July 30, 1929. E. W. SHALLOCK 1,722,344

GRATE AND PALLET STRUCTURE

Filed Jan. 9, 1928

Fig. 1.

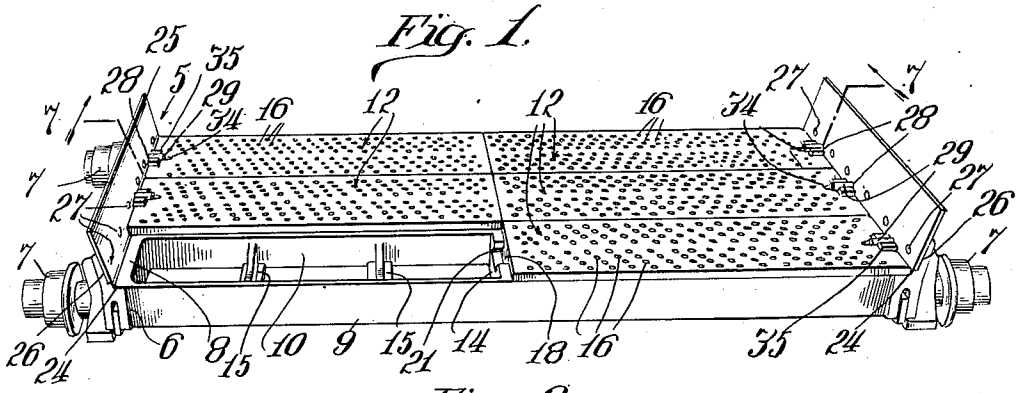


Fig. 2.

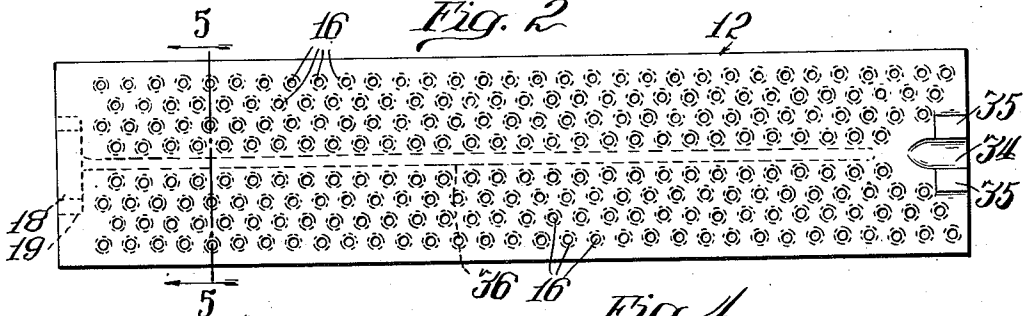


Fig. 3.

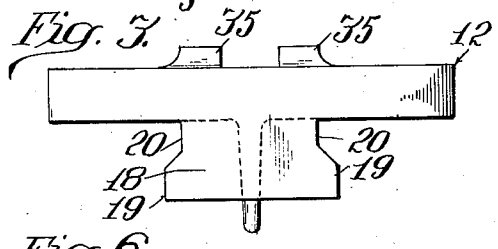


Fig. 4.

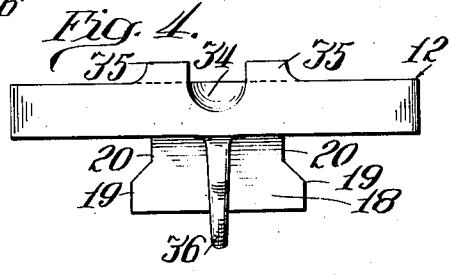


Fig. 6.

