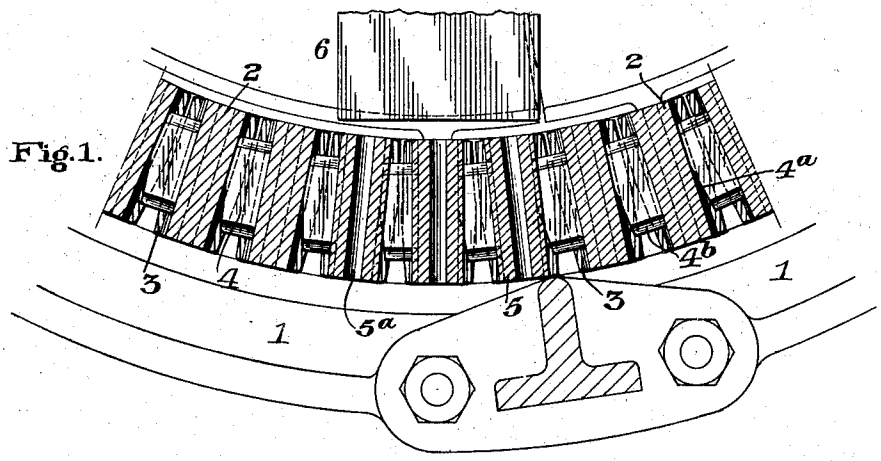
Feb. 11, 1930. O. ANDERSON 1,746,512

SCREEN BAR FOR CRUSHING MACHINERY

Filed July 24, 1928

Fig.1.



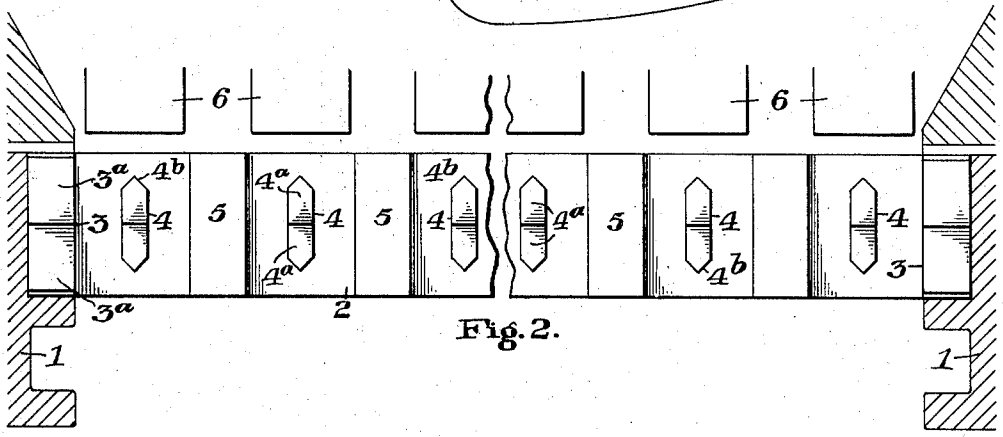


Fig.2.

Fig.3.

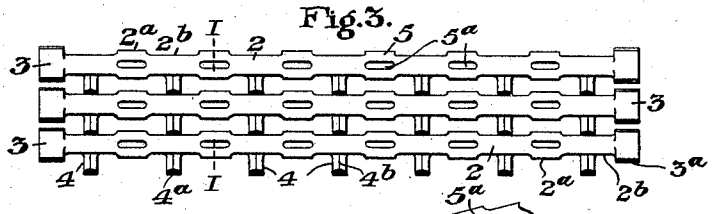
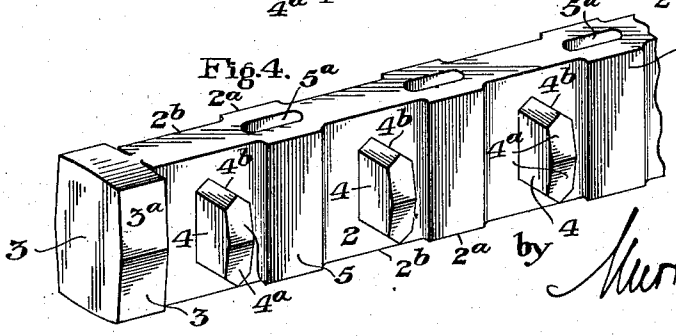


Fig.4.



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UNITED STATES PATENT OFFICE

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SCREEN BAR FOR CRUSHING MACHINERY

Application filed July 24, 1928. Serial No. 295,039.

