

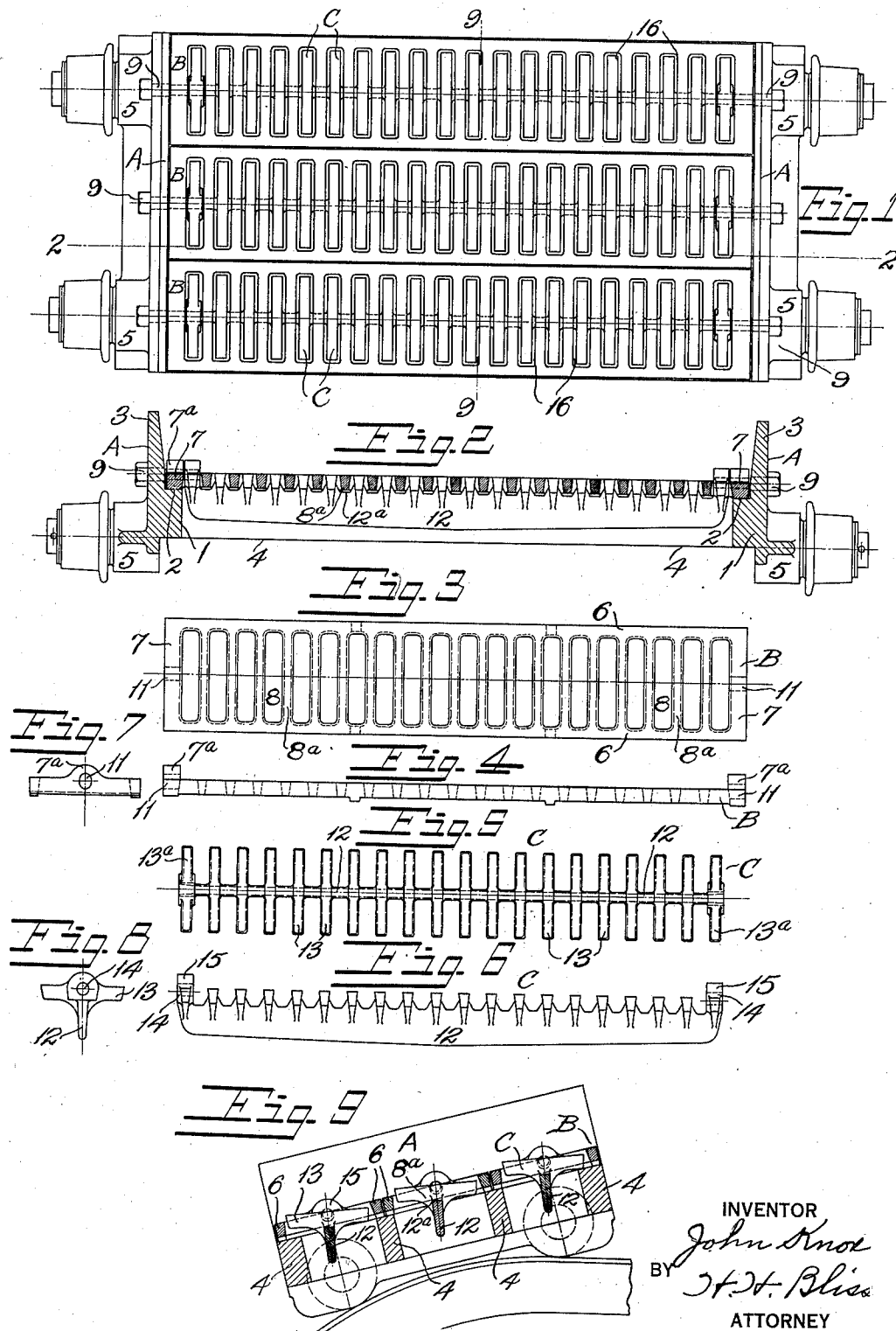
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J. KNOX

PALLET FOR SINTERING MACHINES

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INVENTOR
John Knox
BY *J. H. Bliss*
ATTORNEY

UNITED STATES PATENT OFFICE.

JOHN KNOX, OF PERTH AMBOY, NEW JERSEY, ASSIGNOR TO DWIGHT & LLOYD SINTERING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF DELAWARE.

PALLET FOR SINTERING MACHINES.

