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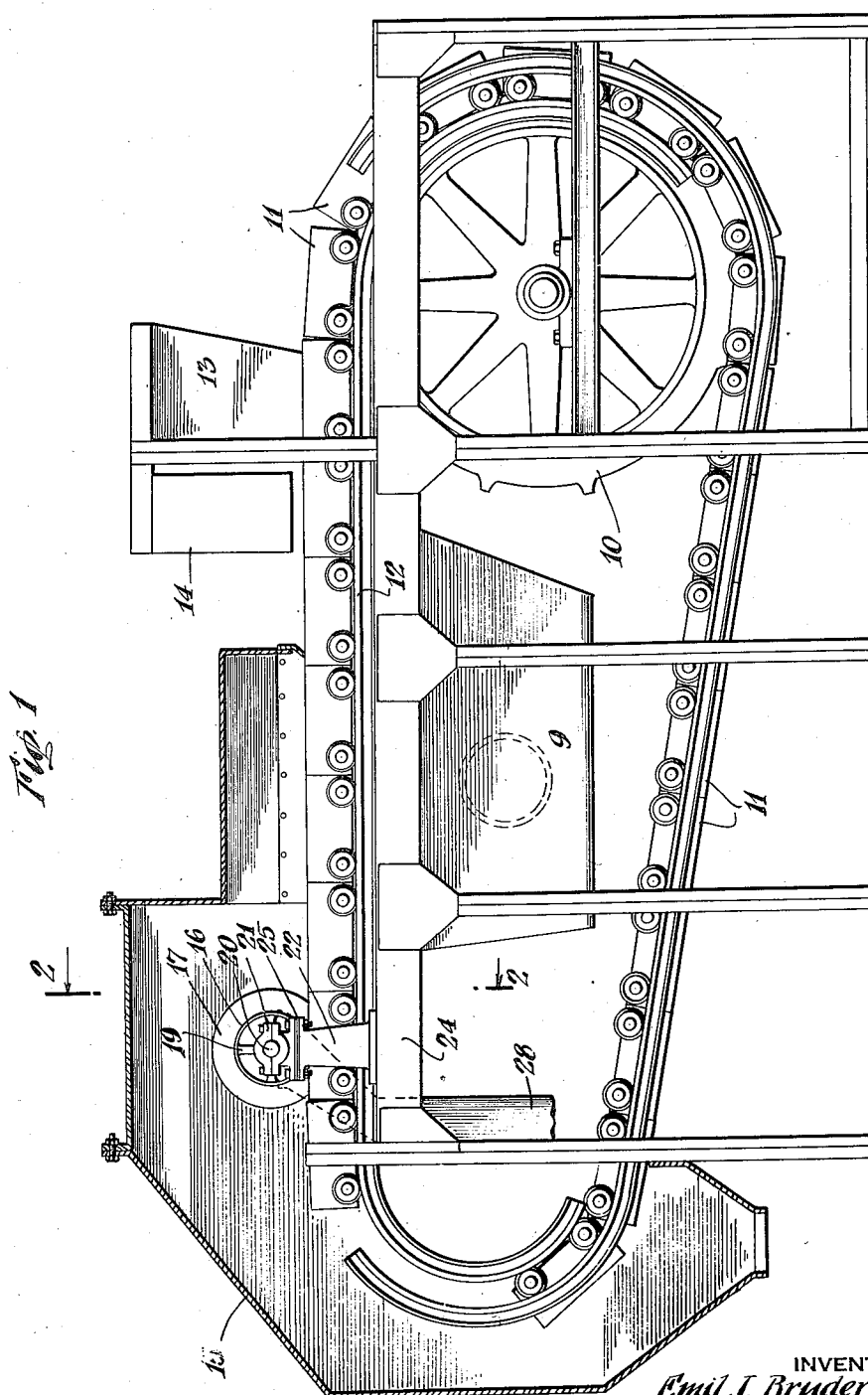
E. J. BRUDERLIN

