

June 19, 1923.

1,459,340

D. J. NEVILL

CRUSHER

Filed June 8, 1920

2 Sheets-Sheet 1

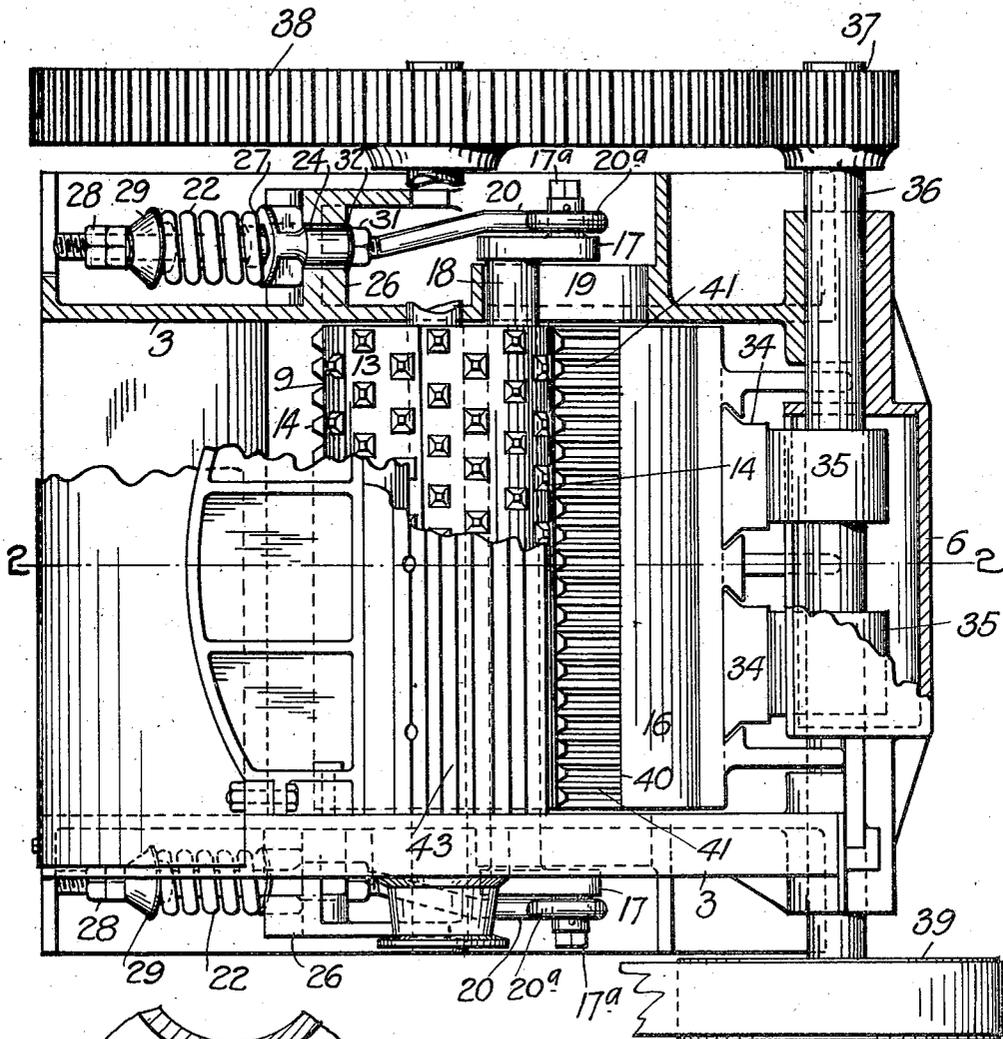


FIG. 1

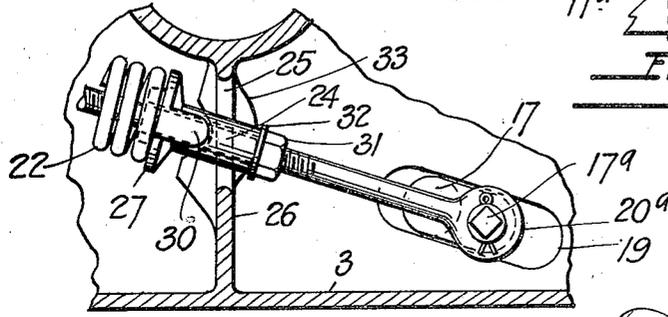


FIG. 3

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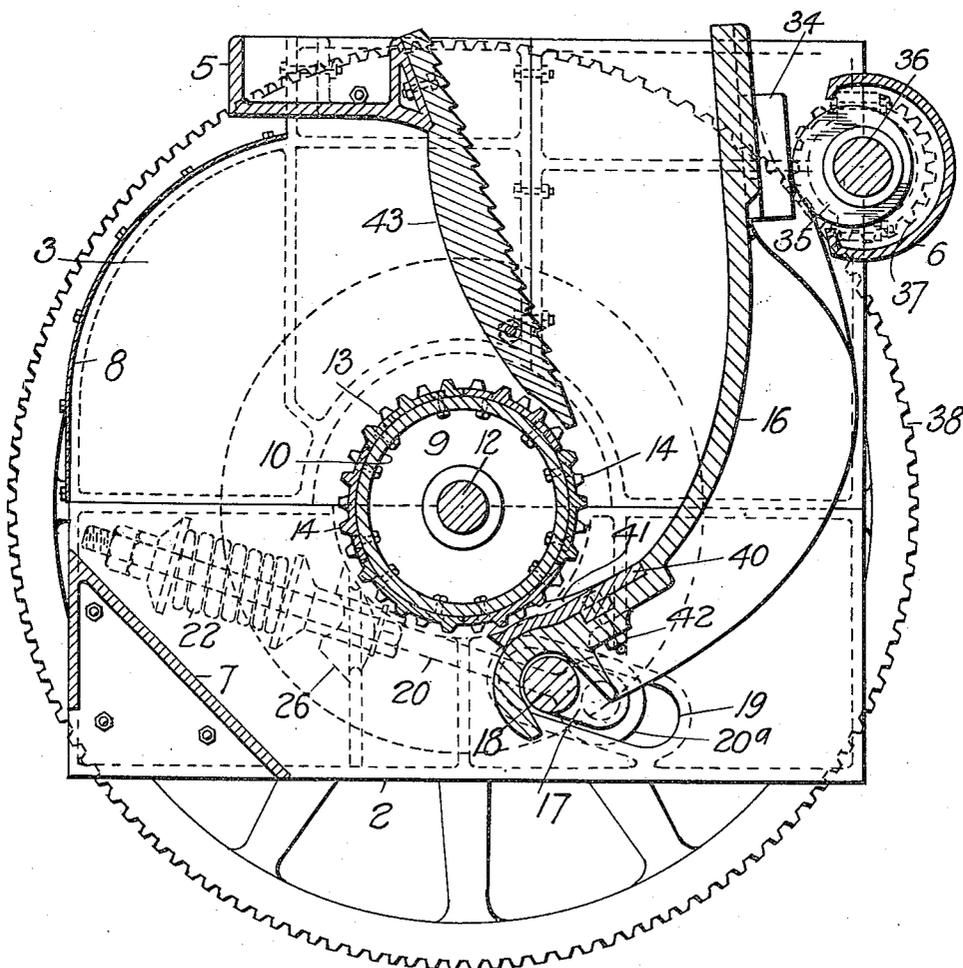
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UNITED STATES PATENT OFFICE.

DAVID J. NEVILL, OF DENVER, COLORADO, ASSIGNOR TO THE STEARNS-ROGER MANUFACTURING COMPANY, A CORPORATION OF COLORADO.

CRUSHER.

Application filed June 8, 1920. Serial No. 387,452.

To all whom it may concern:

Be it known that I, DAVID J. NEVILL, a subject of George V, King of England, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Crushers, of which the following is a specification.

This invention relates to crushing machines and more particularly to crushers of the type adapted to reduce coal and other similar materials to a uniform fineness through the medium of a rotating crushing roll.

It is an object of the present invention to provide a machine of this character which is particularly adapted to crush large sizes of coal to a desired fineness without preparatory comminution, by the use of a simple and efficient means for breaking the coal before it reaches the crushing roll.

Another object of the invention is to provide a simple adjustment to place the machine in an idle condition when the coal fed thereinto is of a size not requiring further reduction.

Another object is to provide in a crushing machine of the character described, a product of uniform size by providing a grooved surface in cooperative relation to a peripherally toothed crushing roll, and still further objects reside in details of construction and arrangements of parts all of which will fully appear in the course of the following description made with reference to the accompanying drawings in the three views of which corresponding parts are indicated by like characters of reference, and in which—

