My invention relates generally to sintering machines and has to do particularly with the grate bars supported by the pallets or sintering pans and the manner of mounting such grate bars upon the pallets or pans.

The grate bars heretofore employed with the pallets or sintering pans of sintering machines of the well-known Dwight & Lloyd type have each been formed of one comparatively long piece extending from one side to the other of the pallet, with the opposite ends supported upon the opposite sides of the pallet. These former grate bars are objectionable for the following, among other reasons: they tend to warp out of shape quickly requiring replacement of the entire grate bar; they develop cracks resulting in breakage after a few days use with considerable loss which makes the sintering process and the maintenance of the machine quite expensive; and breakage of the grate at any point requires replacement of the entire grate bar unit.

The main object of my invention is to provide an improved grate bar structure for sintering machines wherein the foregoing objectionable features have been practically eliminated. More particularly, my invention provides a grate bar which is formed of two end-wise disposed, comparatively light-weight half-grate bar sections each of which is independently supported by the pallet or pan and each of which is so formed and supported that the grate bar may be used a comparatively long time without breakage due to cracks, warping is reduced to the minimum, if not entirely eliminated, so that over long periods of operation practically no replacement is necessary due to this cause, in case of warping, cracking or breaking the affected section only need be replaced, and upkeep and replacement costs are materially reduced.

Another object is to provide a novel form of half-grate bar section having provision for self-holding the same in a predetermined position upon the pallet and to prevent vertical and lateral displacement of the same with respect to the pallet.

A more specific object is to provide a grate bar section adapted to extend approximately half-way across the width of the pallet or sintering pan and having a jaw formation at its inner end for interlocking engagement with a mid-portion of the pallet and having adjacent its inner end lugs which cooperate with the pallet for preventing lateral displacement of the grate bar section.

Other objects and advantages will become apparent as this description progresses and by reference to the drawings wherein—

Figure 1 is a top plan view of a pallet and grate bar assembly embodying my invention;

Fig. 2 is a section through one of the grate bar units taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a transverse section taken substantially on line 3—3 of Fig. 1;

Fig. 4 is a side elevational view of one of the grate bar sections; and

Fig. 5 is a left end view of the section shown in Fig. 4.

In the drawings, I have illustrated my invention as applied to a pallet or sintering pan which is of a construction well adapted for use with sintering machines of the well-known Dwight & Lloyd type. In machines of this character a plurality of pallets are mounted to follow in an endless path of travel, the pallets forming a substantially continuous series so that each pallet in operative position is located closely adjacent to the next leading and following pallets of the series, as, for example, shown in the application filed by Oscar Gerlach Serial No. 248,840, filed December 31, 1927, for Process and apparatus for purifying zinc. It will be understood, however, that although my invention is well adapted to the above form of machine, it is not necessarily limited thereto and may be used in other similar instances where the same or equivalent conditions of operations are to be met.

It will be further understood that wherever I refer herein to "pallet" I intend to include the sintering pan or bed structure which supports the grate bar units.

In the drawings, the pallet 10 consists of side walls 11 connected at their ends by transverse end bars 12. These side walls 11 are also connected or bridged by uniformly...
spaced intermediate transverse bars 13, forming a sturdy bed or frame for supporting the grate bar units. The outer or transverse end bars 12 and the adjacent intermediate bars 13, as well as the intermediate bars themselves, are bridged at their center by U-shaped support bars 14 which serve to carry one end of the grate bar sections as will be described more fully hereinafter. The support bars 14 are mounted in inverted position with their depending U-legs secured to the adjacent intermediate and end bars 12, 13 by suitable bolts and nuts indicated generally at 15. The inner surfaces of the transverse end bars 12 are slightly tapered as at 12a and the adjacent U-legs 14a of the support bars cooperating with such end bars are complementally tapered to provide a wedge-support as between the transverse end bars 12 and the support bars carried thereby to add rigidity and sturdiness to the structure as a whole as will be well understood.

The grate bar unit provided by my invention comprises two half-sections of substantially identical size and shape and only one of these sections will be described in detail. Referring particularly to Figs. 1 and 2, each grate bar section consists of a flat body portion 16 having therein the usual diagonally-arranged grate openings 17. This body portion is, preferably, of sufficient length to extend from the side wall 11 to the center of the support bar 14 so that the two half sections in assembled position (Fig. 2) meet in substantially end-wise abutting relation, thereby forming in each grate bar unit (Fig. 1) a substantially continuous, uniform grate bar surface.

One of the important features of my invention has to do with the manner of securely mounting each half-grate bar section upon the pallet, and the preferred form of structure which I have chosen to illustrate that feature of my invention will now be described. The side walls 11 of the pallet are each provided throughout their length, along their inner surface, with a horizontal ledge or shoulder 18 adapted to support the ends 15a of the grate bar body in horizontally-aligned position. The underside of the grate body 16 at its mid-section is provided with an integral, depending rib 19 which extends from flush with the inner end 16a of the half grate bar section to near, but spaced from its other or side wall 10 and adapted to receive therein the ends 19a of the grate bar unit in horizontally-aligned position. The underside of the grate bar section is so disposed that its respective support bar 14 is received in the notch 20 (Fig. 2) so as to be interlocking embraced by the jaw-formation provided by such notch thereby preventing vertical displacement of that end of the section from the support bar 14 and the pallet. When the two sections are so mounted in end-wise abutting relation (Fig. 2), tipping, tilting of the mid-portions (inward ends 16a of the sections) of the grate bar unit is prevented even though there might be slight play between the notches 20 and the respective grate bar 14. The outward ends 16a of the grate bar which are seated upon the side wall ledges 18 are confined against vertical displacement by the side-wall-carried pins 21 engaging suitable depressions 22 in the upper surface of the grate bar body.

