitated.

Another object of this invention is to provide in a material reclamation system for the economical burning off of foreign matter from granular material being reconditioned without the necessity of using expensive and extensive auxiliary heat treating apparatus.

Still another object of this invention is to provide a simple attachment for a material mulling apparatus which can be used with the apparatus employed to muld sand to burn off foreign matter such as carbon and the like from the material being treated.

A still further object of the invention relates to the provision in a method of treating granular material, such as sand, of a step which can be carried out contemporaneously with the mulling operation and whereby foreign matter can be burned from the material being mulled.

In accordance with the general features of this invention there is provided in a method of treating granular material, such as sand, the steps of mulling and agitating the material in a given area and contemporaneously projecting one or more jets of flame directly into the material being mulled to burn off foreign matter such as carbon from the material.

Still another feature of this invention is to provide an attachment for the mulling and agitating machine of the type including a revolving head in a material confining chamber, the attachment comprising a support for fastening to and rotation with the head and including at least one nozzle for projecting downwardly a jet of flame directly into the material being treated to burn off foreign matter therefrom.

A further feature of the invention relates to a provision in a mulling and agitating apparatus including a mulling chamber and a rotatable muller head with spaced rotatable mullers carried thereby, heating means comprising at least one nozzle projecting a flame downwardly in the chamber against the material and a support for the nozzle connected to the head so as to carry the nozzle in a position between the mulling rolls for rotation with the head during the mulling operation.

Other objects and features of this invention will more fully appear from the following detailed

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description taken in connection with the accompanying drawings, which illustrate a single embodiment thereof, and in which

Figure 1 is a plan view of a mulling apparatus embodying the features of this invention and being partly broken away;

Figure 2 is a fragmentary sectional view taken on substantially line II—II of Figure 1, looking in the direction indicated by the arrows; and

Figure 3 is a generally isometric view, partly broken away, of the jet attachment, and which view is taken generally on the line III—III of Figure 1 looking in the direction indicated by the arrows.

As shown on the drawing:

While I have illustrated my invention as being applied to a sand muller, it will be clear from the following description that the invention is equally well useful with other forms of material treating apparatus.

In the illustrated embodiment of the invention, the jet attachment is shown applied to a more or less well known type of muller, which is substantially similar to the muller shown in the Simpson Patent No. 2,226,023, granted December 24, 1940, and assigned to the assignee of this application.

This muller includes a cylindrical wall 10, which together with an integral bottom 11 defines a material receiving chamber in which the mulling and agitating operations are to be conducted. Disposed centrally of this chamber is a pedestal 12 in which is suitably journaled a rotatable head 13 driven by a motor 14 through the means of suitable gearing (not shown) inside of the base 15. The rotatable head 13 has connected thereto for rotation therewith a pair of spaced mulling rolls 16—16, each of which in addition to being rotatable bodily about the axis of the head 13 is also rotatable on its own transverse axis, as it has already been disclosed in the aforesaid patent. The head 13 has connected to it a vertical platform 17 which assists in the support of the mulling rolls 16, and to which my present invention may be attached as I shall describe hereinafter. In addition, this support platform 17 has attached to it plows 18 and 19 which may be of a construction of the type fully disclosed in the aforesaid patent. The purpose of these plows is to agitate the material in the path of the mulling rolls.

In addition, the chamber bottom 11 in which the material is mulled may be provided with a hinged door 20 operable by a handle 21 to open position when it is desired to discharge the conditioned material from the chamber. Any suitable mechanism may be employed for keeping the

door in a closed position. My invention is not specifically concerned with the elements of the mulling apparatus previously described, but relates more to the provision of a novel heat applying attachment for use with such a mulling apparatus. In fact, it is the aim of this invention to provide an attachment of that character and which is of such construction that it may be employed with the aforesaid muller with a minimum amount of change in the assembly.

In Figure 3 I have illustrated in a more or less isometric view, the principal structure of my attachment which is designated generally by the reference character 25. It comprises a supporting arm 26 adapted to be fastened by means of bolts or screws 24 to the platform 17, as shown in Figure 1, so as to be rotatable with the head of the muller about the axis of the head. The free portion 27 of this arm is provided with one or more apertures 28, in each of which is adjustably supported a vertical nozzle or burner tube 29 having at its lower end a flame jet projecting nozzle or head 30. Each burner may be adjustably secured in a vertical position to the arm 26 by any suitable means, such for example as a set screw 31. In other words, the vertical position of each arm may be adjusted in accordance with the character of the material being treated as well as the depth of the material that has been put in the chamber for treatment.