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To all whom it may concern:

Be it known that I, JOHN KNOX, a subject of the King of Great Britain and Ireland, residing at Perth Amboy, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Pallets for Sintering Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to ore-carrying cars or pallets designed for use in sintering machines.

One of the objects is to provide a pallet which will be self-cleaning, that is to say, have parts which will automatically dislodge all of the particles of ore which may adhere to it after a discharging operation, and leave it entirely clean before it receives a fresh charge.

Another object is to form such a pallet with parts of a minimum number which can be cheaply constructed and easily assembled so that it will be self-contained in respect to the movable devices which effect the cleaning referred to and will not require any external means to actuate said movable parts.

Another object is to so construct the parts of a pallet that air passages or draft apertures of either of several areas can be provided in order to adapt the mechanism to the several sizes of the ore particles that are to be carried thereon. There must be openings through the grate part of the pallet of sufficient area to permit the passage of the required quantity of air to effect the oxidizing of the combustibles in the ore uniformly throughout the entire stratum on the pallets. On the other hand these air passages must be so dimensioned and arranged that the finer particles of the material will not sift through while the charge is on the pallet. The limiting of the area of the air passages in the grate promotes the clogging thereof by the particles during the initial charging of the pallets, and still more during the sintering operation when the particles tend to adhere to each other and to the metal of the grate.

In the drawings—

Fig. 1 is a plan view of a pallet embodying my improvements.

Fig. 2 is a vertical transverse section on the line 2—2 of Fig. 1.

Figs. 3 and 4 are plan and side views respectively of the stationary part of the grate element of the pallet.

Figs. 5 and 6 are plan and side views respectively of the relatively movable part of the grate.

Figs. 7 and 8 are respectively end views of the stationary and of the movable grate parts.

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 1, but showing the relative positions of the parts of the grate element during the cleansing operation.

The devices shown constitute one of the traveling sections or pallets of a sintering furnace; it comprising a bodily movable carrier frame, a relatively stationary bottom part or grate element, and a relatively movable grate element. The outer or frame part comprises end walls A, A and cross bars or walls 4, 4. Each end wall is formed with a relatively thicker portion 1, the horizontal shoulder 2 and the thinner upwardly tapering portion 3. At 5, 5 are projections upon which the wheels supporting the pallet are mounted. The walls 4, 4, of any required number, extend from side to side of the pallet and serve as parts of the carrier frame, also as supports for the grate, and as cut offs for air.

The grate is formed of two elements B and C. The element B, as shown in Fig. 3, resembles in appearance an ordinary stationary grate structure having the relatively longer edge parts 6, 6 and the shorter edge parts 7, 7 at the ends. It is formed with alternating bars and apertures, the slot-like apertures 8, 8, as shown, being approximately equal in area and equally spaced. Between each slot 8 and the next there is a bar 8^a integral with the metal of the edge parts 6 and 7. The end part 7 of the grate element B rests upon the shoulders 2 of the end walls, which shoulders support said element in fixed position relatively to the pallet. As shown, the central parts of the side edges 6, 6 rest upon the walls 4 of the pallet and additionally support the grate section.

To hold the grate element B rigidly in place, while in operation, bolts 9, 9 are inserted through holes 11, 11 in the end parts 7 of the grate element. To avoid the weakening of the metal around the apertures 11,

11, I increase the vertical dimension of the end parts 7 at these points by casting them with the raised parts 7^a.

The relatively movable element C of the grate is substantially U-shaped in elevation, as shown in Fig. 6, and comprises a central longitudinal web member 12 and a series of transverse breaker bars or arms 13, 13^a, cast integral with the web and preferably disposed at substantially right angles to the web portion 12. These breaker bars are preferably made of substantially the dimensions of the apertures 8 in the stationary grate member, and normally lie in surface alignment therewith, so as to give a smooth grate surface and one which will prevent undue sifting of material in process of sintering therethrough, and yet will permit the passage of draft currents through the grate. The two end bars or legs 13^a, 13^a of the substantially U-shaped member are each formed with an aperture 14 and an enlargement 15 to strengthen the metal around the aperture. The bolts 9, 9, described above, are long enough to be inserted through the apertures 14, 14 in the bars 13^a, and constitute pivotal supports for the entire movable element C of the grate.