My invention relates to crushing machinery, more particularly crushers of the hammer mill type employed in the reduction of coal, ore, stone, or the like, and the object of my invention is to provide an improved form of screen bar employed in making up the discharge grate or screen of a structure of this type; the bars making up such grate or screen being disposed in arcuate supports substantially concentric with respect to the path of the hammers which effect the breaking and/or crushing of the material operated upon by beating such material against the edges of the bars making up such grate or screen.

A further object of my invention is to provide a self-spacing bar; such bar having lateral projections disposed at intervals, preferably upon one face of the bar; integral therewith or not, as the case may be.

And a still further object of my invention is to provide a bar of material size designed for employment with massive crushers of the hammer mill type. The size of hammers required for these heavy duty machines and the manner of mounting them in the rotor structure is such that gaps of unusual width may be left between the side faces of adjacent hammers through which coarse and insufficiently crushed material might be discharged, and in order that the spaces between the bars at the portions of the latter intermediate the paths of the hammers may be reduced, I provide the bars with areas of increased thickness and dispose such areas between the paths of the hammers. In order to make up a portion of the screen surface displaced by these thickened portions, the latter are apertured; such apertures extending through the bars from top to bottom of the same. Intermediate the thicker portions of the bars are thinner portions, and the spacing projections preferably extend from these thinner portions; being set inwardly with respect to the top and bottom edges of the bars and having their faces beveled in opposite directions from a central point.

My improved grid or screen bar which has a rectangular or substantially rectangular contour at any cross sectional point, is of the reversible type, so that when one active edge is worn it may be reversed by turning the same upside down and/or end for end, as the case may be, in order that all four active edges of the bar may be brought into cooperative relation with the rotating hammers.

These and other features of my invention are more fully described hereinafter; reference being had to the accompanying drawings, in which:

Figure 1 is a cross sectional elevation, more or less diagrammatic in character, of a portion of the grate support of a crusher of the hammer mill type showing a series of screen or grate bars forming the subject of my invention in the proper relative position; certain of the bars being in section on the line I—I, Fig. 3.

Fig. 2 is an elevation, partly broken away, of one of my improved screen or grate bars positioned in the supports for the same.

Fig. 3 is a plan view of a series of my improved screen or grate bars disposed in a single plane, and

Fig. 4 is a perspective view of one end of one of the bars illustrated in Figs. 1, 2 and 3.

In the drawings, 1, 1, represents supporting portions of the cage or screen of a hammer crusher of the type with which my improved screen bar may be employed; such bars being shown at 2 in the several views. Each of the bars comprises a section of steel or other suitable metal, of material length, having a rectangular or substantially rectangular cross sectional contour, with end projections 3 on opposite sides of the same, and other projections 4, which are disposed intermediate said end projections; the projections 4 being set inwardly with respect to the upper and lower faces of the bar on one side of the same.

The projections 4 have beveled faces 4^a which meet at the centre and these beveled faces are arranged at such an angle with respect to the opposite face of the bar and the broad face of an adjacent bar that the upper beveled face of each projection contacts with the broad face of a directly adjacent bar when set in arcuate supports, as shown in Fig. 1. As clearly indicated in this view, the several bars contact with each other through

the medium of these spacing lugs when arranged to form the screen or grate of a hammer crusher.

The bar is of one dimension in one direction with portions of different thickness at right angles thereto; the thicker portions, indicated at 5, being disposed between he projections 4, so that each longitudinal edge of the bar presents an interrupted margin consisting of the portions 2^a in one plane, and the portions 2^b in another plane; the top and bottom surfaces of each bar being, however, in single planes. These bars are intended for use with hammers of large size, mounted in a rotor structure of large size, and the position of such hammers, indicated at 6, relatively to the bars, is shown in Figs. 1 and 2. These hammers will be carried by disks in the manner common to crushers of the hammer mill type, and these hammer-supporting disks may have spacing hubs or be spaced apart by other and smaller disks. The hammer supporting disks are of such thickness that an unusually wide gap is left between the sides of adjacent hammers. In order to prevent coarse and insufficiently crushed material passing the grate bars at these points, the bars have been widened by the provision of the thickened portions 5, which reduce the space between the bars opposite the laterally projecting edge portions 2^a, as clearly indicated in Fig. 3, and in order to make up a portion of the lost screening surface, these thickened portions 5 have been provided with through openings 5^a, clearly shown in Figs. 1, 3 and 4.

The projections 4 which form the spacing lugs are preferably formed integral with the bar although it will be understood that they may be separately attached by any suitable means, as by welding or riveting the same thereto, and their outer faces are beveled at the desired angle as indicated at 4^a so as to contact with the face of an adjacent bar, as clearly shown in Fig. 1. By preference, the top and bottom edges of these lugs or projections are sharply beveled, as indicated at 4^b, so as to readily shed any material that would otherwise tend to lodge thereon.

