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SINTERING

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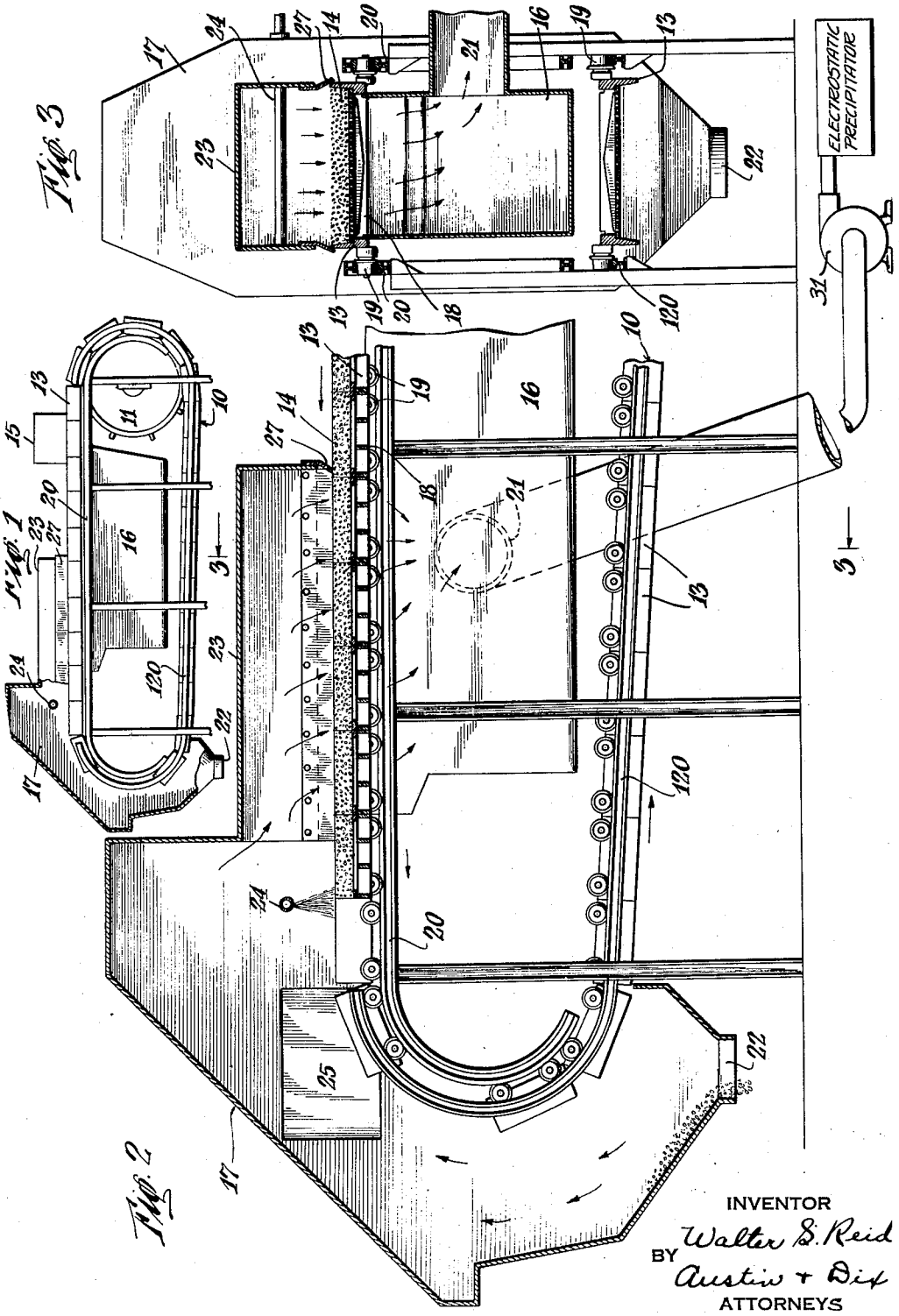


Fig. 3

Fig. 1

Fig. 2

INVENTOR
Walter S. Reid
BY Austin & Dix
ATTORNEYS

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SINTERING

Walter S. Reid, Murray, Utah, assignor to American Smelting and Refining Company, New York, N. Y., a corporation of New Jersey

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5 Claims. (Cl. 266—21)

The invention relates to the art of metallurgy, and more particularly to the art of sintering metallurgical charges.

