Sept. 22, 1931. C. A. JAMISON 1,824,272

HAMMER CRUSHER

Filed Aug. 28, 1928

Fig. 2.

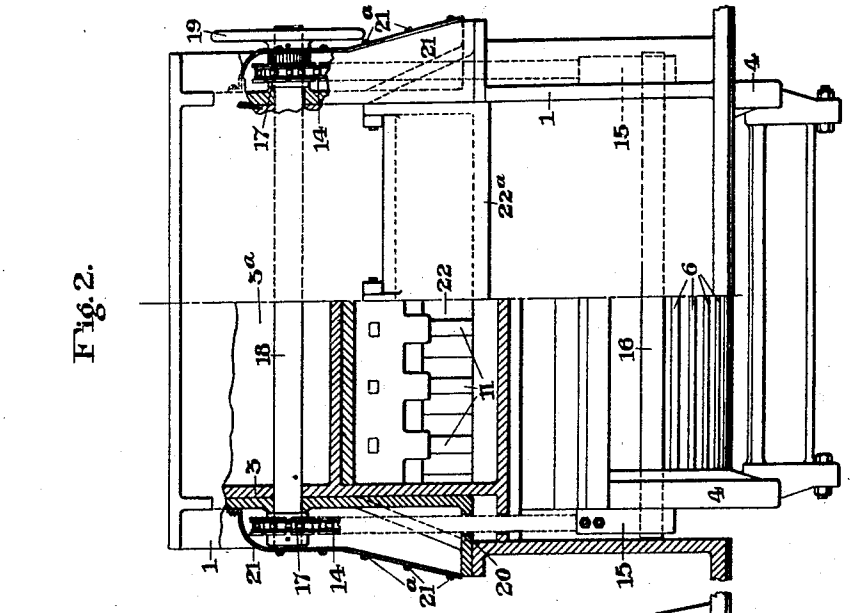
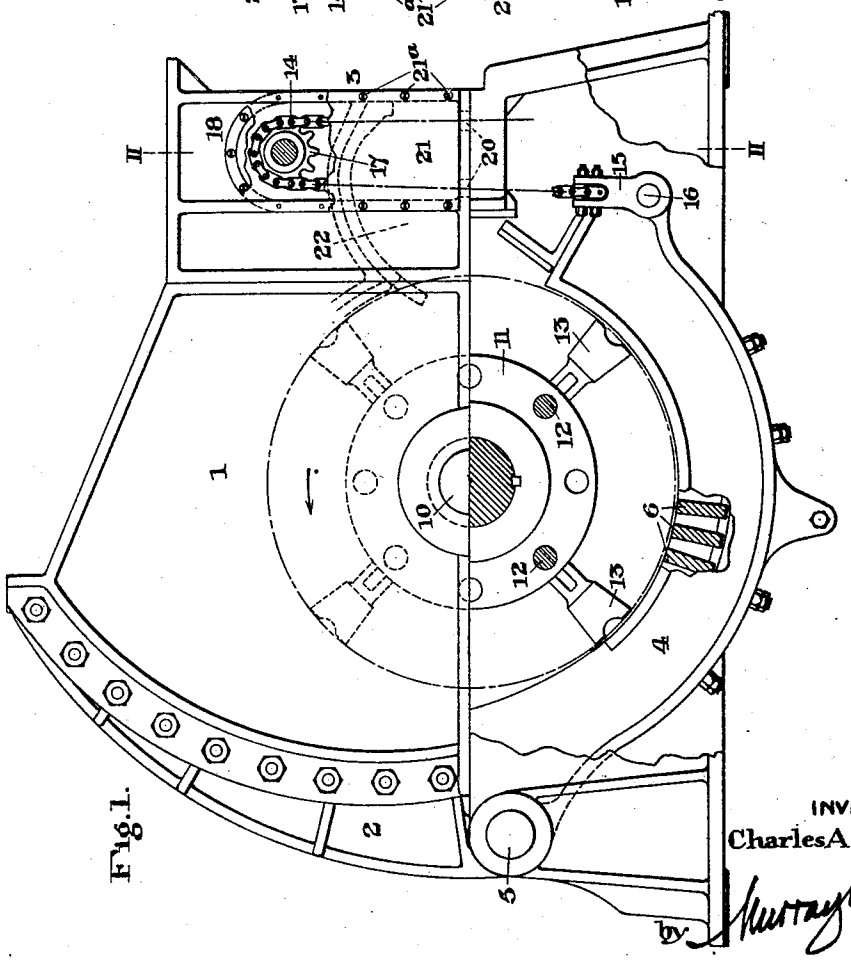


Fig. 1.