2,178,366

SINTERING

Filed Feb. 19, 1937

3 Sheets-Sheet 1



INVENTOR
Emil J. Bruderlin
BY *James R. Kemp*
ATTORNEY

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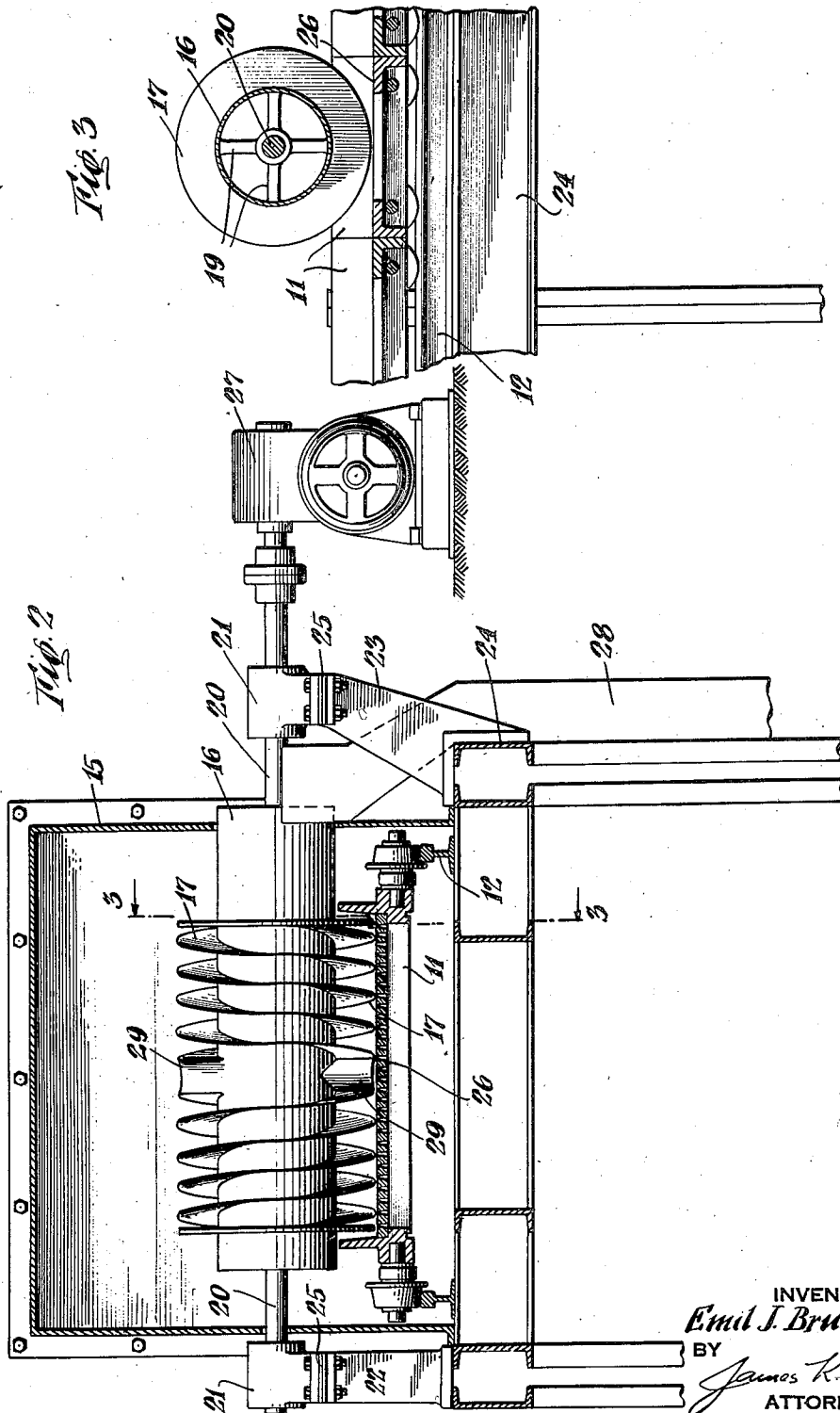
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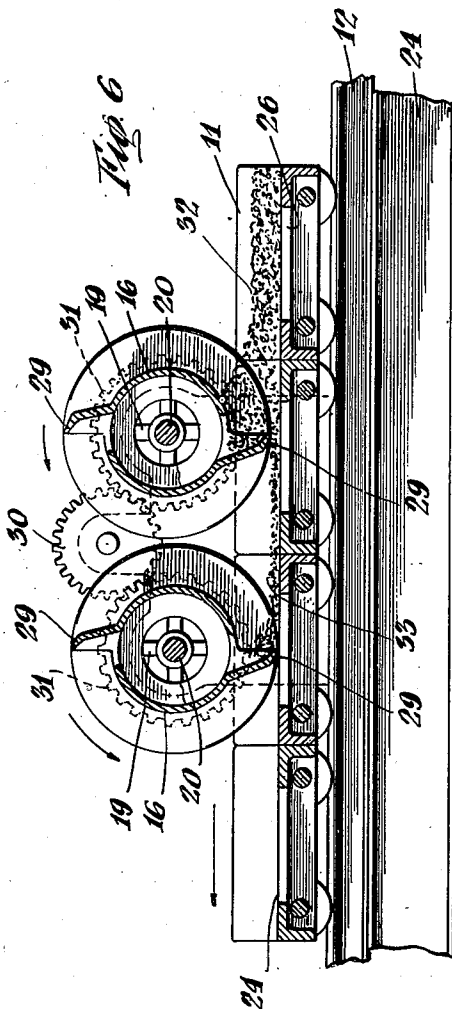
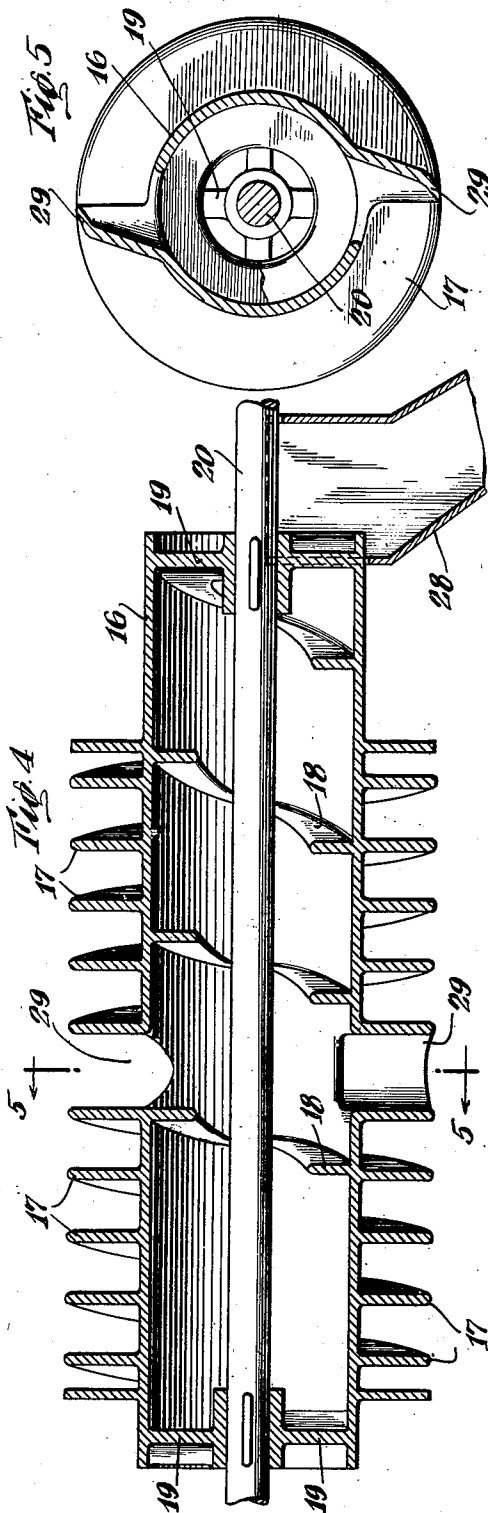
E. J. BRUDERLIN

