To all whom it may concern:

Be it known that I, ARTHUR JAMES PARSONS, a subject of the King of Great Britain, and resident of Mobile, in the county of Mobile and State of Alabama, have invented certain new and useful Improvements in Sawdust Grate Bars of which the following is a specification.

This invention relates to grate bars especially adapted for use in burning sawdust and the like.

In certain sawdust grate bars now widely manufactured and particularly those which rely upon solid parallel longitudinal ribs for supporting the top plate, the necessary joining of the ribs to the top plate prevents the possibility of forming holes or air spaces in the top plate immediately above the supporting ribs with the result that there is a dead air space extending for approximately the full length of the grate bar along the line of contact of the ribs with the top plate.

This difficulty was overcome in the grate bar in United States Patent No. 610,674 issued to W. Edgar, September 22, 1898 by forming the upper portion of the longitudinal ribs with recesses or spaces wherever said longitudinal ribs came immediately beneath and would otherwise have obstructed any of the holes or air spaces in the top plate, thus leaving no dead space in the top plate. However, the manufacture of a grate bar in accordance with the Edgar patent, necessitates in molding, the use of a large number of dry sand cores and this invention achieves superior results without the use of the dry sand cores, the design being such as to permit of the pattern leaving its own green sand core and thus considerably reducing the cost of manufacture.

Also in the use of the Edgar grate bar it has been found that by forming spaces in the upper portion of the supporting ribs said supporting ribs are weakened and are consequently less able to withstand the intense heat so that the life of the grate bar is comparatively short.

Summarized it might be stated that an important object of this invention is to provide a sawdust grate bar wherein the supporting ribs do not in any way interfere with the passage of the air through the bar, and wherein the supporting ribs are devoid of openings so that an extremely economical and durable bar is produced.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a bottom plan view of one form of the grate bar illustrating the transversely corrugated supporting ribs which permit of the free passage of the air through the bar and which also permits the grate bar to be manufactured at a comparatively low cost.

Figure 2 is a side elevation of the form of the invention illustrated in Figure 1.

Figure 3 is a vertical transverse sectional view taken on line 3—3 of Figure 1.

Figure 4 is a vertical transverse sectional view taken on line 4—4 of Figure 1.

Figure 5 is a detail longitudinal section taken on line 5—5 of Figure 1.

Figure 6 is a fragmentary bottom plan view of a slightly modified form of the invention.

Figure 7 is a vertical transverse sectional view taken on line 7—7 of Figure 6.

Figure 8 is a fragmentary plan view of a further modification of the invention.

Figure 9 is a vertical transverse sectional view taken on line 9—9 of Figure 8.

In the drawing the numeral 5 designates the body or top plate of the improved grate bar, which body is of elongated formation and is formed with a series of closely arranged tapered openings 6 through which the air may pass for creating a draft through the grate bar.

In the case of the Edgar bar the longitudinal supporting ribs beneath the body were formed with spaced recess portions which allowed the air to freely pass through the openings in the body, but these recesses in the longitudinal ribs not only decrease the strength and durability of the grate bar but also substantially increase the cost of manufacture for the reason previously stated. Therefore, the longitudinal ribs which in the form of the invention illustrated in Figures 1 to 4 inclusive are designated by the numeral 8 and which are formed integral with the body are corrugated transversely so as to clear the openings. With reference to Figure 1 it will be seen that the longitudinally extending supporting ribs 8 are extended between rows...
of the openings 6 and that the corrugations extend diagonally with reference to the longitudinal axis of the body and do not in any way interfere with the free passage of air through the grate bar.

By corrugating the ribs 8 transversely the length of the ribs is greatly increased and a corresponding increase in the strength of the bar is obtained so that the grate bar is enabled to resist the intense heat. Furthermore the ribs 8 are devoid of spaced openings which would add to the cost of manufacture and decrease the resisting qualities of the bar. In manufacture the pattern leaves its own green sand core and therefore the use of a large number of dry sand cores is unnecessary.

The body 6 may be provided with a plurality of spaced parallel transversely extending supporting ribs 14 which are joined with the transversely corrugated longitudinally extending ribs and serve as a means for greatly strengthening and reinforcing the grate bar. The transversely extending ribs 14 do not in any way interfere with the free passage of air through the openings 6 and strengthen the intermediate portion of the bar so that it will not break under the influence of heat.

As the result of continued experiments it has been found that when a plurality of grate bars of the ordinary type are arranged side by side in a furnace, the edge portions of the bar being unsupported give way under the influence of heat and cause the bars to melt and become unfit for further use. To overcome this defect the invention is provided with pairs of triangular reinforcing webs 16 which join the top plate of the bar with the outer sides of the longitudinally extending ribs 8. It will be seen that the reinforcing webs 16 which are arranged more or less in pairs are located at the sides of the openings 6 and therefore serve to guide the air into the openings. This is an important feature of the invention since it effectively supports the longitudinal edge of the top plate and also serves to guide the air through the openings in the top plate for creating the desired draft.