Figure 1 is a partially sectional plan view of a crushing machine in which my improvements are embodied;

Figure 2, a section along the line 2-2, Figure 1, and

Figure 3, a fragmentary section of the frame of the machine, showing the tension device by which one of the cooperating parts of the crusher is adjustably and yieldingly held in its operative position.

Referring more specifically to the drawings, the reference character 2 designates the frame of the crushing machine which is composed of side members 3 reenforced by ribs on their outer surfaces and connected in parallel relation to each other by cross pieces 5, 6 and 7 and a curved cover plate 8.

A crushing roll 9 rotatably mounted in

journal bearings on the side plates of the frame is composed of a hollow cylindrical body portion 10 rigidly mounted upon a shaft 12 and a sectional facing 13 which is bolted upon the peripheral surface thereof.

The facing has radially projecting, tapering teeth 14 which are arranged circumferentially in rows to work in grooves at the lower portion of a reciprocating jaw 16 which cooperates with the roll to reduce the material passing between them to a desired size.

The jaw consists of a curved plate reenforced by external ribs and provided at its lower end with a transversely extending claw for its pivotal support upon a shaft 18 which is slidably supported in slots 19 of the side plates of the frame.

The shaft 18 is adjustably and yieldingly held in its normal position in which its lower end is spaced from the toothed working face of the crushing roll in close proximity thereto, by means of tension devices applied to parallel cranks 17 at its ends projecting outside the slots in which it is supported.