When the several parts of the grate structure are assembled the movable grate member will be in underslung position relative to the stationary grate member with the bars 13, 13^a of the pivoted element C lying respectively in the slots 8 in the stationary section B; and the two bars 13^a being adjacent the end parts 7, 7, the apertures 10 and 14 are in alignment to receive the bolts 9.

The web part 12 is formed in such way as to provide a clearance between the bottom face of each cross bar 8^a of the element B, and that part of the web member lying below it. The amount of this clearance determines the angle of the oscillation which may occur while the pallet is passing through any vertically curved part of its path; that is to say the pivotal movement of the oscillating section of the grate will be limited by the striking of the metal at 12^a against the lower faces of the bars 8^a at one side or the other of the central transverse vertical plane of the grate. The clearance, therefore, need be only great enough to allow a positive and appreciable relative movement of the grate elements to loosen particles of material which may be lodged in the air passages of the grate elements.

The web member 12 is made relatively deep, as shown in Fig. 8, so that it will have sufficient weight to rock the oscillating section when the frame is tipped from the horizontal, and to insure the return to the normal position of the upper surfaces of the bars 13 when the frame is brought back to its operative position.

The manner in which devices of the sort

described are used is well known and no extended discussion is necessary. The combustible ore, or the like material, is evenly disposed in the pallets above the grate elements and between the end walls. The combustible components are ignited at the top of the stratum and combustion is maintained by air which is drawn downward through the stratum and through the air passages 16.

Some materials are in finer condition than others, and, for this, the rocking bars should have a width predetermined in relation to the width of the slots 8. Where the materials, at any one place, which are to be treated vary from time to time in the fineness of their particles, rocking grate elements with bars of different widths may be provided, so that one can be substituted for another to correspond with the variations in the fineness of the materials.

The rocking bars taper downward and also the bars 8 of the fixed grate element. Consequently the spaces or passageways between them widen downwardly and this prevents the lodging of material below the upper edges of the bars. If particles while softened by heat adhere to the metal as, for example, to the metal of the upper surfaces, or at the edges of the bars, and, on cooling, remain so adhering, they are readily broken and dislodged when the bars swing up and down under the gravity action of the heavy web 12.

The movements of the rocking element of the pallet are entirely automatic and caused by the gravity of the web. No external devices such as links or supplemental parts are required to cause these movements.

It will be understood that changes from the exact disclosure here, which are within the range of mechanical skill, may be made, and that mechanical expedients other than those here shown may be adopted and still be within the purview of my invention. For example, while the term "pallet" is used as aptly descriptive of the disclosure here, it will be understood that any sintering element, other than a pallet, may be substituted for the specific pallet here shown, and my improvements applied thereto.

What I claim is:

1. In an ore sintering apparatus, the combination of a track having curves in vertical planes, and a series of pallets each of which is a self-supporting unit movable bodily relatively to those adjacent to it and having a two-part apertured bottom, the two parts providing a normally flush ore-supporting surface and one part being adapted to automatically move under action of gravity relatively to the other to and from its normal position.

2. In an apparatus of the class described, the combination of the bodily movable supporting frame, and a grate thereon formed

in two elements, one element being stationary relatively to the frame and having a series of slot-like apertures, the other element being oscillatable around a longitudinal axis and comprising a series of cross bars adapted to lie respectively in the said apertures and a connecting web member, the upper surfaces of both the grate elements being normally in the same transverse horizontal plane, and gravity actuated means for moving the oscillating element.

3. In an apparatus of the class described, the combination with the traveling supporting frame, of a stationary grate element having a series of transverse slots, and a horizontally pivoted grate element comprising a series of transverse bars and a longitudinally depending web member, the said bars being adapted to lie one in each of said slots and with their upper surfaces normally in the same horizontal plane as that of the upper surface of the said stationary element, and the bars and the web being adapted to have their weight swing the bars toward and from said plane.

4. In an apparatus of the class described, the combination with the traveling supporting frame, of a grate formed of two elements, one element being stationary with respect to the frame and the other element being movable relative to the first named element, and stops on the stationary element to limit the relative movement of the movable element.

5. In an apparatus of the class described, the combination with the traveling supporting frame, of a grate formed in two elements, the upper surface of both elements normally lying in the same horizontal plane, and one of said elements being held stationary relatively to the frame, and the other being adapted to rock vertically under the action of gravity, and means to limit the rocking movement of said movable grate member.