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UNITED STATES PATENT OFFICE

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HAMMER CRUSHER

Application filed August 28, 1928. Serial No. 302,562.

My invention relates to hammer crushers of the type substantially as set forth in my pending application for patent for improvements in hammer mills, filed August 25, 1928, Serial No. 302,108, wherein a hammer-carrying structure is shown as rotatably mounted with respect to a cage or screen, and the principal object of my present invention is to provide supporting and adjusting mechanism for one end of the cage or screen forming the lower part of the crushing chamber that may be kept clear of the material being crushed and avoid fouling and blinding of the links of the chain.

My invention has been applied to hammer crushers of the type in which the cage or screen is pivotally supported at one end by a relatively fixed shaft journaled in the frame or base of the crushing structure, and hung at its opposite end from chains passing over sprocket wheels mounted on a shaft which may be journaled in the walls of the frame or casing and which may be operable by a hand wheel, either directly or through a train of gearing, to raise or lower the end of the cage. Such mechanism may be so arranged that motion imparted to said shaft will effect movement of the chains in either direction, as the case may be, to adjust the cage or screen relatively to the path of the hammers as conditions of crushing or wear upon the hammers may require.

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 side elevation, partly in section, of cage-adjusting mechanism arranged in accordance with my invention, and

Fig. 2 is an end elevation, partly in section on the line II—II, Fig. 1.

My invention is shown as applied to a crusher of the type set forth in my pending application noted above, and the co-pending application of George W. Borton, filed August 25, 1928, Serial No. 302,080, wherein the side walls or frames of the structure are carried well above the axis of the hammer-carrying rotor; the shaft carrying the sprocket wheels over which the chains supporting the cage or screen pass, being journaled in the side walls of this portion of the frame.

The frame of the crusher may be made up of side members 1, with cross-connecting members 2 and 3, at the respective ends of the same. A cage or screen which may comprise side members 4, hung from a shaft 5 disposed at one end of the crusher structure, and provided with the usual spaced cross-bars indicated at 6, is disposed in the lower portion of the crusher structure and is adjustable with respect to the path of the rotary beaters or hammers carried by a rotor structure mounted in the crushing chamber above said cage or screen. This rotor structure, of a type usually employed with crushers of this character, may comprise a hammer-carrying member which includes a shaft 10 to which motion may be imparted by suitable means; disk 11, supporting rods 12 from which hammers 13 are hung, and end plates to which said rods 12 are connected. The hammers of such rotor structure cooperate with the bars 6 of the cage or screen supported at one end by the shaft 5, and this shaft may be of the adjustable type such as described in the patent of Charles R. Rouse, No. 1,695,562, dated Dec. 18, 1928.

The cage or screen mounted in the lower part of the crusher is adjusted on its pivotal support 5 with respect to the path of the hammers 13, for various crushing conditions or to compensate for wear of the hammers, and in the present instance I have shown adjusting means in the form of chains 14, which may be secured to shackle members 15, connected to a cross-bar or shaft 16 connecting the ends of the side members 4 of the screen; such chains passing over sprocket wheels 17, carried by a shaft 18, which may be operatively connected to a hand wheel 19, either directly or indirectly, whereby motion may be imparted to said shaft to raise or lower the chains and impart similar movement to the end of the screen. Similar adjusting means for the cages or screens of hammer crushers have heretofore been employed, but the chains and chain wheels have usually been arranged directly adjacent the end of the cage or screen where they are

subject to fouling by wet or sticky material which, collecting in the links of the chain, blinds the same and prevents their proper engagement with the sprocket wheels.

In carrying out my invention, the shaft 18, carrying the sprocket wheels 17, is disposed some distance above the end of the cage or screen and out of the way of the material passing through the crushing structure; such shaft being arranged in a recess 3^a in the cross-member 3. As illustrated in Fig. 2, the chains 14 are brought up through openings 20 in the side flanges of the upper portions of the frame and are disposed on the outside of such frame between vertical flanges 1^a of the same; such arrangement disposing the sprocket wheels 17 and the greater portion of the chains 18, wholly outside the crushing chamber. In order that complete protection may be afforded such chains and chain wheels, I preferably provide cover plates or housings of light sheet metal, indicated at 21, which may be secured to the side frames by screws 21^a, or in any other suitable manner.

