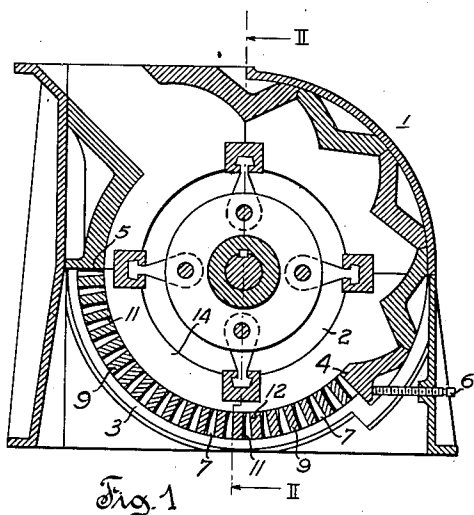
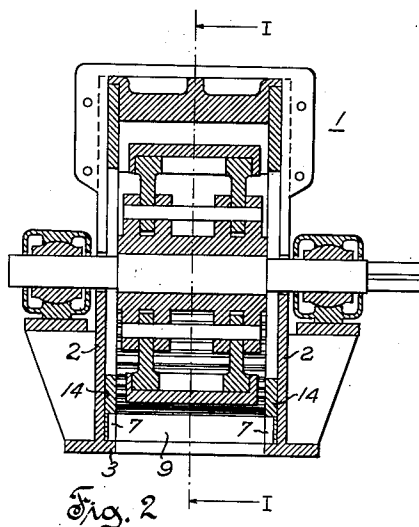
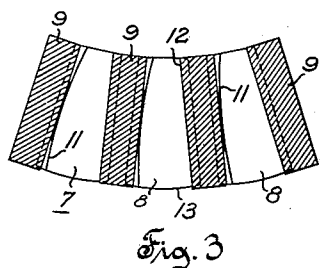
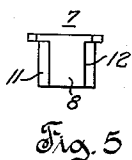
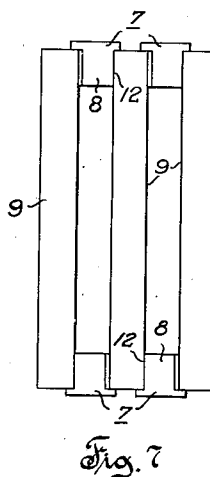
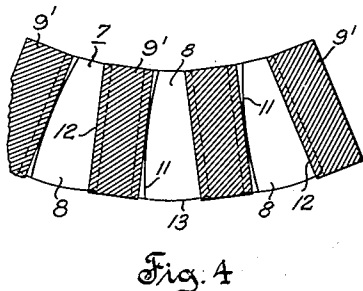
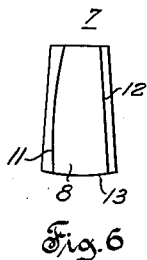


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PULVERIZER GRATE STRUCTURE, INCLUDING
A CURVED-SIDE FILLER PIECE
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PULVERIZER GRATE STRUCTURE, INCLUDING A CURVED-SIDE FILLER PIECE

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8 Claims. (Cl. 241—89)

1

This invention pertains to rotary impact pulverizers and particularly to grate structure for such pulverizers.

It is already known in the art to assemble a grate in an arcuate guide frame by inserting a series of grate bars and pairs of filler pieces locating and spacing the bars of the grating.

However, it has previously been necessary to use a different set of filler pieces for every thickness of bar which might be used in making up the grate and for every different curvature of grate which might be desired.

An object of the present invention is to create a grate structure in which a single set of filler pieces will accommodate bars of any thickness while maintaining proper regularity of bar arrangement and substantially predetermined spacing between the bars.

More particularly it is an object to provide a form of grate spacer piece which can be used to space bars of any thickness and give firm spacing action in an arcuate grate by full planar engagement on one bar and engagement in a limited, central portion only on another adjacent bar.