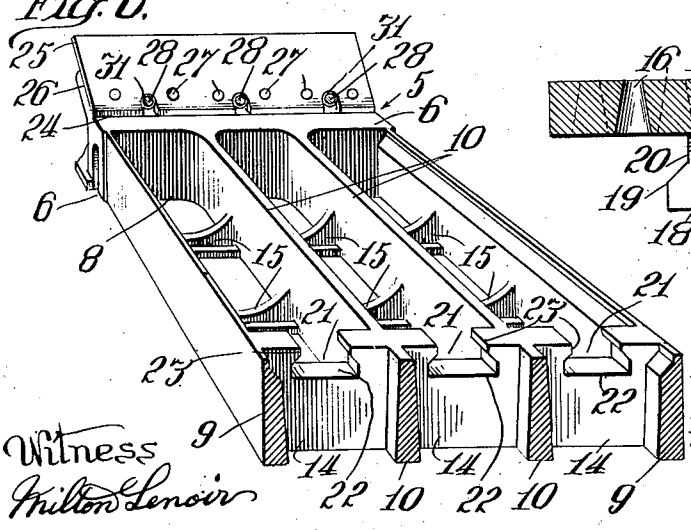
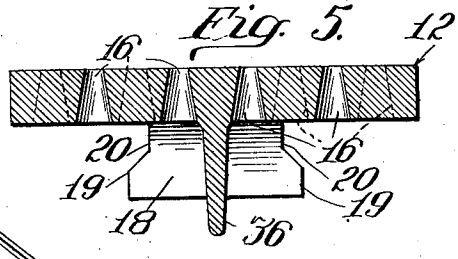


Fig. 5.



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UNITED STATES PATENT OFFICE.

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GRATE AND PALLET STRUCTURE.

Application filed January 9, 1928. Serial No. 245,284.

This invention relates to an improved grate and pallet structure, suitable, particularly, for use, in ore sintering machines.

Sintering, as well understod in the art, is the process of agglomerating fine ore material, such as, for example, flue dust, into a mass suitable for blast furnace use. In the continuous sintering process, now in use, the sintering mixture, usually after being mixed and, if desired, moistened, is delivered onto the grates of the sintering machine in a continuous layer of the desired thickness and permeability and this continuous layer is moved under an ignition burner where the fuel in the upper surface of the layer is ignited and the charge then continues its movement over a wind box which draws air down through the charge, the sintering action progressing through the depth of the layer to the grates.

In actual practice, the grate sections become warped, distorted, and even disintegrated and it is an object of the present invention to decrease the warping and distortion of the grate sections and to provide a generally improved and simplified grate in which convenient replacement as well as convenient straightening or other repair of the grate sections is permitted.

Another object is the provision of an improved sectional grate structure in which unnecessary grate area replacement is avoided together with an improved pallet structure and an improved provision for interlocking the grate sections with or fastening them to the pallet structure, this interlocking or fastening provision being quickly detachable to permit facile replacement of the sections.

The interlocking or fastening provision between the grate sections and the pallet structure in combination with the sectional grate construction of the present invention not only expedites replacement, as well as straightening and other repair, but avoids unnecessary grate area replacement and serves to better hold or retain the grate sections against warping or distortion than where the sections are of a length equal or substantially equal to the width of the grate and fastened or secured to the pallet structure only along the opposite sides of the grate. In such a case the relatively great length of the section makes it more liable to warping or distortion as well as more difficult to straighten or repair and the liability to warping or distortion has been augmented by the free condition of the section throughout its length from one side of the grate to the other. In addition, in such a device, the greater area or portion of the section may be in good condition and suitable for further use but it has had to be entirely replaced in order to replace only a very small unsatisfactory portion or area of the grate.

The present invention avoids all of these disadvantages.

The invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a perspective view of a pallet embodying the present invention, with one of the grate sections removed;

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

Fig. 3 is an inner end view of the grate section;

Fig. 4 is an outer end view of the same;

Fig. 5 is a transverse section through one of the grate sections on the line 5—5 of Fig. 2; and

Fig. 6 is a fragmentary perspective view of one side of the pallet.