Machines of this type are usually provided with a tramp iron pocket, and such recess is indicated at 22, and may be formed in the cross-member 3; a swinging cover plate, such as indicated at 22^a, being usually provided for the same. In the present instance this pocket is arranged entirely independently of the screen, in the cross-member 3 and below the shaft 18 carrying the sprocket wheels 17, so that discharge of any material foreign or otherwise into and from such pocket can not affect such shaft or the sprocket wheels, or the chains 14 passing over the latter and supporting the cage or screen.

My invention provides simple and efficient means for keeping the adjusting chains in clean and operative condition at all times.

I claim:

1. In a hammer crusher, the combination with a casing having a crushing chamber with vertical side walls, a hammer-carrying rotor structure disposed within the same, a cage forming the bottom of said crushing chamber and cooperating with said hammers and a pivotal support normally occupying a fixed position for one end of the cage while the opposite end of said cage is susceptible to raising and lowering movements to adjust the surface of the same relatively to the path of the hammers, of supporting chains passing outside the side walls of the casing and connected to said movable end of the cage, sprocket wheels over which said chains pass also disposed outside the side walls of the casing; said side walls having external vertical flanges forming spaces for the reception of the sprocket wheels and the upper portion of the chains which pass over the same and horizontal flanges slotted for the passage of said chains, and a manually operable shaft journaled in said side walls and carrying said sprocket wheels.

2. In a hammer crusher, the combination with a casing having a crushing chamber with vertical side walls, a hammer-carrying rotor structure disposed within the same, a cage forming the bottom of said crushing chamber and cooperating with said hammers and a pivotal support normally occupying a fixed position for one end of the cage while the opposite end of said cage is susceptible to raising and lowering movements to adjust the surface of the same relatively to the path of the hammers, of supporting chains passing outside the side walls of the casing and connected to said movable end of the cage, sprocket wheels over which said chains pass also disposed outside the upper part of the walls of the frame; the side walls of the frame having external vertical flanges forming spaces for the reception of the sprocket wheels and the upper portion of the chains which pass over the same and horizontal flanges slotted for the passage of said chains to connections with the cage, a manually operable shaft journaled in said side walls and carrying said sprocket wheels, and housings for the sprocket wheels and those portions of the chains disposed externally of the side walls of the casing.

3. In a hammer crusher, the combination with a casing having a crushing chamber with vertical side walls, a hammer-carrying rotor structure disposed within the same, a cage forming the bottom of said crushing chamber and cooperating with said hammers, and a pivotal support normally occupying a fixed position for one end of the cage while the opposite end of said cage is susceptible to raising and lowering movements to adjust the surface of the same relatively to the path of the hammers, of supporting chains passing outside the side walls of the casing and connected to said movable end of the cage, sprocket wheels over which said chains pass also disposed outside the upper part of the walls of the frame; said walls having flanges forming spaces for the reception of the sprocket wheels and the upper portions of the chains which pass over the same and portions of said side walls being slotted for the passage of said chains, connections between one end of said chains and one end of the cage or screen, and means for imparting movement to said chains.

4. In a hammer crusher, the combination with a casing having a crushing chamber with vertical side walls, a hammer-carrying rotor structure disposed within the same, a cage forming the bottom of said crushing chamber and cooperating with said hammers and a pivotal support normally occupying a fixed position for one end of the cage while the opposite end of said cage is susceptible to raising and lowering movements to adjust the surface

of the same relatively to the path of the hammers, of supporting chains passing outside the side walls of the casing and connected to said movable end of the cage, sprocket wheels over which said chains pass also disposed outside the upper part of the walls of the frame; said walls having flanges forming spaces for the reception of the sprocket wheels and the upper portions of the chains which pass over the same and slotted flanges for the passage of said chains to the cage connections; a manually operable shaft journaled in said side walls and carrying said sprocket wheels, a cross member forming one end of the crusher structure and having a tramp iron pocket and a recess above said pocket; the end of the cage supported by said chains being disposed below said tramp iron pocket, and the shaft supporting said sprocket wheels being disposed in the recess of the cross member above said tramp iron pocket.

In witness whereof I have signed this specification.

CHARLES A. JAMISON.