April 29, 1930. E. W. SHALLOCK 1,756,037

GRATE AND PALLET STRUCTURE

Original Filed Jan. 9, 1928 2 Sheets-Sheet 1

Fig. 1.

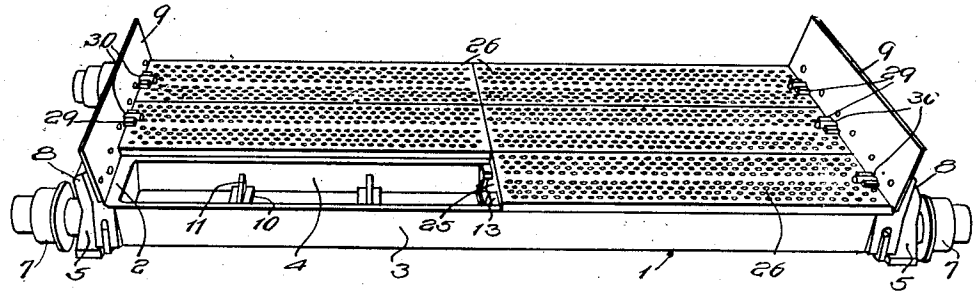


Fig. 2.

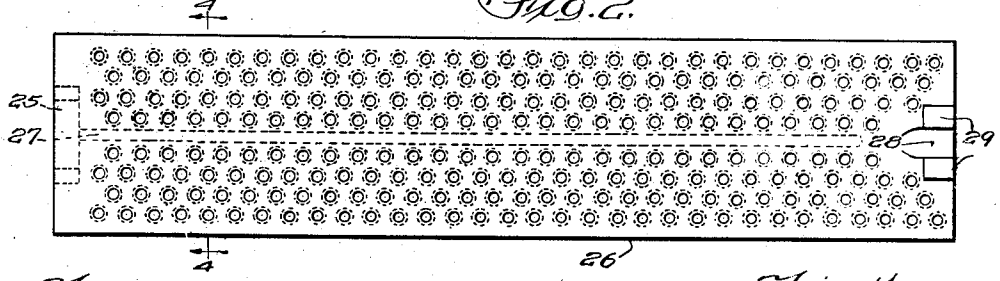


Fig. 3.

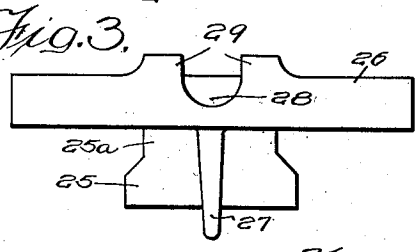


Fig. 11.

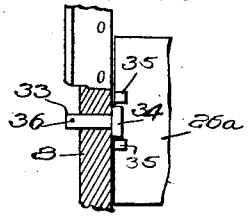


Fig. 5.

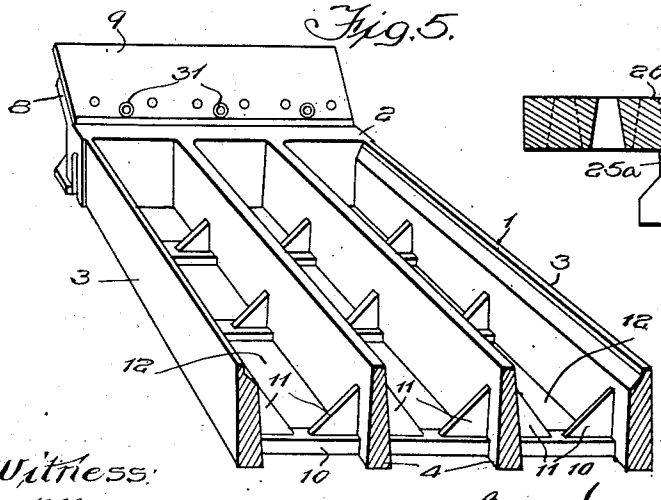
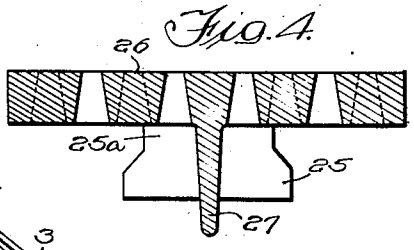


Fig. 4.



