Aug. 12, 1930. W. A. BATTEY 1,772,533

HAMMER CRUSHER

Filed Aug. 25, 1928

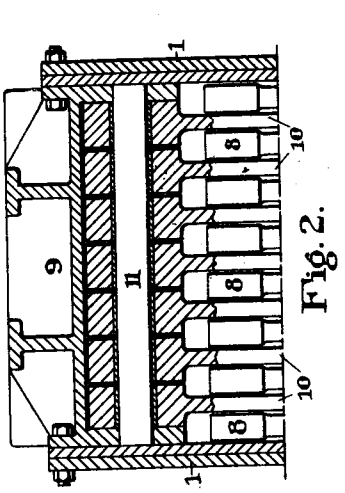


Fig. 2.

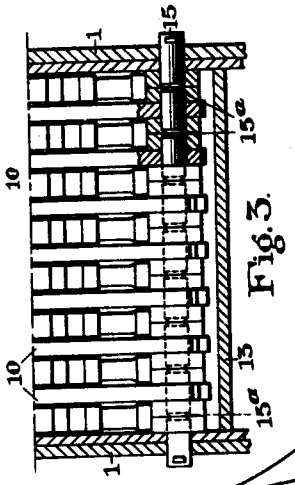


Fig. 3.

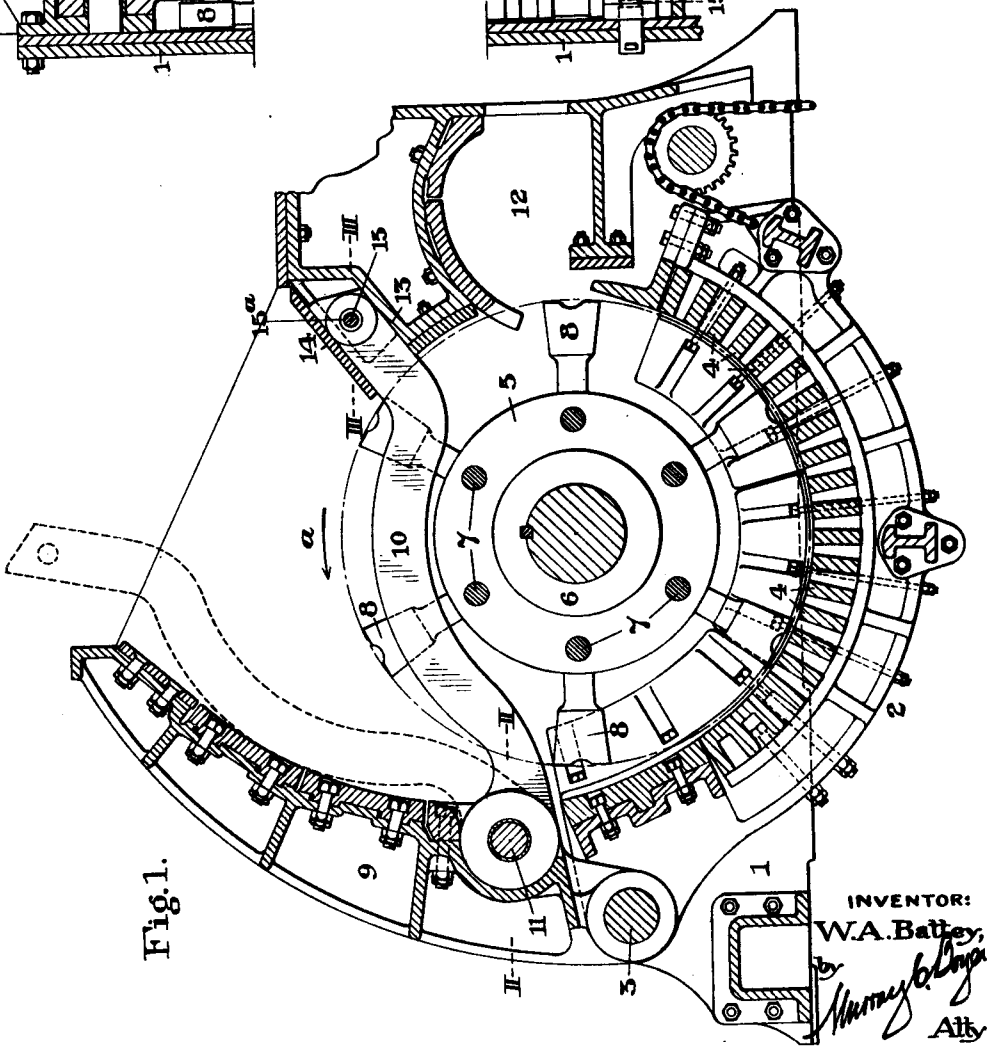


Fig. 1.

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UNITED STATES PATENT OFFICE

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HAMMER CRUSHER

Application filed August 25, 1928. Serial No. 302,087.

My invention relates to hammer crushers, and comprises certain improvements in the type of hammer crusher set forth in the application of George W. Borton, filed August 25, 1928, Serial No. 302,080.

In the structure of the Borton application, the chute leading to the crushing chamber wherein material introduced into said chute is crushed by the action of hammers carried by a suitable rotor structure of the type common to crushers of this general type, is provided with a grate or grid in order that large masses which might otherwise clog the crushing chamber are held temporarily and gradually reduced by the nipping action of the hammers whose path of movement carried them between and above the upper surface of said grid bars. These crushers are of massive size, and have been designed to act upon what may be termed "steam shovel feed, which will include large single masses of rock, ore, and/or other material; too large to be passed directly to the crushing zone, and requiring gradual reduction while temporarily arrested; the portions broken off while such material is resting upon the grate or grid being subjected to further crushing action by the hammers in cooperation with a grate or screen at the bottom of the crushing chamber.

In the use of crushing structures of this type, the presence of tramp iron, railroad parts and other pieces of uncrushable material from various sources has always been a potential source of damage to the machine, and provision is always made for so-called "tramp-iron pockets," into which such foreign material may be passed by the hammers, out of their zone of action and clear of the crushing zone.