6. In an apparatus of the class described, the combination with the traveling supporting frame, of a grate element having a plurality of slots formed therein and a horizontally pivoted grate element comprising a plurality of parallel bars respectively positioned in said slots and secured to a depending web member which swings around the axis of the grate element.

7. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings, and an underslung movable grate member having breaker bars extending upwardly into the openings in said stationary grate member.

8. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; and an underslung, pivotally mounted grate member having breaker bars extending upwardly into

the openings in said stationary grate member.

9. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; an underslung, pivotally mounted grate member having breaker bars extending upwardly into the openings in said stationary grate member; and means to maintain said breaker bars normally in surface alignment with said stationary grate bars.

10. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; an underslung, pivotally mounted grate member having breaker bars extending upwardly into the openings in said stationary grate member; and gravity-controlled means to maintain said breaker bars normally in surface alignment with said stationary grate bars.

11. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings, and an underslung grate member having pivotal supports above its center of gravity and provided with breaker bars extending upwardly into the openings in said stationary grate member.

12. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; and an underslung, pivoted, pendulous grate member having a web portion below said stationary grate bar and breaker bars extending upwardly from said web portion into the openings in said stationary grate bar.

13. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; and a gravity-controlled, pendulous grate member having a web-portion lying transversely of the bars and openings of said stationary grate member, with breaker bars at substantially right angles to said web portion and extending upwardly into the openings into said stationary grate member.

14. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; an underslung, gravity controlled, pivoted grate member having breaker bars extending upwardly into the openings in said stationary grate member; and means to limit movement of said pivoted grate member.

15. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; an underslung, gravity controlled, pivoted grate member having breaker bars extending upwardly into the openings in said stationary grate member; and means on said stationary grate member to limit movement of said pivoted grate member.

16. In a sintering pallet, the combination of a stationary grate member having alter-

nating bars and openings; an underslung, gravity controlled, pivoted grate member having breaker bars extending upwardly into the openings in said stationary grate member; and stops to engage and limit movement of said pivoted grate member.

17. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; an underslung, gravity controlled, pivoted grate member having breaker bars extending upwardly into the openings in said stationary grate member; and stops on said stationary grate member to engage and limit movement of said pivoted grate member.

18. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; a movable grate member having breaker bars extending into the openings and normally in surface alignment with the bars of said stationary grate member; and pivot bearings for said movable grate member above its center of gravity and so disposed as to permit rocking of said movable grate member on an axis at right angles to the bars and openings of said stationary grate member.

19. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings; a movable grate member made up of a web-portion lying below and at right angles to the bars and openings of said stationary grate member; breaker bars extending upwardly from said web-portion into the openings and parallel with the bars of said stationary grate member; and pivot bearings at the ends and above the center of gravity of said movable grate member to permit rocking of said movable grate member on an axis at right angles to the bars and openings of said stationary grate member.

20. In a sintering pallet, the combination of a stationary grate member having alternating bars and openings, and a substantially U-shaped movable grate member

mounted beneath said stationary grate member and having pivot bearings in its legs and breaker bars between said legs, said breaker bars projecting upwardly into the openings in said stationary grate member, and normally in surface alignment with the stationary grate bars.

21. In a sintering pallet, the combination of stationary grate member having alternating bars and openings, and a substantially U-shaped movable grate member lying below said stationary grate member, and having pivot bearings in its legs and breaker bars of substantially the dimensions of the openings in the stationary grate member between said legs, said breaker bars projecting upwardly into the openings in said stationary grate member and normally in surface alignment with said stationary grate bars.

22. A movable grate member for sintering pallets, comprising a web-portion having breaker bars extending from one edge thereof at substantially right angles, and provided at each end with pivot elements disposed above its center of gravity.

23. A substantially U-shaped movable grate member for sintering pallets, having pivot bearings in its legs and breaker bars extending from one edge of its central portion and disposed substantially at right angles to said central portion.

24. In an apparatus of the class described, the combination of a traveling supporting frame, a plurality of stationary grate members having alternating bars and slots mounted on said frame, and a plurality of pivoted grate members comprising series of parallel bars positioned in the apertures of said stationary grate member and secured to a depending web member which is adapted to swing about the axis of said pivoted grate member.

In testimony whereof I affix my signature.

JOHN KNOX.