The above and further objects may be best carried into effect in the manner fully described below with reference to the accompanying drawing in which:

Fig. 1 is a cross-sectional view of a pulverizer taken on line I—I of Fig. 2;

Fig. 2 is a vertical sectional view taken on line II—II of Fig. 1;

Fig. 3 is a fragmentary sectional view of grate bar and filler piece assembly using light grate bars;

Fig. 4 is a fragmentary sectional view similar to Fig. 3 using same spacers and heavier grate bars;

Fig. 5 is a top detail elevation of a filler piece;

Fig. 6 is a detail front elevation of a filler piece; and

Fig. 7 is a fragmentary top elevation of a grate bar and filler piece assembly.

Like reference characters refer to similar elements throughout the several figures of the drawing.

A pulverizer 1 of the rotary impact type is provided with parallel side walls 2 having arcuate guide flanges 3 forming a grating frame or seat. A movable frame member 4 is provided, capable of being moved endwise of flanges 3 by a clamping screw 5 for a purpose which will appear hereinafter. A stop piece or surface 5 is formed at one end of flanges 3. A grating through which pulverized material may pass is formed by in-

2

serting into the frame a series of pairs of filler pieces 7 roughly T-shaped in cross section. The legs 8 of the filler pieces form bar spacing projections between the adjacent ends of successive bars 9, 9', which rest with one edge on flanges 3. The head, or web of the filler piece 7 abuts adjacent bar ends forming coplanar shoulders to locate the bars endwise between side walls 2.

If it were desirable to design a filler piece which would be usable only with one radius of grate curvature and one thickness of bar, a filler piece of the kind shown in U. S. Patent 1,625,554 to W. K. Liggett could be employed. However, in order to accommodate a thicker grate bar in the Liggett grate a different set of filler pieces would have to be provided, having a different angle between the sides of the leg or spacer portion because different thicknesses of rectangular grate bars placed on an arcuate guide flange will have their sides at different angles to the radius of the radially inner corner of the grate bar. If the same set of fillers were used there would be spacing contact only at the inner edges of the bars and a series of such thicker bars could not be firmly clamped in place and held in true radially edgewise position.

The applicant provides a filler piece 7 shown in detail in Figs. 5 and 6 in which one face 11 of the leg or spacer projection 8 is cambered, that is, convexly curved, with respect to a mean plane inclined to the oppositely facing planar face 12. That is, a high point of the face 11 relative to its mean plane lies intermediate the edges of the planar side surface of an adjacent bar 9, 9', as clearly shown in Figs. 3 and 4. The leg or spacer projection 8 thus has a plano-convex form, the convex surface 11 being substantially cylindrical with its axis substantially parallel to the plane surface. The surface 11 could of course take substantially any known form of smooth convexly curved surface, so long as a high point relative to its mean plane lies intermediate the extremities of the piece radially, and surface 11 need not be a true right circular cylindrical surface. One end surface 13, the outer end radially of the piece, adapted to rest on flange 3, is preferably arcuate or convex in form with a curvature greater than that of any grate to which it might be applied within practical limits, so as to make a line contact with said flange 3 in any normal position.

When the grate is assembled, the pieces 7 and grate bars 9, 9', will take positions as shown most clearly in Figs. 3, 4 and 7. From Figs. 3 and 4 it will be plainly evident that whether a thick bar

9' (Fig. 4) or a thin bar 9 (Fig. 3) is employed, the filler piece will assume a position with the face 12 firmly engaging a side face of an adjacent bar. The angle of the filler piece to a radius through its center will be different for different thicknesses of bars and the piece will therefore contact flange 3 at one line of surface 13 for one thickness of bar as shown in Fig. 3 and at another line of surface 13 for a thicker bar as shown in Fig. 4. The face 11 of the filler piece 7 will contact the planar side surface of an adjacent grate bar 9 in a high point or line of tangency intermediate the extremities of said surface in a radial sense. Pressure exerted by bar 9 on the high point of surface 11 will cause the filler piece to be firmly and stably positioned relative to the succeeding bar for full facial contact therewith along planar surface 12.

