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2,414,591

CRUSHER ROLL WITH SECTIONAL SURFACE ELEMENT

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Fig. 1

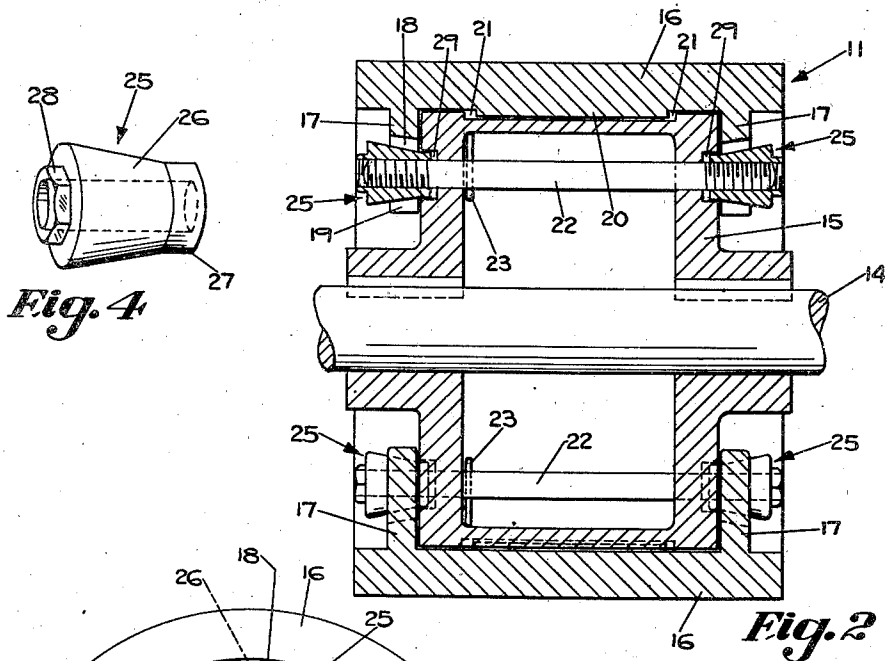
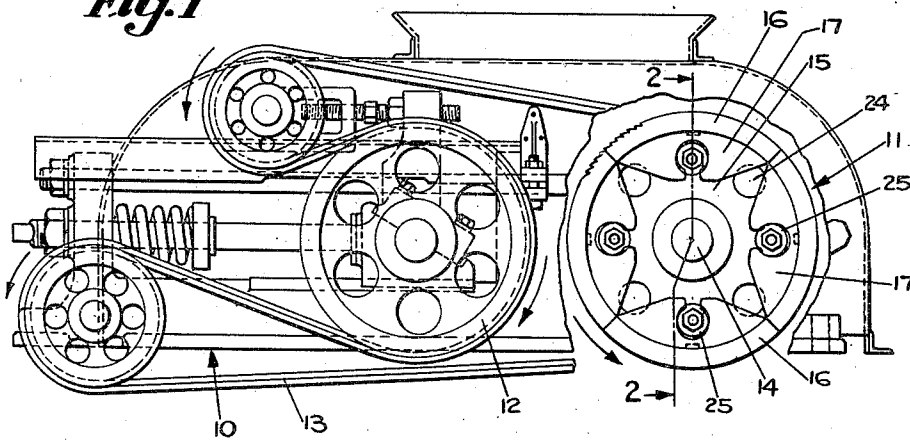


Fig. 4

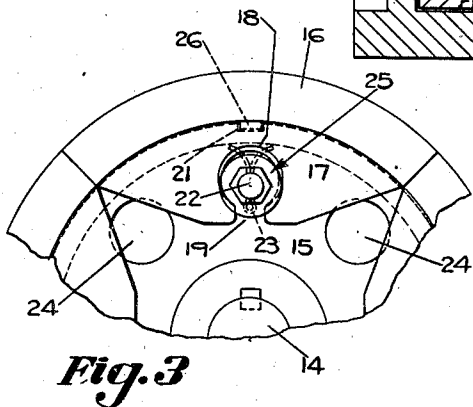
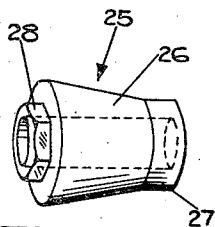


Fig. 3

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UNITED STATES PATENT OFFICE

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CRUSHER ROLL WITH SECTIONAL SURFACE ELEMENTS

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mesne assignments, to The Jeffrey Manufac-
turing Company, a corporation of Ohio

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2 Claims. (Cl. 241—294)

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This invention relates to a crusher. An object of the invention is to provide a crusher with an improved rotor construction particularly in which simplified and improved means are provided to clamp removable segments to the rotor frame.

Other objects of the invention will appear hereinafter, the novel features and combinations being set forth in the appended claims.

In the accompanying drawing,

Fig. 1 is a side elevational view of a crusher including the structure of my invention, with parts broken away to show one of the rotors;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is an enlarged end view of a segment of the rotor; and

Fig. 4 is a perspective view of one of the clamping thimbles or nuts.

Referring particularly to Fig. 1 of the drawing, it will be seen that the crusher including the features of my invention is a double roll crusher including a main frame 10 upon which a pair of crushing rolls, one of which is seen at 11, is mounted, said rolls being driven by flywheels one of which is seen at 12, the flywheels being interconnected by a driving belt 13 reeved about pulleys so as to drive the two rolls in opposite directions as indicated by the arrows.

