Sept. 30, 1941. G. E. KRIDER 2,257,388

TRIPLE CRUSHING MACHINE

Filed Aug. 2, 1940

Fig.1.

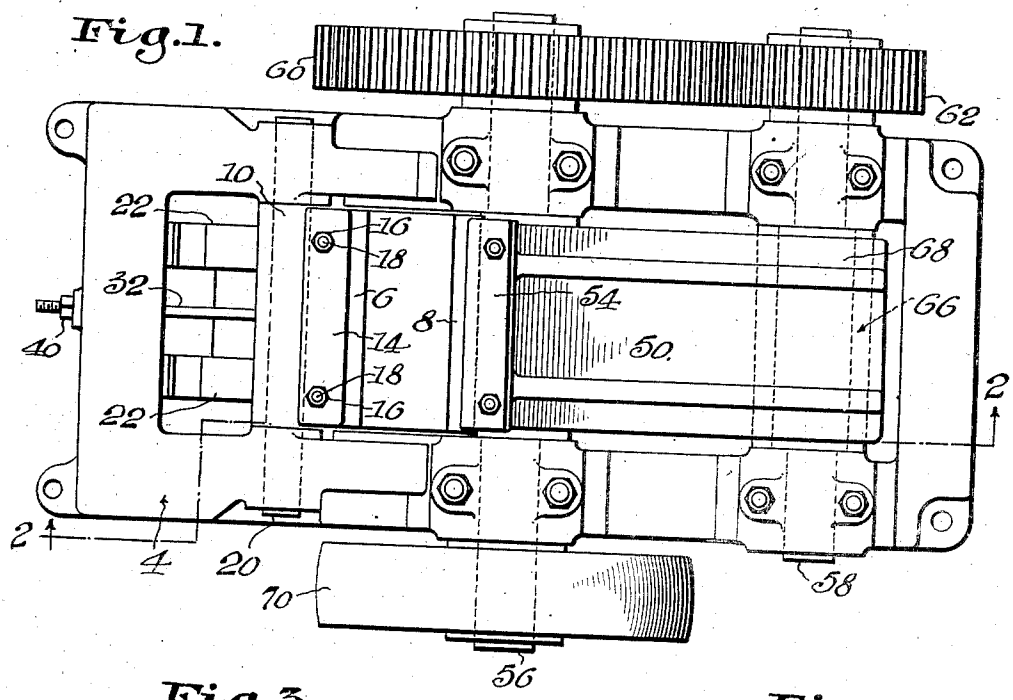


Fig.3.

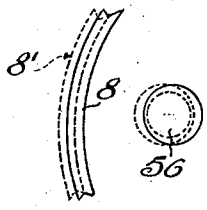


Fig.4.

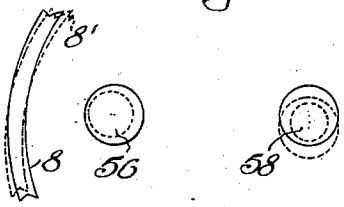
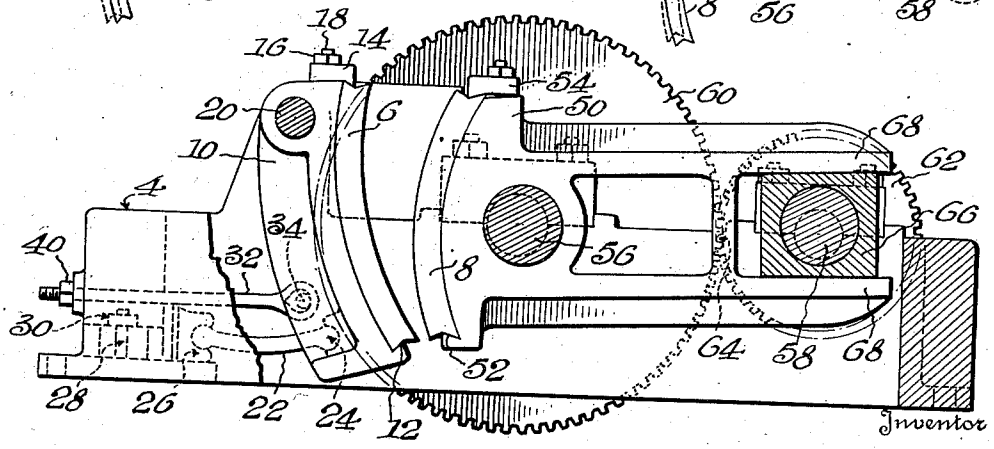


Fig.2.