It will be seen by visualizing a displacement of one of the bars in Fig. 3 or Fig. 4 from a truly radial position, that the points of contact of the curved surfaces 11 of the two spacers engaging such a displaced bar on opposite sides will be displaced radially of the grating so that a corrective couple is formed by the circumferential clamping forces acting laterally on the bars, which will tend to rectify the position of the displaced bar and spacer, resulting in a tendency for all bars to assume a radial arrangement relative to the grate curvature.

Now when a plurality of rectangular bars 9, or 9', or bars having substantially rectangular spaced portions, are inserted in the frame formed by side walls 2, flanges 3 and stop piece 5, with pairs of identical filler pieces 7 arranged to space and locate the adjacent ends of successive bars, the bars 9, or 9', regardless of thickness will take a radial edgewise position because the pieces will tend to form a corrective couple if the bars are displaced from true radial positions, as more fully explained hereinabove. The bars thus will be firmly and stably clamped into a regular arcuate grating by compression between stop surface 5 and movable frame member 4 by the action of clamping screws 6 acting on member 4 which is arranged to contact the end pieces of the series of bars 9, or 9', and move them endwise relative to flanges 3. The spacing between the radially inner corners of the bars will be substantially the same whether thin or thick bars 9, or 9', are used, and a different curvature of the grate frame will not affect the stability or true radial arrangement of the assembled grate, for filler pieces according to this invention are self-positioning regardless of the radius of curvature of the grate or the thickness of the bars, within practical limits.

The rectangular bars 9 or 9' are reversible end for end and edge for edge, thus forming a grate of maximum usable life. The upper ends of filler pieces 7 may be protected by side wall liner pieces 14 forming opposed arcuate channels with flanges 3 and side walls 2.

It should be noted that using identical filler pieces 7 the planar faces 12 of the pair of spacer portions 8 between a given pair of grate bars 9, or 9', will face in opposite directions as shown in Fig. 7. While this is a part of the invention and is highly desirable for economy in manufacture and ease of assembly and conducive to firmness due to the fact that each grate bar will bear on a flat spacer surface on each side, it will be understood that the invention is not limited to such identity and that paired or right and left hand spacers may be used.

While a particular form of the invention has been specifically described and illustrated, it will be understood that such equivalents and modifications as may readily occur to persons skilled in the art are included within the invention which is limited only by the scope of the appended claims.

It is claimed and desired to secure by Letters Patent:

1. A pulverizer grating comprising a frame having opposed arcuate seats, a series of bars having spaced substantially rectangular portions engaging said seats, and a plurality of spacing elements positioned in said seats between adjacent said spaced portions of successive bars, said spacing elements each having a lateral surface engaging a lateral surface of one of said spaced portions and an oppositely facing convex surface having the form of a cylindrical segment engaging a lateral surface of the adjacent spaced portion of the succeeding bar substantially on a line of tangency parallel to and intermediate the edges of said lateral surface and intermediate the chordal extremities of said convex surface.

2. A pulverizer grating comprising a frame having opposed arcuate seats, a series of bars having spaced substantially rectangular portions engaging said seats, and a plurality of spacing elements positioned in and engaging said seats between adjacent said spaced portions of successive bars, said spacing elements each having a lateral surface engaging a lateral surface of one of said spaced portions and an oppositely facing convex surface having the form of a cylindrical segment engaging a lateral surface of the adjacent spaced portion of the succeeding bar substantially on a line of tangency parallel to and intermediate the edges of said lateral surface and intermediate the extremities of said convex surface, at least one end surface of each said spacing element being convexly curved to a substantially greater degree of curvature than said arcuate seats and engaging one of said seats in internally tangent relation.