Referring to the drawings, the pallet 5 comprises a generally rectangular metallic frame 6 arranged lengthwise across the grate and fitted on each side with a pair of flanged wheels 7 which may bear or roll on suitable tracks, as well understood in the art. In practice, a train of articulated pallets 5 form a continuous traveling conveyor or feeder for continuously moving the sintering mixture under the ignition burner and over the windbox. The wheels 7 may also engage the driving sprockets for transmitting the drive to the pallets, although this forms no part of the present invention and with the particular manner of associating the pallets may vary widely within the scope of the present invention. The pallet frame 6 has parallel side walls 8 connected at opposite ends by parallel outer walls 9 and between their ends by intermediate walls 10 parallel with each other and with the outer walls 9. In the particular embodiment shown the depth of the frame 6, that is the distance between the opposite outer sides of the walls 9, is substantially equal to the width of three grate sections 12, but this may vary and the pallets may have any desired number of grate sections laid side by side thereon. The upper edges of the walls 9 underlie and support the outer marginal

edges of the outer grate sections 12 and the upper edges of the intermediate walls 10 underlie and support the abutting marginal edges of the sections 12. The outer ends of the sections 12 overlie and are supported, along one side of the pallet or grate, upon the upper edge of one side wall and the outer ends of the sections 12 at the opposite side of the grate or pallet overlie and are similarly supported upon the upper edge of the opposite side wall 8.

The grate is sectionalized across the width of the pallet into a pair of grate sections 12, arranged end to end with the abutting ends meeting between the side walls 8 and overlying and supported upon an upstanding intermediate wall 14 extending transversely of the pallet between and parallel with the side walls 8, with its upper edge beneath the abutting ends of the grate sections 12. The walls 9 and 10 may be provided with connecting webs 15 between the walls 8 and 14 for imparting the desired strength and these reinforcing webs may be of angular formation (as shown) or of other suitable formation.

The grate sections shown are of the pin hole type, each comprising a flat generally rectangular plate of a length approximately equal to one half the width of the grate or pallet and each of suitable width, depending upon the width of the pallet and the number of sections to be laid side by side thereon. Each plate has a plurality of tapered openings 16 opening vertically therethrough with their smaller ends at the top or upper surface of the plate and their lower ends opening from the bottom of the bar, it being understood that these openings 16 permit the wind box to draw the air down through the charge upon the grate to sinter the same. The openings 16 are preferably relatively fine or small and in the embodiment shown they are arranged in eight staggered rows, although this may be varied.

For the purpose of attaching the grate sections 12 to the pallet 5 or for holding same down thereon, the meeting ends of the sections 12 are provided with integral depending heads 18 downwardly enlarged at 19 and upwardly reduced at 20 and the wall 14 has, between the outer and intermediate walls 9 and 10, recesses or openings 21 which recesses are correspondingly enlarged downwardly at 22 and restricted upwardly at 23 and open from the upper edge of the upright wall 14. In attaching the grate sections 12 to the pallets the downwardly enlarged heads 18 enter the upwardly restricted recesses 21 and interlock therewith to fasten or hold the meeting or inner ends of the sections 12 to the pallet, it being understood that there may be sufficient play or clearance to permit tilting the sections slightly at their outer ends to enter the heads 18 in the recesses of openings 21 by endwise movement of the sections 12.

At the outer ends of the grate sections 12 the side walls 8 of the pallet are scarfed at 24 to receive the ends of the sections 12. The sides 25 of the pallet are shown as being flared upwardly slightly and are set along their lower ends into scarfs 26 in the sides of the pallet frame and secured at 27 to the pallet. For the purpose of securing or fastening the outer ends of the grate sections to the pallet the sides of the pallets are provided with openings 28 through which pins 29 are removably inserted. Each pin 29 is releasably secured against endwise movement in a known manner. The inner end of the pin projects centrally over the adjacent outer end of each grate section 12 and enters a socket or depression 34 and between a pair of integral upstanding lugs 35 on the adjacent end of the grate section 12 to interlock the outer end of the grate section with the pin 29 and against lateral displacement relative thereto. In order to replace the grate sections the holding pins 29 may be removed or withdrawn, at least sufficiently to clear the tops of the grate sections 12, which may then be tilted up at their outer ends and moved longitudinally outwardly sufficiently to free the holding heads 18 from the recesses 21. The bottom or underside of the grate section 12 may be provided with a depending strengthening rib 36 extending lengthwise of the section between the sides thereof and disposed across the width of the grate when the sections are assembled upon the pallet, as shown.