From the foregoing, it is obvious that each grate bar section, and the grate bar unit as a whole, is securely locked to the pallet against vertical displacement in any position which the pallet may assume on its conveyor structure.

It is also highly desirable that each of the grate bar sections be maintained in a substantially predetermined lateral position with respect to the pallets and each other so that the grate bar units will all be maintained in the proper position for presenting a substantially continuous, uniform grate bar surface over the bottom of the pallet. To that end, I employ at the inward or jaw end 10 of each of the sections, depending, integral lugs 23. These lugs, on each section, are disposed on opposite sides of the rib 19 near its jaw-end and adjacent the side edges of the grate bar body. Furthermore, these lugs are so positioned that when the section is mounted upon the pallet, said lugs lie close to the adjacent transverse and intermediate bars 12, 13 (or the intermediate bars 13 alone, as the case may be) cooperating therewith to prevent lateral displacement of the sections with respect to the pallet. This arrangement in conjunction with the end-wise abutting relation between the sections of each unit, insures that the sections and units will all be held or locked in a substantially fixed position against relative vertical and lateral displacement.

The advantages afforded by my invention will be well appreciated from the foregoing. The sectional construction tends to avoid, or at least reduce to a minimum, warping, cracking and breaking. If warping, cracking or breaking should occur, the replacement of only the one section is necessary (instead of the entire grate bar unit). All the foregoing, as will be appreciated, tends not only toward a more sturdy structure but also increases the life of the grate bar structure materially and greatly reduces operation and maintenance costs.
While I have shown only one form of my invention, it will be understood that other changes in details and arrangement of parts may be made without departing from the spirit and scope of my invention as defined by the claims which follow.

I claim:

1. In structure of the class described, a support having sides of substantial depth and thickness, spaced cross bars of substantial depth and thickness extending in parallel relation between said sides, inverted U-shaped bars extending transversely between and joined to the mid-portions of said cross bars, so that the horizontal portions of said U-shaped bars are disposed substantially in alignment with the upper surfaces of said cross bars, and a grate bar unit consisting of two similar sections adapted to be disposed in end-to-end relation, each said section having one end jaw-shaped to embrace the horizontal leg of the respective said U-bars so that in the assembled position of said sections said horizontal leg is surrounded by said grate bar unit, depending lugs adjacent the jaw-shaped end of each said section at the side of each section co-acting with the adjacent of said cross members, and means for supporting and detachably securing the end of each said section opposite its jaw end.

2. In structure of the class described, a support having side members, spaced cross bars integral with and extending in parallel relation between said side members, transverse bars of inverted U-shape extending between and detachably joined to the mid-portions of said cross bars, dividing said support into a plurality of grate bar supporting sections, a grate bar unit adapted to be mounted upon said support, each of which units comprise a pair of similar sections adapted to be mounted in end-to-end relation, each of said sections having at one end a jaw adapted to embrace the respective transverse bar so that in the assembly of said grate bar unit said transverse bar is surrounded by said unit, the other end of each said section being adapted to seat upon said support side, and means carried by said support and detachably engaging each grate bar unit to removably lock said unit in place.

3. In structure of the class described, a support having side members, spaced cross bars extending in parallel relation between said side members, inverted U-shaped bars having relatively thin horizontal web portions extending transversely between said cross bars, with their depending U-legs detachably joined to the mid-portions of said cross bars, a grate bar unit consisting of a pair of similar sections each of a width approximating the distance between said cross bars and of a length approximating the distance between said U-shaped bars and said side members, and means for securing each said section to said support which comprises a depending jaw element at one end of each section adapted to embrace the horizontal web of each of said U-bars so that the grate bar unit in its assembled position substantially surrounds said horizontal web portion of the U-bar, a seat formed upon each said side member to receive the end of each said section opposite said jaw element, and means carried by each of said side members for releasably securing in place the end of said section seated thereon, and means carried by each said section and cooperating with said cross bars to prevent lateral displacement of each said section.

4. A grate bar unit for structure of the character described which comprises a pair of sections each having a body portion of generally rectangular shape, an integral centrally disposed rib depending a substantial distance from the underside of said body and extending from one end of the body to near but spaced from its other end, the end of said rib at said one end of the body being notched in the direction of its length to give such end a jaw-shape, and integral lugs depending from said body on the opposite sides of said rib and adjacent said jaw-shaped portion and the side edges of said body.

5. A grate bar unit for structure of the character described which comprises a pair of sections each having a body portion of generally rectangular shape, a centrally disposed rib depending from the underside of said body and extending from one end of the body to near but spaced from its other end, the end of said rib at said one end of the body being thickened laterally to provide a head which is notched inwardly throughout its width in the direction of the length of said body to give such rib end a sturdy jaw-formation for interlock engagement with a supporting surface, and lugs depending from said body on the opposite sides of said rib and adjacent said head and the side edges of said body.

In testimony whereof, I have subscribed my name.

THOMAS H. BENNETT.