According to the invention, a sintering machine of the Dwight & Lloyd type, consisting of a traveling conveyor and the usual ignition device and wind box, is provided with an auxiliary hood at the discharge end of the conveyor. The auxiliary hood extends to some degree over the wind box so that the latter draws air from the hood. This operates to direct the dust caused by the dumping operation back into the charge on the conveyor. A spraying device may also be applied to the auxiliary hood to assist in laying the dust, and to condition the gases drawn out through the wind box for subsequent treatment by an electrostatic precipitator, for example, of the Cottrell type.

The invention further consists in the new and novel features of operation and the new and original arrangements and combinations of steps in the process hereinafter described, and more particularly set forth in the claims.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims appended hereto, the invention itself, as to its objects and advantages, and the manner in which it may be carried out may be better understood by referring to the following description taken in connection with the accompanying drawing forming a part thereof, in which

Fig. 1 illustrates diagrammatically a sintering machine according to the invention;

Fig. 2 is an enlarged longitudinal section through the discharge end; and

Fig. 3 is a section on the line 3—3 of Fig. 2.

In the following description and in the claims, various details will be identified by specific names for convenience, but they are intended to be as generic in their application as the art will permit.

Like reference characters denote like parts in the several figures of the drawing.

In the drawing accompanying and forming part of this specification, certain specific disclosure of the invention is made for purposes of explanation, but it will be understood that the details may be modified in various respects without departure from the broad aspect of the invention.

Referring now to the drawing, and more particularly to Fig. 1, the sintering machine comprises a closed path, indicated generally by 10, on which run a series of pallets or cars 13 carrying the charge to be sintered, indicated by 14. A bull wheel, indicated by 11, is provided at the charging end for carrying the pallets from the lower part of the closed path to the upper part, as is well understood in the art.

Located at the charging end of the conveyor, at a point subsequent to the application of the charge, is a muffle burner 15 having suitable ignition apparatus, as will be understood by those skilled in the art, for igniting the mixture of ore and fuel to be sintered. Located under the upper part of the conveyor is the usual wind box 16 to which a source of suction is applied. At the discharge end of the conveyor, where the sintered ore is dumped from the pallets, a hood 17 is provided for a purpose hereinafter described.

Referring now more particularly to Figs. 2 and 3, each pallet 13 comprises a frame 18 having wheels 19 which run upon the rails 20, as indicated. At the discharge end these pallets are inverted and run back by gravity on return rails 120 to the bull wheel 11 where they are carried to the starting position, as is well known in the art.

The wind box 16 has a suitable sealing connection with the frame of the pallets and is provided with a flue 21 connected to a suitable source of suction indicated by 31. The suction device 31 may direct the products of the sintering operation to any suitable device for further metallurgical treatment, such as, a high potential electrostatic precipitator of the Cottrell type illustrated diagrammatically in the drawing, which operates to separate out the fume or solid particles in the gases.

The discharge hood 17 is provided with an opening 22 which lets pass the sintered charge dumped from the pallets. It is also provided with an inspection door 25 and a spray pipe 24 to which a source of water supply is connected for spraying the sintered charge. The hood 17 is provided with an extension 23 which projects over a portion of the wind box 16, and is also provided with sealing flaps 27, as illustrated.