It has been found from experience that sawdust grate bars having intervals or spaces in the longitudinal ribs underneath the holes in the top plate, as is the case in the expired Edgar patent and some other bars, the same have a tendency to break off across the top plate at the point where the longitudinal ribs end and in a lesser degree the defect occurs in bars not having intervals or air spaces in the longitudinal ribs, but having the usual holes in the top plate close to the point where the longitudinal supporting ribs end. To remedy this defect I have provided reinforcing heels or blocks 19 on the outside of the longitudinal ribs, attached to and beneath the top plate, which heels or blocks materially strengthen the bar at the weak points and add considerably to its durability.

The reinforcing blocks may be made in any desired shape and size and are so arranged that they will not in any way interfere with the passage of the air through the top plate.

In the form of the invention illustrated in Figures 6 and 7 the top plate is designated 22 and is formed on its under side with a pair of straight longitudinally extending reinforcing ribs 24 having spaced thickened portions 25, cored to provide openings 26 which communicate with the openings 27 in the top plate. It will be seen that the thickened portions 25 greatly strengthen the ribs 24 and also form the openings or passages 26 which communicate with the openings 27 so that the free passage of the air through the top plate is provided for. The top plate may be provided with transversely extending reinforcing ribs 28 which cooperate with the longitudinally extending ribs 24 in strengthening and reinforcing the bar. In carrying out the invention the passages 26 may be gradually reduced in diameter toward the openings 27 so that the velocity of the air is increased, as it approaches the sawdust.

The grate bar may be constructed as illustrated in Figures 6 and 9 wherein the top plate is designated by the numeral 30 and is formed with longitudinally extending grooves as illustrated in Figure 9. Also the top plate 30 may be curved transversely in any form of the invention without departing from the spirit of the invention. As illustrated in Figure 8 the grooved top plate 30 is formed with openings 31 which are arranged on opposite sides of the ribs 32. In this form of the invention it will be observed that the ribs which extend longitudinally of the top plate are arranged inwardly of the longitudinal edges of the top plate and webs similar to those illustrated in Figures 1 and 2 may be employed to connect the longitudinally extending ribs with the edge portions of the top plate.

With reference to the foregoing description taken in connection with the accompanying drawing it will be observed that in the manufacture of the improved grate bar it is not necessary to provide the spaced openings in the supporting ribs as in the Edgar patent and furthermore the strength of the grate bar is substantially increased by the omission of these spaced openings and the cost of manufacture is decreased.

It will be observed that the invention forming the subject matter of this application is capable of a variety of mechanical expressions and therefore it is to be understood that the forms of the invention here-
with shown and described are to be taken merely as preferred examples of the same and that such minor changes in arrangement and construction of the parts may be made as will remain within the spirit of the invention and the scope of what is claimed.

Having thus described the invention what I claim is:

1. A grate bar comprising a body with a plain top surface and having draft perforations arranged in straight rows, the perforations in adjacent rows being relatively staggered, spaced solid reinforcing flanges integral with and depending from the under side of the body and positioned in longitudinal direction of the body between adjacent rows of the perforations, and transverse reinforcing ribs connecting said longitudinally running flanges, said flanges being of sinusoidal formation and forming therebetween an unobstructed draft space throughout the length of the bar.

2. A grate bar comprising a top plate having a plurality of openings arranged in lengthwise and transverse rows, longitudinal ribs cast integral with said top plate and each being arranged entirely between two adjacent lengthwise rows of openings and between the openings of the said adjacent rows, said ribs being corrugated transversely to clear said openings and to strengthen the top plate, and a series of shallow transverse reinforcing ribs extending across the top plate between the transverse rows of openings and connected to said top plate and to the adjacent portions of said longitudinal ribs, said transverse ribs cooperating with one another to support and strengthen the longitudinal ribs and still leave a substantially unobstructed lengthwise air passage between said longitudinal ribs.

3. The construction set forth in claim 2, said ribs having a continuous unbroken connection at their upper edges with said top plate.

4. A grate bar comprising a top plate having a plurality of rows of openings, longitudinal reinforcing ribs formed integral with said top plate and each being arranged entirely between two adjacent rows of openings and between openings of the adjacent rows, said ribs being corrugated transversely to clear said openings and to strengthen the top plate, transverse ribs connected to said longitudinal ribs and to said top plate, said ribs having an unbroken connection along their entire upper edges with said top plate, and oppositely inclined reinforcing webs cast integral with said top plate and said longitudinal ribs and arranged at opposite sides of certain of said openings whereby to guide air through the openings.

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