In the present structure, the hammers are uprunning, and pass between the grid bars for action upon the material supported thereby. If tramp iron or other uncrushable foreign bodies present in the material being crushed are too large to or for other reasons fail to pass into the tramp iron pocket, or when for some reason they might become jammed, they would be carried by the hammers against the underside of the bars of the grate or grid and some part of the machine would give way. The object of my invention is to provide a mounting for the grid bars so that in the case of any foreign material being jammed against said bars, they may give and relieve the breaking stress that would otherwise occur. To this end I propose to pivotally mount the individual bars in the breaker plate which forms one wall of the chute leading to crushing chamber, and at the opposite end of said bars where they are supported above the tramp iron pocket, I propose to retain them by means of a shear pin (or pins), arranged to break under a calculated stress or strain well below the limit of any other part of the crushing structure. In the event of foreign material being carried against the grate bars by the hammers, these shear pins will give way, and the grate bars will be lifted on their pivotal connections against the surface of the breaker-plate without damage to the machine or breakage of other parts.

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 hammer crushing mechanism to which my invention has been applied.

Fig. 2 is a fragmentary sectional view on the line II—II, Fig. 1, and

Fig. 3 is a view illustrating a detail of my invention, in section on the line III—III, Fig. 1.

The crusher structure may include side walls 1, supporting a cage or screen 2, pivotally mounted at 3, and which may be made up of cross-bars 4 between which the crushed material is passed, or any other form of foraminous bottom. Within the crushing chamber a rotor structure is mounted which may comprise disks 5, mounted in spaced relation upon a shaft 6; said disks carrying rods 7, from which hammers 8, are suspended. Suitable means, common to structures of this type, are employed to drive such rotor structure, and the path of the hammers is in the direction of the arrow *a*.