In addition, each of the nozzle tubes 29 is connected to a common fuel header or pipe 32 through the means of a lateral pipe connection 33. One end of the fuel tube 32 is capped at 34 and the other end is bent at 35 and projects into a hole in the head 13 as shown in Figure 2. The inner end of the bent end 35 is in communication with a bore 36 which, in turn, is in communication at its upper end with the interior of a fitting 37 having a fuel pipe connection 39. It will be appreciated that the fitting 37 through which the fuel is delivered to the burners must remain stationary and for this reason the upper end of the head 13 is provided with a swivel connection 38 suitably journaled and anchored within the fitting 37 so as to rotate therein. Any suitable type of swivel fitting such as is now available on the market may be used to establish a coupling between the burner pipe 35 and the fixed fuel line 39. In these couplings it is sometimes customary to employ sealing gaskets and the like to prevent leakage.

I propose to deliver a proper mixture of gas and air from the pipe 39 through the head 13 to the burner nozzles of my attachment.

In the use of my invention, it will be appreciated that granular material such for example as used foundry sand to be reconditioned is first placed in the chamber on top of the chamber bottom 11. Thereafter upon energizing of the motor the head 13 and the mulling rolls 16 are caused to rotate about the axis of the head resulting in the rolls 16 mulling the sand against the bottom 11. Contemporaneous therewith the plows 18 and 19 function to stir and agitate the sand as they are rotated with the head.

During these normal mulling operations and without any change in such operations, the attachment 25 of my invention functions to deliver one or more jets of flame against the sand on the bottom 11. Any suitable valve mechanism (not shown) may be employed to control the delivery of fuel to the nozzle jets. Moreover, each of the nozzles 30 may be of any suitable nozzle construction, such as is now employed in gas

burners and the like. I find it desirable in the treatment of foundry sand, for example, to so proportion the combustion mixture of air and gas that the direct gas flame jets will have a temperature of from 2000 to 2500° F. Due to this high temperature of the jet and its direct application to the sand, I find that it is possible to eliminate foreign matter, such as carbon from sand by a direct burning action in a minimum amount of time and with a very simple form of attachment.

It should be noted that if it is so desired, the upper end of the chamber wall 10 may be covered by a suitable hood such for example as that disclosed in the aforesaid Simpson patent.

It is believed that my novel method of treating granular material and in removing foreign or carbonaceous matter therefrom will be fully understood from the aforesaid description of the apparatus. While my invention is especially useful in the burning off of carbonaceous matter from used foundry sand being reconditioned it is contemplated that it may be equally well used with other types of granular material.

I claim as my invention:

1. An attachment for a material mulling and agitating machine including a muller roller and a revolving head for moving the roller in a material confining chamber, a support fastened to and rotatable with said head and with said roller, a nozzle carried by and rotatable with said support for projecting downwardly a jet of flame directly into the material being treated to burn off foreign matter therefrom.

2. An attachment for a material mulling and agitating machine including a revolving head in a material confining chamber and a muller roller removable with said head, said attachment comprising a support fastened to and rotatable with said head in spaced relation ahead of said roller and including at least one nozzle for projecting downwardly a jet of flame directly into the material being treated to burn off foreign matter therefrom, said jet being supplied with fuel through a fitting carried by and in which a portion of said head is rotatably disposed.

3. In a material mulling and agitating apparatus including a material receiving chamber and a rotatable muller head therein, means carried by and rotatable with said head for projecting a jet of flame directly against the material as it is being milled to burn off foreign matter therefrom, said means comprising at least one nozzle in said chamber and a support for said nozzle connected to said head to rotate therewith.

4. In a material mulling and agitating apparatus including a material receiving chamber and a rotatable muller head therein, means carried by said head for projecting a jet of flame directly against the material as it is being milled to burn off foreign matter therefrom, said means comprising at least one nozzle in said chamber and a support for said nozzle connected to said head, and said support being attached to said head for rotation therewith and with the muller about the axis of the head.

5. In a material mulling and agitating apparatus, including a material receiving chamber and a rotatable head carrying a pair of mulling rolls rotatable with said head and each of which rolls is rotatable also on its own axis, means carried by said head for projecting a jet of flame against the material as it is being milled, said means comprising at least one nozzle and a support for said nozzle connected to said head, said nozzle

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being located between the mulling rolls and in the path of the rolls so as to heat treat the material as the same is mulled in the chamber.

6. In combination, a mulling chamber, a muller head rotatable in said chamber, a pair of rollers 5 secured to said head, a support arm engaging said head between said rollers, a burner unit secured on said support arm and including at least one burner for directing a flame for impingement directly on the sand being mulled in 10 the chamber.

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REFERENCES CITED

The following references are of record in the 15 file of this patent:

6**UNITED STATES PATENTS**

Number	Name	Date
1,352,381	Reynolds -----	Sept. 7, 1920
1,401,678	Darlington -----	Dec. 27, 1921
1,433,429	Taylor -----	Oct. 24, 1922
1,435,930	Laury -----	Nov. 21, 1922
1,627,585	Vogel-Jorgensen ----	May 10, 1927
2,192,310	Hartshorn -----	Mar. 5, 1940
2,412,057	Nichols -----	Dec. 3, 1946

FOREIGN PATENTS

Number	Country	Date
192,677	Great Britain -----	Feb. 1, 1923