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SINTERING

Filed Feb. 19, 1937

3 Sheets-Sheet 3



INVENTOR
Emil J. Bruderlin
BY
James K. Kent
ATTORNEY

UNITED STATES PATENT OFFICE

2,178,366

SINTERING

Emil J. Bruderlin, Amarillo, Tex., assignor to
American Smelting and Refining Company,
New York, N. Y., a corporation of New Jersey

Application February 19, 1937, Serial No. 126,623

6 Claims. (Cl. 266—1)

This invention relates to sintering and particularly concerns a novel conditioning and discharge device for sintering machines.

In accordance with the invention, a sintering machine, preferably of the straight line or Dwight-Lloyd type, is provided at its discharge end with one or more rotating or revolving cylinders having helicoid or spiral flights mounted thereon in a manner calculated to cut and condition the sinter cake and deliver the resulting product from the machine.

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 drawings forming a part thereof, in which

Fig. 1 illustrates diagrammatically a sintering machine embodying the invention;

Fig. 2 is an enlarged cross section taken on the line 2—2 of Fig. 1;

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

Fig. 4 is a longitudinal section through the type of conditioning and discharge device illustrated in Fig. 2;

Fig. 5 is a cross section taken on the line 5—5 of Fig. 4, and

Fig. 6 is a fragmentary longitudinal cross section of a sintering machine equipped with two devices of the type shown in Figs. 2, 4 and 5.

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

Referring to Fig. 1, there is illustrated a sintering machine of the Dwight-Lloyd type having bull wheel 10 for conveying pallets 11 along the track 12 under charging device 13 and ignition device 14 and over windbox 9 to the discharge end of the machine enclosed in hood 15. Positioned at the discharge end of the machine and mounted transversely to the direction of movement of the pallets 11 is the revolving cylinder 16.

As is well illustrated in Figs. 2 and 4, spiral flights 17 and 18 are mounted externally and internally, respectively, on the walls of the cylinder 16. The flights, which are of steel that may be specially treated to resist wear, are secured to the cylinder wall in any suitable manner as, for example, by appropriate lugs and bolts (not shown).

The cylinder 16 is provided at its ends with webs 19 which are keyed to shaft 20 carried by

bearings 21 on pedestals 22, 23 supported by the frame 24 of the sintering machine. Means, for example, shims 25 between the bearing 21 and pedestals, are provided for adjusting the cutting edges of the external flights 17 with respect to the grates 26 of the pallets 11.

A variable speed reducer drive 27 permits rotation of the cylinder 16 at any desired predetermined speed and a discharge spout 28 is positioned at the discharge end of the cylinder 16. The configuration of the external flights is such as to form two scoop-like members 29 with openings at the bases thereof into the interior of the cylinder 16.

While the invention is not limited in use to the sintering of any particular material, it will be specifically described with reference to the sintering of zinc ores or concentrates for purposes of illustration.

In a preferred mode of operation, zinc concentrates after pre-roasting are sintered in the manner disclosed in United States Letters Patent No. 2,064,479 granted December 5, 1936 to Stuart H. Levison and Emil J. Bruderlin, preferably with a small amount of additional fuel being supplied to the lower portion of the charge in accordance with the teachings of United States Letters Patent Nos. 1,926,043 and 1,926,044 granted September 12, 1933 to Bruce W. Gonser.

As the sinter cake approaches the discharge end of the machine it meets the cutting edges of the flights 17 mounted on the revolving cylinder 16 which cut up the cake and deliver the sized product from either side to the center of the bed where it encounters the scoop members 29 and is delivered to the interior of the cylinder.

As the crushed and sized product enters the interior of the drum 16 it is conveyed by the spiral internal flights 18 to one end of the drum where it passes through the web or spider 19 into the discharge spout 28. In the preferred practice just described, the cylinder is so positioned that the cutting edges just barely clear the grate bars with the result that all of the sintered product is delivered to the spout 28 thereby practically eliminating the dust nuisance which exists when the cake is dumped from the pallets in the usual manner.

Further, the invention delivers the sintered product from the discharge spout 28 in such size and condition that it may be directly mixed and charged to the reduction retorts. Thus, not only is the need for crushers, crushing rolls, screens, etc. eliminated but a superior sintered product is obtained—actual screen analyses show that the

product produced by the device of the invention is not only more uniform in size but that the percentage or amount of dust and fines is markedly less. The desired predetermined size is readily
5 procured by correlating the speed of the revolving cutter 16 with that of the pallets of the sintering machine proper. By eliminating all necessity for crushers, crushing rolls, screens, etc., material savings both in power and equipment are effected
10 and at the same time another former constant source of dust and dirt is eliminated.