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Patented Sept. 30, 1941 2,257,388

UNITED STATES PATENT OFFICE

2,257,388

TRIPLE CRUSHING MACHINE

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Application August 2, 1940, Serial No. 349,537

4 Claims. (Cl. 83—53)

The present invention relates to certain improvements in machines for crushing materials in which the materials are crushed, or broken, by means of two jaws oppositely disposed to each other and spaced apart to form a tapered opening therebetween.

The general structure and operation of the machine consists of having one of the jaw members fixedly secured in a stationary position and the other jaw member provided with means for moving it alternately to and from the face of the stationary jaw. The materials to be ground are fed into the opening between the jaws, where they are broken or reduced in size to any degree of fineness. This effect is accomplished by the particular arrangement and operation of the movable jaw with relation to the oppositely placed stationary jaw and certain mechanism by which the movable jaw is operated.

The primary object of the invention is to provide an improved material crushing machine which will have a triple crushing action on the material in order to increase the capacity of the machine or make the machine more effective on materials of unusual hardness.

Another object of the invention is to provide a mechanism for operating machines of the type which will require less power than has been previously necessary.

While several of the objects of the improved crushing machine have been specifically pointed out, other objects will be apparent from the specification when taken in connection with the drawing which forms a part of this application and in which:

Fig. 1 is a top plan view of the crusher.

Fig. 2 is a cross-sectional view of the machine taken on the line 2—2 of Fig. 1.

Figs. 3 and 4 are diagrammatical vertical views showing the positions of the crushing plate at various steps in the operation of the machine.

Referring now in detail to the drawing, the machine comprises a stationary frame member 4 upon which is supported a stationary jaw face plate 6 and the movable jaw face plate 8. The stationary face plate is mounted upon an adjustable supporting member 10 and is held in position on the supporting member by the dovetailed slot 12 at the bottom of the support and the member 14 at the top of the support. The member 14 is removable and is held in position on the member 10 by the stud 18 and the threaded nut 16. The jaw supporting member 10 is pivotably supported upon the shaft 20 located adjacent the top of the support. The lower edge of the support 10 is adjustably supported upon the frame 4 by the member 22. One end of the member 22 is adapted to rest against the supporting member 10 at 24, while the opposite end is supported upon a movable block member 26. This block member 26 is slidable along the frame and is securable in its adjusted position by the studs and nuts 28 and 30 respectively.

Likewise adjacent the lower edge of the supporting member 10 is a rod member 32, having one end secured to the member 10 at 34, and the opposite end extending through an opening in the frame and provided with a threaded nut 40 for adjusting the member 32 relative to the frame. The object of the member 32 is to provide for preventing the supporting members 22 from becoming dislodged from the jaw carrying member 10, or the movable plate 26 by holding the member 10 against the members 22 which retain them within their respective bearing when the nut 40 is properly adjusted.

The movable jaw plate 8 is supported upon a frame 50 and is held thereon by the dove-tailed slot 52 and the member 54 in substantially the same manner as described for the stationary jaw plate. The end of the frame 50 adjacent the plate 8 is supported upon an eccentric shaft 56, while the opposite end of the frame is supported upon an eccentric shaft 58. Attached to one end of the shaft 56 is a gear 60 and attached to one end of the shaft 58 is a gear 62. The sizes of these gears are such that they will intermesh as shown at 64. The gear 60 is twice the size of the gear 62 which will give the shafts 56 and 58 a speed ratio of 1 to 2 respectively.

The eccentric shaft 58 operates within a sliding block 66 which is located within the bifurcated end 68 of the frame 50. By this arrangement this end of the frame is moved in an arc about a fulcrum provided by the eccentric shaft 56. Attached to the opposite end of the shaft 56 is a driving gear, or pulley 70. Although the driving means is shown attached to the shaft 56, the machine may be operated equally as well by attaching the driving means to the shaft 58.