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GRATE AND PALLET STRUCTURE

Original Filed Jan. 9, 1928 2 Sheets-Sheet 2

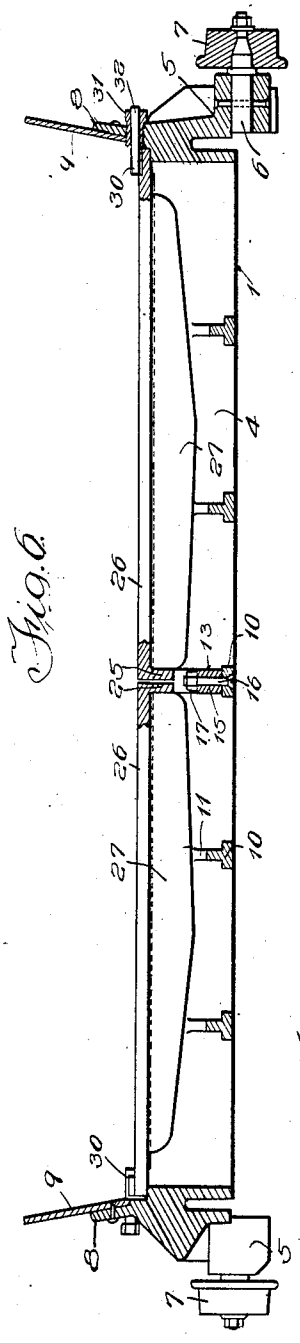


Fig. 6.

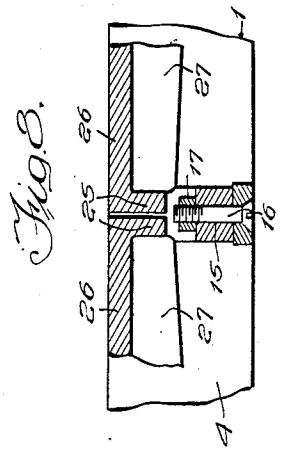


Fig. 8.

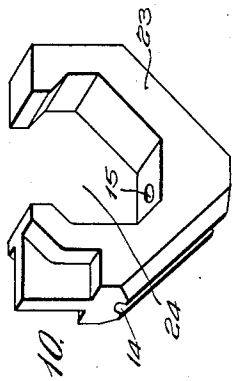


Fig. 10.

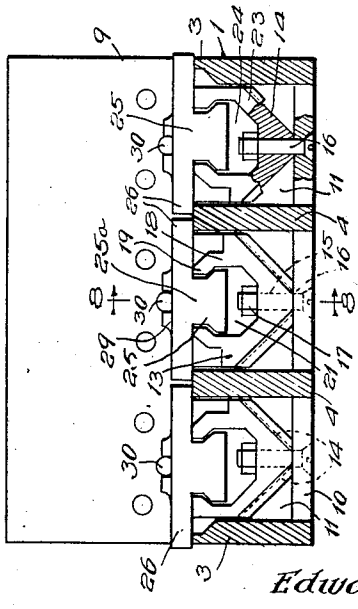


Fig. 7.

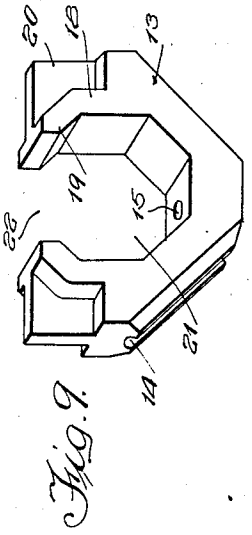


Fig. 9.

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Patented Apr. 29, 1930 1,756,037

UNITED STATES PATENT OFFICE

EDWARD W. SHALLOCK, OF CHICAGO, ILLINOIS, ASSIGNOR TO AMERICAN ORE RECLAMATION COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW YORK

GRATE AND PALLET STRUCTURE

Original application filed January 9, 1928, Serial No. 245,284. Divided and this application filed December 3, 1928. Serial No. 323,457.

This invention relates to pallet and grate structures, and more particularly to a structure of the character stated for use with sintering machines of what is known as the Dwight and Lloyd type.

Pallets used in ore sintering machines are commonly 6 ft. and more in width and are provided with a single grate corresponding, substantially, in width and length to the width and length of the pallet, that is, the grate used in a pallet of this sort measures approximately 6 ft. in width by 2 ft. in length. During the sintering operation the grate is subjected to intense heat and is apt to buckle or burn out so that it has to be replaced. These grates are rather expensive and, due to their size, are difficult to handle by hand. This means a considerable loss in time and labor, as well as expense in replacing the grate. It commonly happens that but a relatively small area of the grate is burned out or warped but, under present conditions, this necessitates the replacing of the entire grate.

One of the main objects of my invention is to provide a pallet and a grate structure in which the grate is composed of a plurality of grate sections which can be quickly removed and replaced. In the event of burning out or warping of any of the sections this particular section can be replaced without any necessity for replacing the entire grate structure. I have also found that by using relatively short or narrow grate sections the tendency thereof to warp is much less than the tendency of a one piece grate of the full width of the pallet. This is due, probably, to the more uniform distribution of heat throughout the smaller section than is possible when using a one piece grate of relatively great extent.