The novel apparatus of the invention may also be employed in a classifying capacity. For instance, it is well known in sintering zinc ores on a
15 down draft sintering machine that the lower portion of the sinter cake will be materially higher in cadmium and lead than the central or even upper portion thereof unless some provision is made to overcome it. Accordingly, when no
20 such provision is made, it is highly advantageous to grade the sintered product.

Such grading or classifying may be readily accomplished by varying the position of the revolving cutter with respect to the grates of the
25 pallets or by employing a plurality of cutters or both. Thus, instead of operating the cylinder 16 so that the external flights just clear the grate bars as previously described, the cylinder 16 may be raised a suitable distance from the grates by
30 inserting sufficient shims 25 between the bearings 21 and pedestals 22, 23. When operated in this manner, the upper portion of the cake is removed as previously described while the inferior portion nearest the pallet grates proceeds past the cutter
35 and is dumped in the usual manner.

In Fig. 6 there is illustrated another possible variation in which the sintering machine is provided with two of the revolving devices embodied
40 by the invention. In construction, they are the same as the single device illustrated in the other drawings except for the provision of the gear 30 and gears 31 for driving one from the other although they can, of course, be so mounted as to be driven independently of each other and at
45 different speeds if desired.

In operating the specific apparatus shown in Fig. 6, the top of the cake 32 is removed by the first cutter while the remainder of the cake 33 is removed by the second cutter. If desired, however,
50 the two cutters can be adjusted to yield three classifications by removing a selected different portion of the bed by each of the cutters and permitting the remaining portion nearest the grates to pass both cutters and be dumped in the
55 usual manner. The particular classification made in any given operation will, of course, be influenced by the other details of the sintering operation such as composition of the charge, its preparation, etc.

60 While various specific disclosures have been made for the purpose of illustrating the invention, it will be readily apparent that the invention is not strictly limited thereto but that, on the contrary, various changes both in the operation
65 and in the detailed construction of the apparatus may be indulged in within its scope. Thus, the flights on the cylinder may be single or multiple

and so designed as to discharge the sintered product to either or both ends of the cylinder. Accordingly, it is desired to include within the scope of the invention these and such other similar modifications as are useful in adapting it to
5 varying conditions and uses.

What is claimed is:

1. Apparatus of the class described comprising a revolving cylinder mounted transversely to the direction of travel of the bed of a sintering machine, a plurality of helical blades encircling said
10 cylinder and mounted thereon, and means for discharging treated material from said machine via the interior of said cylinder.

2. A device for conditioning a sintered product
15 in situ on the bed of a sintering machine and removing the resulting conditioned product therefrom comprising a rotary drum having an opening in the wall thereof, a helicoid blade member encircling and affixed to said drum and terminating in a baffle at said opening, and means for
20 discharging the conditioned product from the interior of said drum.

3. In the combination of a sintering machine with a cylindrical discharge device having an
25 opening in the cylinder wall for receiving material from the bed of the machine, transfer means for removing material from the bed and delivering it to the interior of the device via said opening, and an internal screw conveyor for dis-
30 charging material from the interior of the cylinder, that improvement comprising an external screw on the periphery of the cylinder for engaging the cake and conveying it laterally of said bed to said transfer means.
35

4. A device for physically conditioning and discharging sintered material from the bed of a sintering machine comprising a rotatable drum for mounting across the bed of the machine, the central portion of said drum being provided with
40 openings for the passage of material from the bed into the drum, a plurality of external screw flights on the drum for engaging the sintered material and conveying it inwardly from the sides of the bed to said openings, and baffle members
45 affixed to the drum at said openings for receiving the sintered material and delivering it into the drum.

5. The improved method for treating sinter cake which consists in cutting and sizing same to
50 desired predetermined condition in situ on the bed of the sintering machine, forming the resulting properly sized product into a continuous windrow in the center of the bed of the machine as a part of the cutting and sizing operation and
55 discharging the windrowed product from the machine.

6. The method of operating a sintering machine which consists in performing the sizing of the final product upon the bed of the sintering
60 machine, continuously forming the sized, final product into a window by conveying the product inwardly from both sides of the bed toward the central portion thereof, and removing the wind-
65 row from the machine.

EMIL J. BRUDERLIN.