The movements set up by the cam members 56 and 58 have a very effective consequence upon the materials being crushed. The cam 56 is of substantially small throw and is adapted to alternately alter the size of the tapered opening between the jaw members. While the cam action of the shaft 58 is substantially greater than that of the shaft 56 in order to give the opposite end of the frame 50 a substantial amount of displacement. By using the eccentric shaft 56 as a ful-

crum, the crushing plate 8 will be rocked about a horizontal axis at the same time it is being moved in and out of the opening between the jaw members as shown by the dotted lines 8' in Fig. 3.

In operation of the machine the opening between the jaws is regulated by adjusting the stationary jaw 6 by the manipulation of the blocks 26 and the rod and nut members, 32 and 40 respectively. The material is then placed in the top of the tapered opening between the two jaws 6 and 8. The moving jaw is then reciprocated by the eccentric cam shafts 56 and 58 as described hereinbefore. The throw of cam 56 is relatively small in comparison to the throw of the cam 58. The rocking of the jaw 8 by the cam 58 moves the crushing plate upwardly and downwardly as the cam 56 moves the jaw inwardly on the material laying between it and the stationary jaw. This upward and downward motion is also repeated when the jaw 8 is moving away from the stationary jaw for moving the material down into the tapered opening. This arrangement, together with the method of operation, provides a crushing machine of this class with increased capacity, and which may be operated with substantially less power than is now necessary for the conventional type crusher. This machine is designed particularly along sturdy and practical lines and is well-adapted to the hard use which machines of this type are often subjected.

While the invention has been illustrated and described in detail, it is not intended that the same be limited to the specific structure shown as the scope of the invention is best described in the following claims.

I claim:

1. In a machine for crushing materials comprising a frame, a stationary jaw member and a movable jaw member, said stationary jaw member being rigidly supported upon said frame and an elongated horizontal carrying member supporting the said movable jaw, the said jaw members being positioned to have their faces oppositely disposed as to each other and arranged to provide a tapered opening there between, the carrying member of the movable jaw member being pivoted at a point adjacent the jaw upon a rotatable eccentric shaft, the opposite end of the said carrying member being supported upon a block slidable horizontally of the said support through which passes a second rotatable eccentric shaft of greater throw than the first eccentric shaft whereby the jaw carrying member will be oscillated about the axis of the first shaft when the machine is in operation.

2. In a machine for crushing materials comprising a frame, a stationary jaw member and a movable jaw member, said stationary jaw member being rigidly supported upon said frame and an elongated carrying member supporting the said movable jaw, the said jaw members being positioned to have their faces oppositely disposed as to each other and arranged to provide a tapered opening there between, the carrying member of the movable jaw member being pivoted at a point adjacent the jaw upon a rotatable eccentric shaft, the opposite end of the said carrying member being supported upon a block slidable horizontally of the said support through which passes a second rotatable eccentric shaft and means for driving the said last mentioned shaft member at twice the speed of the first mentioned shaft member.

3. In a machine for crushing materials comprising a frame, a stationary jaw member and a movable jaw member, said stationary jaw member being rigidly supported upon said frame and an elongated horizontal carrying member supporting the said movable jaw, the said jaw members being positioned to have their faces oppositely disposed as to each other and arranged to provide a tapered opening there between, the carrying member of the movable jaw member being pivoted at a point adjacent the jaw upon a rotatable eccentric shaft, the opposite end of the said carrying member being supported upon a block slidable horizontally of the said support through which passes a second rotatable eccentric shaft, power transmission means connecting the two shafts, whereby the shafts will be operated at a predetermined ratio.

4. In a machine for crushing materials comprising a frame, a stationary jaw member and a movable jaw member, said stationary jaw member being rigidly supported upon said frame and an elongated horizontal carrying member supporting the said movable jaw, the said jaw members being positioned to have their faces oppositely disposed as to each other and arranged to provide a tapered opening there between, the carrying member of the movable jaw member being pivoted at a point adjacent the jaw upon a rotatable eccentric shaft, the opposite end of the said carrying member being supported upon a block slidable horizontally of the said support through which passes a second rotatable eccentric shaft, power transmission means connecting the first and second shafts in the speed ratio of one to two respectively.

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