As already explained the shorter length of the grate sections 12 reduces the warping and distortion and permits straightening and repair which has been difficult with the full length sections. Where holes are burned in the sections 12, or where they are disintegated or otherwise become unfit for further use, they are conveniently replaceable by removing the desired section in the manner already set out and replacing it with another section. With the shorter grate sections unnecessary grate area replacement is voided and the cooperation of the top of the pallet frame with the under surfaces of the grate sections provides a strong and sturdy structure. The fastening or hold-down provision between the inner or adjacent ends of the sections and the pallet not only enables the use of the shorter sections with the advantages obtained thereby but holds the sections centrally between the opposite sides of the grate firmly against warping or distortion.

I claim:

1. In combination, a pallet having an upwardly restricted recess, a grate section having a depending and downwardly enlarged head at one end adapted to enter said recess and interlocking therewith, and means for fastening the opposite end of said grate section to the pallet, said last means comprising

a socket in the grate section and a pin passing through the adjacent side of the pallet and entering over the adjacent end of the grate section and in said socket.

2. In combination, a pallet, a pair of grate sections arranged end to end across said pallet, said pallet having upwardly restricted recess means adjacent the meeting ends of said sections, downwardly enlarged heads on said sections at the meeting ends thereof and entering said recess means to lock said sections to the pallet and pins entering through the sides of the pallet and over the outer ends of said sections for holding said ends to the pallet.

3. As an article of manufacture, a grate section having a downwardly enlarged head depending from the bottom thereof at one end, and fastening pin receiving means on the top of the opposite end of said section.

4. As an article of manufacture, a grate section having a downwardly enlarged head depending from the bottom thereof at one end, fastening pin receiving means on the top of the opposite end of said section, said section having a plurality of openings therethrough and an integral lengthwise rib depending from the bottom of said section.

5. In combination, a pallet, a plurality of grate sections arranged in series end to end across the pallet, and means for independently and releasably securing the sections to the pallet, the sections of each series being removable and replaceable independently of each other and of the sections of the other series, the sections being disposed with their lateral edges adjacent each other and the combined widths of said sections equalling the length of the pallet.

6. In combination, a pallet, a plurality of grate sections arranged in series end to end across the pallet, the sections of each series being similar and interchangeable, said sections being disposed with their lateral edges adjacent each other and the combined width of the sections equalling the length of the pallet, and means for independently and releasably securing the sections to the pallet, the sections of each series being removable and replaceable independently of each other and of the sections of the other series.

7. In combination, a pallet, a plurality of grate sections arranged in series across the pallet and disposed in series lengthwise of the pallet, means for releasably securing the outer ends of the outer sections of the respective series to the sides of the pallet, and means for independently and releasably securing the inner ends of the sections to the pallet, the sections of each series being removable and replaceable independently of each other.

8. In combination, a pallet, a plurality of grate sections arranged in series across the pallet and disposed in series lengthwise of the pallet, means for releasably and independently securing the outer ends of the outer sections of the respective series to the sides of the pallet, and means for independently and releasably securing the inner ends of the sections to the pallet, the sections of each series being removable and replaceable independently of each other.

9. In combination, a pallet provided intermediate its sides with upwardly opening sockets each having an upper restricted neck and a lower enlarged portion, grate sections disposed in pairs across the pallet with their inner ends adjacent, said sections being similar and interchangeable and being provided at their inner ends with depending elements conforming to and engaging into said sockets and adapted for insertion into and withdrawal from the socket by endwise movement of the sections, and means for releasably and independently securing the outer ends of the sections to the pallet.

In witness whereof, I hereunto subscribe my name this fourth day of January, 1928.

EDWARD W. SHALLOCK.