It is thought that the operation of this invention will be obvious to those skilled in the art. A mixture of crushed ore and fuel is supplied to the sintering machine at the charging end, just before the muffle 15, to spread a thin layer of charge on the pallets, as indicated. This charge is ignited by the ignition apparatus in the muffle 15 and the suction in the wind box 16 draws air down through the charge causing the charge to become sintered as it travels along in the usual manner of operation of such machines.

The sintered charge is dumped at the discharge end (as shown) and the suction from the wind

box 16, applied to the hood 17, draws the dust raised by the dumping operation and the spray from spray 24 to the top of the charge within the hood extension 23, as indicated by the direction of the arrows.

An advantage of the present invention is the elimination of the usual stack at the discharge end of the sintering machine and the recovery of the dust and fines caused by the dumping operation, which usually pass out of this stack. The draft draws the dust back in a layer on the pallets and the spray wets it down. Furthermore, the spraying of the water upon the hot bed of sintered charge causes steam to be formed which is drawn into the gas stream through the wind box. This assists materially in humidifying and conditioning the gases which pass to the electrostatic precipitator.

The present invention renders it unnecessary to use sulphuric acid or other substance for conditioning the gases for the electrostatic precipitator. The invention also renders unnecessary the spraying of water under pressure into the flue chambers ahead of the precipitator. This spraying, which formerly was necessary, is not only expensive but it has bad effects on the Cottrell apparatus. By the present invention, the excess heat in the sintered charge is used for generating the steam for the humidification and conditioning of the gases without any bad effect on the Cottrell precipitator.

While certain novel features of the invention have been disclosed and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. The metallurgical process which comprises feeding a charge in a thin layer onto a traveling conveyor, igniting said charge at the upper part thereof, applying a suction under said charge throughout the extent of the sintering zone to draw air through said charge, conveying the gaseous products of combustion to an electrostatic precipitator of the Cottrell type, dumping said charge after it has passed through the sintering zone, spraying said charge after it has passed through the sintering zone and causing the dust raised by said dumping operation and the moisture from said spray to be directed back onto the charge on the conveyor, whereby the dust caused by said dumping is conveyed back to the charge and the gaseous product is conditioned prior to its introduction into the precipitator.

2. In a furnace, a conveyor adapted to support a charge, means for applying a charge to said conveyor at the feeding end thereof, means for igniting the charge, a discharge hood enclosing the discharge end of said conveyor and within which the charge is dumped, means for supplying an aqueous conditioning fluid in said discharge hood and means for applying a draft to said charge via said discharge hood.

3. In a sintering machine, a movable conveyor, means for feeding charge to said conveyor at the feeding end, a muffle burner disposed over said conveyor at the feeding end, a wind box having a source of suction applied thereto and disposed under said conveyor and extending substantially the entire burning zone along the conveyor, said conveyor dumping the sintered charge at the discharge end, a discharge hood surrounding the discharge end of the conveyor and extending for a distance over said wind box, said discharge hood having an opening in the bottom through which the sintered charge falls, and an aqueous spray device in said discharge hood disposed over the discharge end of said conveyor beyond said wind box, said discharge hood being sufficiently closed to cause a draft to be drawn in through said bottom opening, said draft taking up the dust raised by dumping the sintered charge and also liquid from said aqueous spray device and depositing them on the top of the charge passing over the wind box.

4. The metallurgical process which comprises feeding a charge onto a traveling conveyor, igniting said charge, applying a draft to said charge, conveying the gaseous products of combustion to an electrostatic precipitator to precipitate suspended solids, dumping said charge after it has been burned, spraying said charge with water after burning but before dumping and causing the moisture from the spray and the dust raised by dumping to be directed into said draft before application to said charge.

5. The method of operating a sintering machine which comprises feeding a charge onto a traveling conveyor, igniting the charge, applying a draft to the charge, conveying the gaseous products of combustion to an electrostatic precipitator to remove suspended solid particles, and supplying water from an external source to said charge during the burning process to condition the gases for the precipitator.

WALTER S. REID.