Each tension device consists of a rod 20 pivotally connected with a wrist 17^a on the respective crank by an integral eye 20^a. A sleeve 24 on the rod 20 extends loosely through a slot 25 in a bearing block 26 formed integral with the respective side plate of the frame, and terminates in a head 27 for the abutment of a tension spring 22.

The rod is threaded for the application of nuts 28 which through the medium of a washer 29 of larger diameter bear upon the opposite end of the tension spring.

The sleeve has underneath its flange opposite rounded ribs 30 which engage in correspondingly formed seats in the face of the bearing block to permit of an oscillating movement of the rod when the shaft 18 is adjusted by reversing the position of its cranks, and a nut 31 on the rod bears upon a washer 32 engaging rounded surfaces 33 on the opposite side of the bearing block to limit the outward movement of the rod in the sleeve.

The extremities of the crank wrists 17^a projecting outside the eyes of the respective tension rods are squared for the application of a wrench when it is desired to reverse the position of the cranks against the opposing action of the tension springs, for the pur-

pose of slidingly adjusting the position of the shaft upon which the jaw is supported, in the slots through which its ends extend.

The upper free end of the jaw has in its exterior surface two grooves of dove-tailed section for the attachment of two straight faced bearing blocks 34 engaged by eccentrics 35 on a driving shaft 36 which is rotatably mounted in journal bearings on the side members of the frame.

A pinion 37 at an end of the driving shaft meshes with a gear wheel 38 on the shaft 12 of the crushing roll and a pulley 39 at the opposite end of the driving shaft provides for its connection with a conveniently located source of motive power.

The lower portion of the jaw is recessed for the application of a die 40 which is grooved as at 41 to receive the teeth of the crushing roll and which is rigidly fastened to the jaw by bolts 42.

Rigidly secured between the side plates of the frame and extending slantingly over the crushing roll and in opposite relation to the reciprocating jaw, is a breaker jaw 43 which if so desired may have its working surface serrated to increase its effectuality in the operation of the machine.

The coal or other material to be reduced is fed between the jaws 16 and 43 and by the reciprocating movement of the one with relation to the other is broken into small pieces before it enters the space between the movable jaw and the crushing roll.

It will be observed that at the point of nearest approach of the roll to the grooved surface of the moving jaw the latter has but very little displacement, owing to the proximity of the relatively stationary shaft 18 upon which it is pivotally supported and that in consequence the space between the cooperating crushing parts remains practically unchanged during the reciprocating movement of the jaw, to insure a product of substantially uniform size.

The tension springs 22 are of sufficient strength to withstand the ordinary crushing pressure and function principally as a safety measure to permit of a yielding movement of the lower end of the pivoted jaw when metal objects or other hard foreign matter inadvertently fed into the machine with the coal, attempt to pass through the narrow space between the jaw 16 and the crushing roll.

In case the material fed into the machine is of a size not requiring reduction, the shaft is slidingly adjusted in the slots in which it is supported by reversing the position of its cranks, thereby separating the reciprocating jaw from the crushing roll to an inoperative position.

The machine in its idle condition acts as a chute for the passage of the material to the

crushed coalbins and as such allows of a continuous operation of the plant irrespective of the size of the material delivered thereto, it being understood that the width of the space between the breaking jaws is sufficient to receive lumps of coal of a size which ordinarily must be broken before being fed to the crushing machine.

Having thus described my invention what I claim and desire to secure by Letters-Patent is:

1. In a crusher, the combination of a rotary crushing roll, a jaw cooperating therewith, a rotary and laterally movable shaft upon which the jaw is movably supported, and a resilient element having crank-connections with the shaft and adapted to hold it in either its normal position with relation to the roll or in an adjusted position in which it is further separated therefrom.

2. In a crusher, the combination of a rotary crushing roll, a jaw cooperating therewith, a rotary and laterally movable shaft upon which the jaw is movably supported, cranks on the shaft, longitudinally movable rods supported for oscillation in pivotal connection with the cranks, and tension-springs yieldingly opposing longitudinal movement of the rods.

3. In a crusher, the combination of two crushing members one of which has a reciprocating movement relative to the other, a shaft having a lateral arm upon which the reciprocating member is pivotally supported, said arm being adjustable from one determinate position to another by rotation of the shaft, whereby to vary the distance between the crushing members, and a resilient element acting upon the shaft to hold the arm in its adjusted positions.

4. In a crusher, the combination of two crushing members one of which has a reciprocating movement relative to the other, a shaft having a lateral arm upon which the reciprocating member is pivotally supported, said arm being adjustable from one determinate position to another by rotation of the shaft, whereby to vary the distance between the crushing members, and a resilient element to hold the arm in its adjusted positions.

5. In a crusher, the combination of two crushing members one of which has a reciprocating movement relative to the other, a support for the reciprocating member, mounted for adjustment about an axis to determinate positions at opposite sides thereof, whereby to vary the distance between the crushing member, and a resilient element to hold the arm in its adjusted positions.

In testimony whereof I have affixed my signature.

DAVID J. NEVILL.