In my copending application for grate and pallet structure, filed January 9, 1928, Serial No. 245,284, which has matured into Patent No. 1,722,344, dated July 30, 1929, of which this application is a division, I have shown a pallet having a frame of special construction and a grate composed of a plurality of grate sections having elements cooperating with elements of the pallet frame for securing the sections thereto. While this structure is highly efficient it necessitates the use of a specially constructed pallet frame. My present invention has to do more particularly with means whereby a grate structure composed of a plurality of grate sections can readily be applied to a pallet frame of existing construction and now commonly used in sintering machines of the type referred to. Further objects and advantages of my invention will appear from the detailed description.

In the drawings:

Fig. 1 is an end perspective view of a pallet and grate structure in accordance with my invention, one of the grate sections being omitted.

Fig. 2 is a plan view of one of the grate sections.

Fig. 3 is a side view of one of the sections.

Fig. 4 is a section taken substantially on line 4—4 of Fig. 2.

Fig. 5 is a fragmentary detail view, in perspective, of the pallet frame taken on a line extending longitudinally of the same and in advance of the transverse center thereof.

Fig. 6 is a transverse section through the pallet, including the grate structure, parts being shown in elevation.

Fig. 7 is a longitudinal sectional view through the pallet, showing the grate structure applied, parts being shown in elevation.

Fig. 8 is a fragmentary sectional view taken substantially on line 8—8 of Fig. 7, the adjacent end portions of two of the grate sections being shown broken away and in section.

Fig. 9 is a perspective detail of the inner adapter.

Fig. 10 is a perspective detail of one of the outer adapters.

Fig. 11 is a detail of modified fastening means.

I have illustrated my invention as applied to a pallet comprising a rectangular frame 1 having side bars 2 which are connected by bars 3, which may be termed the end bars, and intermediate bars 4 disposed parallel to bars 3. This frame is provided, at each side thereof, with depending brackets 5 in which

are secured stub shafts 6 upon which are mounted flanged rollers 7 which travel upon the track of the sintering machine.

The pallet, in practice, is disposed transversely of the machine and travels lengthwise thereof upon the track. I have, therefore, referred to the greater dimension of the pallet frame as its width and the less or shorter dimension as its length, referring to the relation of the pallet to the machine. Each of the side bars 2 is provided, at its upper portion, with an outwardly inclined flange 8 to which is secured in a suitable manner, as by riveting, a side plate 9. The bars 3 and 4 are connected, at suitable intervals, by cross members 10. Each of these members comprises two web elements or fillets 11 formed integrally therewith and with the bars connected by such cross members. These pallets define a substantially V-shaped socket 12. The cross members 10 materially reinforce the frame 1 as a whole and reduce likelihood of warping of the bars thereof. The pallet so far described is of known construction, being that which is commonly used in sintering machines of the type referred to.

In order that a sectional grate may be used with this pallet frame I provide adapters which seat upon and are secured to the cross members 10 at the transverse center of the frame. In the construction shown, there are four bars connecting the side bars 2 of the frame and, consequently, I employ three adapters. The central adapter 13 is of substantially V-shape and is provided, in the outer face of each arm, with a groove 14 which receives the inner edge portion of fillet 11. The adapter 13 is provided, at its lower or vertex portion, with an opening 15 which receives a bolt 16 passing through cross member 10, a nut 17 being screwed onto the upper end of this bolt and bearing against the adapter so as to secure the same, in co-operation with the bolt, to the cross member.

Preferably the head of the bolt 16 is countersunk in cross member 10 as illustrated. Each arm of the adapter is provided with an extension 18 at its upper end which is inclined upwardly and inwardly of the adapter at 19, and is provided with an outwardly extending web 20 disposed to contact with the bar 4 adjacent the upper end of the arm. The arms of the adapter, and the extensions thereof, define an opening 21 which accommodates the upper end of the bolt and the nut, the upper portion of this opening being substantially of dovetail shape and being restricted at 22. When the adapter is secured to the cross member 10 it is held securely in position and against movement transversely of the same by the fillets 11 which engage into the grooves 14. An adapter 23 is mounted upon each of the cross pieces 10 between the bars 3 and 4, this adapter being similar in all respects to the adapter 13 except that the opening 24 thereof is off-center.

The adapters receive securing lugs or heads 25 depending from grate sections 26 at the inner ends thereof. Preferably, though not necessarily, each grate section is further provided with a reinforcing rib 27 which extends from the head 25 to a point adjacent the outer end of the grate section, this rib being disposed centrally of the section. The rib and the head are preferably cast integrally with the section, as illustrated. The section is further provided, at its outer end and in its upper face, with a central depression 28, and with two lugs 29 at each side of this depression. This depression is adapted for reception of a securing pin 30 which is inserted through a nipple 31 (Fig. 6) threaded through flange 8 of the frame.