3. In an arcuate grating, a series of grate bars having spaced end portions with substantially parallel side surfaces, a filler piece comprising coplanar bar positioning shoulders engaging adjacent said spaced end portions of a pair of successive bars of said series and a bar spacing projection extending between said spaced end portions of said pair of successive bars, said bar spacing projection having a lateral surface perpendicular to said shoulders engaging a side surface of one of said spaced end portions and an oppositely facing convex lateral surface having the form of a cylindrical segment perpendicular to said shoulders engaging a side surface end of the adjacent spaced portion of the succeeding bar substantially in a line perpendicular to said shoulders intermediate the chordal extremities of said convex surface.

4. A pulverizer grating comprising a frame with spaced parallel plates having opposed arcuate channels, a series of bars having substantially flat sided end portions, opposed pairs of filler pieces in said channels, each said filler piece having a pair of coplanar shoulders engaging adjacent ends of successive bars and locating said bars endwise between said plate and a spacing projection between adjacent end portions of successive bars, each said spacing projection having a lateral surface perpendicular to said shoulders engaging a flat side surface of one of said end

5

portions and an oppositely facing convex lateral surface substantially perpendicular to said shoulders adapted to engage a flat side surface of the adjacent end portion of the succeeding bar only in a line intermediate the edges of said side surface and intermediate the extremities of said convex surface, and movable clamping means on said frame for circumferentially clamping said series of bars and filler pieces in said channels to form a firm uniformly spaced grating with said bars regularly arranged, substantially irrespective of the radius of curvature of the arcuate channels or the thickness of bars used with a given set of filler pieces.

5. A pulverizer grating comprising spaced parallel plates having opposed arcuate channels, a series of bars having substantially flat side end portions, and opposed pairs of filler pieces in said channels, each said filler piece having a pair of coplanar shoulders engaging adjacent ends of successive bars and locating said bars endwise between said plates and a spacing projection between said bars, each said spacing projection having a plane lateral surface perpendicular to said shoulders engaging a flat side surface of one of said end portions, and an oppositely facing convex lateral surface substantially perpendicular to said shoulders adapted to engage a flat side surface of the adjacent end portion of the succeeding bar substantially in a line intermediate the edges of said side surface and intermediate the extremities of said convex surface, said filler pieces of each said pair being identical and being rotated 180° relative to each other about an axis radial to said arcuate channels in assembly.

6. As an article of manufacture, a spacing element substantially T-shaped in cross section, comprising a head plate and a spacing projection, said spacing projection having a first side surface perpendicular to said head plate and a second oppositely facing convex side surface having the form of a cylindrical segment substantially perpendicular to said head plate.

6

7. As an article of manufacture, a spacing element for an arcuate grating composed of spaced bars, comprising a head plate and a spacing projection integral with said head plate, said spacing projection having a first side surface perpendicular to said head plate and a second oppositely facing convex side surface substantially perpendicular to said head plate, at least one end of said element being formed with an arcuate end surface perpendicular to said head plate and having a curvature in the plane of said head plate substantially greater than that of said grating.

8. As an article of manufacture, a universal spacing and positioning element for arcuate grates composed of bars having substantially flat parallel sided end portions, said element being substantially T-shaped in cross section and comprising a head plate portion and a spacing leg, said spacing leg having a first bar engaging side surface perpendicular to said head plate and a second oppositely facing bar engaging surface perpendicular to said head plate and convexly curved to the form of a cylindrical segment having a curvature sufficient to prevent engagement of the extremities of said convexly curved second surface with the side surface of the engaged end portion of a grate bar, within practical limits as to bar thickness and radius of grate curvature.

GEORGE O. VERCH.

REFERENCES CITED

The following references are of record in the file of this patent:

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Number	Name	Date
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1,625,554	Liggett	Apr. 19, 1927
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2,049,083	Schaefer	July 28, 1936

Certificate of Correction

Patent No. 2,463,223.

March 1, 1949.

GEORGE O. VERCH

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 4, line 39, claim 2, for the words "the extremities" read *the chordal extremities*; line 58, claim 3, after "surface" strike out "end" and insert the same in line 59, after "spaced"; column 5, line 17, claim 5, for "side" read *sided*; and that said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 5th day of July, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.