It is to be understood that the roll or rotor of my invention may be employed with other type crushers, such as single roll crushers.

The structure of the rotor or roll 11 is best seen by reference to Fig. 2 of the drawing, and includes a shaft 14 upon which a frame 15 is mounted and keyed for rotation therewith. The frame 15 is preferably in the form of a heavy casting generally in the shape of a cylinder having hubs at opposite ends which are keyed to the shaft 14.

The outer surface of the roll or rotor 11 is provided by a plurality of removable cylindrical segments 16, the surfaces of which may be provided with teeth to assist in the crushing action. As illustrated in the drawing, there are four segments 16 which form the entire cylindrical surface of the rotor or roll 11. The number of such segments is optional.

Each segment 16 includes a pair of spaced radially inwardly extending wings or flanges 17 which extend along opposite sides of the frame 15. Adjacent their bottoms each of the wings or flanges 17 has an opening 18 which is generally frusto-conical in shape but is modified by the provision of a communicating slot or groove 19 at the bottom or inner side thereof so that a key-hole type opening is formed in the bottom or

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inner side of each wing. Adjacent the inner cylindrical surface of each segment 16 is a rib 20 which extends into a groove 21 formed in the frame 15 to assist in properly aligning the segment 16 on the frame 15.

Extending through aligned openings in the rotor frame 15 is a tie bolt 22 for each segment 16, said tie bolt preferably being provided with a cotter pin 23 extending through a hole therein adjacent one end of it to prevent rotation of the tie bolt 22 by abutting a wall of the frame 15. The frame 15 is provided with spaced openings 24 sufficiently large for a person to extend his hand there-through to gain access to the interior of frame 15.

The opposite ends of the tie bolt 22 are screw-threaded to receive similar removable nuts or threaded thimbles 25, the function of each of which is to act as a clamping means in co-operation with the bearing surface in the bottom or inner portion of each opening 18 to clamp the segment 16 on to the rotor frame 15 by pulling it radially toward the axis of the shaft 14. Each of said nuts or thimbles 25 is threaded on the interior thereof and is provided with a frusto-conical wedging portion 26 and a cylindrical end portion 27. The outer end is provided with a wrench receiving head 28.

Assuming that a segment 16 is separate from the frame 15 and is to be attached and clamped in position, the operation will be as follows. The nuts or thimbles 25 will be removed from the opposite ends of the tie rod 22. The segment 16 will be set on the rotor frame 15 and the slots or grooves 19 permit radial movement of said segment 16 so that the ends of tie bolt 22 pass through said slots or grooves 19 into the openings 18. The rib 20 will fit into the groove 21 to assist in proper alinement of segment 16. Axial alinement of the segment 16 with respect to the frame 15 is provided by the co-operation between the inner faces of the wings or flanges 17 and the adjacent outer surface of the frame 15.

The nuts or thimbles 25 are then preferably simultaneously or successively threaded on to the opposite ends of the tie bolt 22 and since the tie bolt 22 is along an axis which is parallel with the axis of the rotor 14, as the frusto conical surfaces 26 of the thimbles or nuts 25 contact with the lower bearing surfaces of the openings 18 as the nuts or thimbles 25 are screwed home, a wedging action takes place therebetween to force segment 16 radially against the outer periphery of the rotor frame 15 and thus clamp said segment securely in place.

The cylindrical portions 27 of the thimbles or

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nuts 25 may extend into cylindrical recesses 29 adjacent the aligned holes in the rotor frame 15 which receive tie bolt 22. To remove a segment 16 it is only necessary to remove the thimbles or nuts 25, whereupon the segment may be freely removed radially from the rotor frame 15.

It is to be noted that the rotor construction which I have provided, employs a minimum of parts and when disassembled there are no small parts such as small nuts, washers, cotter keys and the like, to become lost, since only the thimbles or nuts 25 are removed.

Obviously those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention as defined by the claims hereto appended, and I therefore wish not to be restricted to the precise construction herein disclosed.

Having thus described and shown an embodiment of my invention, what I desire to secure by Letters Patent of the United States is:

1. A rotor including a frame, a removable segment having radially extending wings on opposite sides of said frame, aligned holes in said wings having bottom opening slots to extend over a tie bolt, a tie bolt extending through said frame and through both of said holes, the afore-

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said slots providing for radial movement of said segment toward the axis of said rotor by providing free movement of opposite ends of said tie bolt into said aligned holes, and tapered nuts threaded on opposite ends of said tie bolt and extending through said wing holes while bearing on the inner bearing surfaces thereof and adjustable along the tie bolt to effect a progressive radial clamping action between said segment and frame as one or both of said nuts are fed toward said frame.

2. A rotor including a frame, a removable segment having radially extending wings on opposite sides of said frame, aligned holes in said wings having bottom opening slots to extend over a tie bolt, a tie bolt extending through said frame and through both of said holes, the aforesaid slots providing for radial movement of said segment toward the axis of said rotor by providing free movement of opposite ends of said tie bolt into said aligned holes, and a tapered nut threaded on at least one end of said tie bolt and adjustable along the tie bolt to effect a progressive radial clamping action between said segment and frame as said nut is fed toward said frame.

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