The pin is releasably secured in the nipple in a suitable manner, as by a cotter pin, or other suitable member 32 inserted through the nipple 31 and pin 30. In Fig. 11 I have shown a modified form of securing means for the outer end of the section, such form including a pin 33 which is inserted through flange 8 and is provided, at its inner end, with a head 34 disposed between lugs 35 on the upper face of section 26a. A cotter pin 36 is inserted through the outer end of pin 33 and serves to releasably secure it in position.

The grate is illustrated as formed of six sections 26, each equal in length to one-half the width of the pallet frame. In placing these sections upon the pallet they are disposed at a slight inclination transversely thereof and are moved lengthwise so as to move the heads 25, which are of substantially dovetail shape, into the openings or sockets of the adapters, the reduced neck 25a of the head entering the opening 22 of the adapter and the inclined shoulders of the head engage the elements 19 of the adapter. In this manner the grate sections are secured to the pallet frame, centrally thereof, with facility and in endwise relation to each other. The outer ends of these sections are then secured to the sides of the pallet frame by the pins and lugs in the manner described, the sections being thus effectively secured to the pallet and held against undesirable looseness or play. In the event of warping, burning or other damage to any of the grate sections, such section can readily be removed and replaced without disturbing the other sections of the grate structure.

By providing the adapters mounted upon the cross members of the pallet frame in the manner illustrated and described, a grate structure composed of a plurality of independently removable and replaceable sections can readily be applied to a pallet of present construction such as is commonly used in sintering machines.

The grate sections are provided with openings of suitable type and disposition to permit ready flow of air and other gases through the sections during combustion of the material supported thereon during the sintering operation, as well understood in the art. The sections shown are of what is known as the pinhole type, though any other suitable or preferred type of section may be employed. While I have described my invention as applied to a pallet adapted for use with the Dwight and Lloyd type of sintering machine, I do not in any way limit myself to this one type of pallet since, in its broader aspects, it may be applied to pallets of other types with advantage.

What I claim is:

1. In combination, a pallet, an adapter member detachably secured to said pallet and having an upwardly restricted recess, a grate section having a downwardly enlarged depending head entering said recess and interlocking therewith, and diagonal corner pieces on the pallet interlocked with said adapter member.

2. In combination, a pallet frame comprising side bars and cross bars extending across the frame and connecting the side bars, cross members connecting said cross bars and comprising fillets connecting said cross bars and the cross members, adapters secured to the cross members and seating upon the fillets, said fillets and the adapters having cooperating means holding said adapters against movement across the frame, and grate sections seating upon the frame bars and having releasable interlocking engagement with the adapters.

3. In combination, a pallet frame, cross members bracing said frame, each of said members defining a substantially V-shaped socket, adapters of substantially V-shape fitting into said sockets and secured to the cross-members, the arms of said adapters having grooves receiving the lateral portions of the cross-members, and grate sections seating upon the frame, said grate sections and the adapters having cooperating means releasably securing the sections to the adapters.

4. In combination, a pallet frame, cross-members bracing said frame, each of said members defining a socket, adapters fitting into the sockets and secured to the cross members, and grate sections seating upon the frame, said grate sections and the adapters having cooperating means releasably securing the sections to the adapters.

5. In combination, a pallet frame, cross-members bracing said frame, each of said members comprising fillets defining a substantially V-shaped socket, adapters fitting into said sockets and secured to the cross-members, said adapters having grooves receiving the fillets and each having an opening for reception of a coacting securing member, and grate sections mounted upon the frame and having depending securing members engageable into said openings and cooperating with the adapters for securing the grate sections to the frame.

6. In combination, a pallet frame comprising side bars and cross-bars connecting said side bars, cross-members connecting the cross-bars, adapters seating upon the cross-members and disposed between the cross-bars and held thereby against movement lengthwise of the pallet frame, means for securing the adapters to the cross-members and for holding said adapters against movement across the frame, and grate sections seating upon the frame, said grate sections and the adapters having cooperating means releasably securing the sections to the adapters.

7. In combination, a pallet frame comprising side bars and cross-bars connecting the side bars, cross-members connecting the cross-bars, adapters seating upon and secured to the cross-members, grate sections seating upon the frame and disposed end to end in abutting and non-overlapping relation, and cooperating means carried by the grate sections and the adapters for releasably securing the sections to the adapters.

In witness whereof, I hereunto subscribe my name this 23d day of November, 1928.

EDWARD W. SHALLOCK.