A breaker plate 9, which includes and forms one wall of the chute leading to the crushing zone may be pivotally mounted upon the rod 3 which supports the cage or screen; being movable on said pivot connection when detached from the side frames for the purpose of repair or for removal of the rotor structure or for other purposes. Above the rotor structure a grate of grid is provided, which may consist of bars 10, curved substantially in the manner shown, and the hammers 8, pass between these bars and into the space above the same where they may act upon the larger masses of material arrested and temporarily retained by said bars.

In the present instance, the individual bars 10 are pivotally connected to the breaker plate; the latter supporting a cross-bar or shaft 11, upon which said bars may be hung. At the opposite end these bars overlie a tramp iron pocket 12, and are supported by a cross portion 13 of the frame; the lower portion of the feed chute being arranged directly over these bars, and a plate 14, which may form a continuation of such feed chute bottom, overlies the ends of said bars; said plate being lightly held so as to give under any stress that would tend to lift said bars from their seat. The bars at this end are connected by a shear pin (or pins) 15, of suitable cross section and of calculated stress; such pin (or pins) keeping the bars in proper alignment. Under a breaking stress such as might be occasioned by the presence of a piece of tramp iron jammed between the hammers and said grate bars, this shear pin (or pins) will give way, and the bars will simply be lifted out of their seats and turned on their pivotal connection as clearly illustrated by the dotted lines, Fig. 1.

If desired, each grid bar may have a separate shear pin, or a single shear pin may extend across the structure. This pin may be annularly grooved at 15^a to provide breaking areas, or its cross section may be calculated to the desired joint without the necessity of providing specially weakened portions.

I claim:

1. In a crushing structure comprising a hopper for the material to be crushed including a breaker plate and a rotor structure carrying hammers, a series of grid bars forming the bottom of said hopper, means for pivotally connecting said grid bars at one end to said breaker plate, and a shear pin connecting the opposite ends of said grid bars to the crushing structure; said hammers being arranged to pass between the bars of said grid and into said hopper.

2. In a crushing structure comprising a hopper for the material to be crushed including a breaker plate and a rotor structure carrying hammers, a series of grid bars forming the bottom of said hopper, means for pivotally connecting each of said grid bars at one end to said breaker plate, and shear pins connecting the opposite ends of said grid bars to the crushing structure; said hammers being uprunning and arranged to pass between and through the spaces between the bars of said grid and into the hopper and entering said spaces adjacent said shear pin connections.

3. In a crushing structure of the character described, the combination with a frame, a breaker plate carried thereby, a rotary-hammer-carrying member supported by said frame and a cage or screen below said hammer-carrying member, of a series of bars forming a grid above said cage and between which said hammers may pass, means for pivotally connecting said bars to the breaker plate, and a shear pin connecting the opposite ends of said bars with the frame and maintaining them in alignment.

4. In a crushing structure of the character described, the combination of a frame, a breaker plate carried thereby, a rotary hammer-carrying member supported by said frame, a cage or screen below said hammer carrying member, a series of individual bars forming a grid above said cage and between which said hammers may pass, means for independently pivoting said bars to the breaker plate, and a shear pin connection for the opposite ends of said bars.

5. In a crushing structure, the combination with a breaker plate forming one wall of a hopper receiving the material to be crushed, and a rotor structure carrying hammers disposed in the lower part of said crushing structure, of a series of grid bars pivotally connected at one end to the breaker plate and forming the bottom of said hopper, and a shear pin connecting the opposite ends of said grid bars to the crushing structure; the hammers of the rotor structure being arranged to pass between the bars of said grid and into said hopper.

6. In a crushing structure, the combination with a breaker plate forming one wall of a hopper receiving the material to be crushed, a rotor structure carrying hammers disposed in the lower part of said crushing structure, and a series of grid bars pivotally connected at one end to the breaker plate and forming the bottom of said hopper, of a shear pin connecting the opposite ends of said grid bars to the crushing structure; the hammers of the rotor structure being arranged to pass between the bars of said grid and into said hopper above the grid bars.

In witness whereof I have signed this specification.

WILLIAM A. BATTEY.