The bar forming the subject of my invention is reversible by being turned end for end and/or upside down with respect to the position shown in Fig. 1, so that all four edges of the bar may be brought into proper cooperative position relatively to the direction of movement of the hammers. In one position, the lugs or projections 4 will face in the direction illustrated in Fig. 1, while in a reversed position such lugs or projections will face in the opposite direction.

The end projections 3 may be beveled in opposite directions from the centre of the same toward the top and bottom surfaces of the same, as indicated at 3^a, and the top and bottom surfaces of the bar at the ends are preferably curved in the arc of a circle of the same curvature as the arcuate seats receiving the bars when arranged to form the desired screen or grate. The angle of the beveled faces 3^a may be such that the end projections of the several bars will be in contact when placed to form a screen or grate as indicated in Fig. 1, though such arrangement is not essential in the employment of screen bars of my improved construction.

I claim:

1. A screen bar substantially rectangular in cross section, having areas of different thickness extending the full dimension of the bar in one direction and arranged in regular order throughout its length and having lugs set inwardly with respect to the edges of said bar and projecting at right angles from the same; said lugs being disposed opposite those portions of the bar which are of the least thickness.

2. A screen bar substantially rectangular in section and of one dimension in one direction, having areas of different thickness extending the full dimension of the bar in one direction and arranged throughout its length at regular intervals and having lugs set inwardly with respect to the edges of said bar and projecting at right angles from one face of the same; said lugs being disposed opposite the thinner portions of the bar.

3. A screen bar substantially rectangular in cross section and of one dimension in one direction, and having areas of different thickness extending the full dimension of the bar in one direction and arranged in regular order throughout its length; the thicker portions of the bar having through openings extending from top to bottom thereof.

4. A screen bar substantially rectangular in cross section, having areas of different thickness extending the full dimension of the bar in one direction and arranged in regular order throughout its length and having lugs set inwardly with respect to the edges of said bar and projecting at right angles from the same; said lugs being disposed opposite those portions of the bar which are of the least thickness and having beveled outer faces.

5. A screen bar substantially rectangular in cross section and of one dimension in one direction, and having areas of different thickness extending the full dimension of the bar in one direction and arranged in regular order throughout its length; the thicker portions of the bar having through openings extending from top to bottom thereof and the thinner portions of the bar having spacing lugs extending at right angles therefrom.

6. A screen bar substantially rectangular in cross section and of one dimension in one direction and having areas of different thickness extending the full dimension of the bar in one direction and arranged throughout its length at regular intervals; the thicker por-

tions of the bar having through openings extending from top to bottom of the bar and the thinner portions of the bar having spacing lugs extending at right angles therefrom; said lugs having beveled outer faces.

7. A screen bar substantially rectangular in cross section and of one dimension in one direction, having areas of different thickness extending the full dimension of the bar in one direction and arranged throughout its length at regular intervals and having spacing lugs extending at right angles therefrom opposite the thinner portions of the bar.

8. A screen bar substantially rectangular in cross section and of one dimension in one direction, having areas of different thickness extending the full dimension of the bar in one direction and arranged throughout its length at regular intervals and having spacing lugs extending at right angles from the thinner portions of the bar for contact with adjacent bars; the faces of said lugs being beveled in two directions and one beveled surface of each lug being adapted for continuous contact with an adjacent bar when disposed in arcuate seats.

9. A screen bar substantially rectangular in cross section and of one dimension in one direction, having areas of different thickness extending the full dimension of the bar in one direction and arranged throughout its length at regular intervals and having spacing lugs or projections extending at right angles from the thinner portions of the bar for contact with adjacent bars; the upper and lower edges of said lugs being beveled to shed material passing between the bars.

10. A screen bar substantially rectangular in cross section and of one dimension in one direction and having areas of different thickness extending the full dimension of the bar in one direction and arranged throughout its length at regular intervals; the thicker portions of said bar providing lateral projections for the active edges of the bar.

11. A screen bar substantially rectangular in cross section and of one dimension in one direction and having areas of different thickness throughout its length at regular intervals; the thicker portions of said bar providing lateral projections for the active edges of the bar and being provided with through openings extending from top to bottom of the bar.

12. A screen bar substantially rectangular in cross section and of one dimension in one direction and having areas of different thickness throughout its length at regular intervals; the thicker portions of said bar providing lateral projections for the active edges of the bar which serve to decrease the space between adjacent bars and being provided with through openings extending from top to bottom of the bar and said bar having spacing lugs or projections extending therefrom intermediate said thicker portions.

In witness whereof I have signed this specification.

OSCAR ANDERSON.