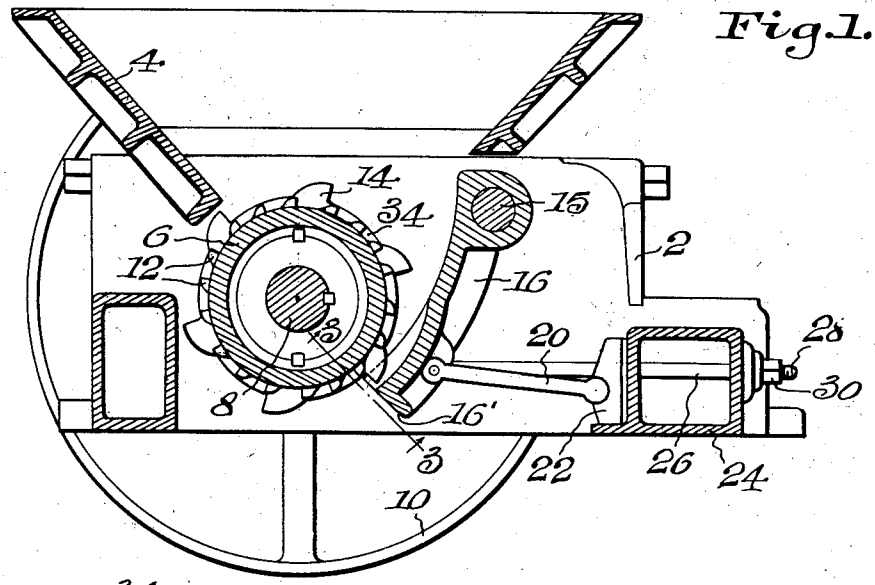
Oct. 6, 1942. G. E. KRIDER 2,297,782

CRUSHING MACHINE

Filed June 12, 1940

Fig.1.



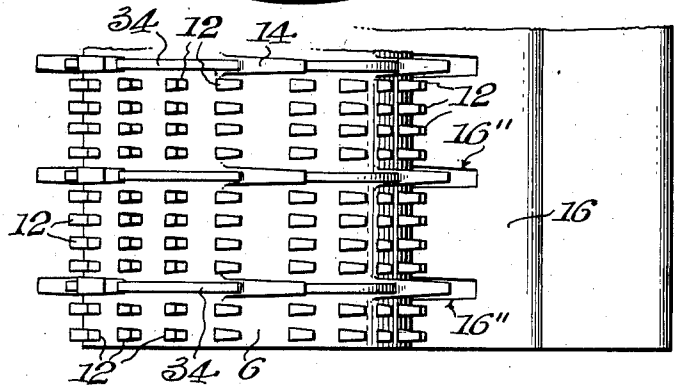


Fig.2.

Fig.3.

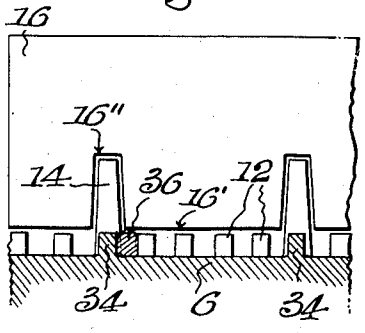
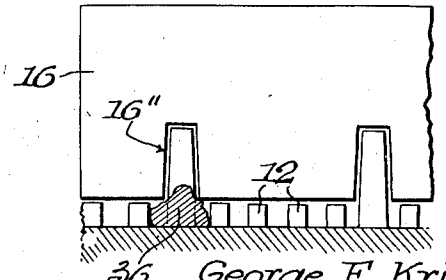


Fig.4.



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CRUSHING MACHINE

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Application June 12, 1940, Serial No. 340,164

1 Claim. (Cl. 83—53)

The present invention relates to new and useful improvements in crushing machines for coal, and similar materials, which are adapted to reduce the materials to uniform size by passing the same between a single toothed roll and a stationary plate.

Prior to the present invention the structure of apparatus of this type allowed a high percentage of oversized material to escape with the finished product, which is very objectionable when the materials are used for certain purposes. It is, therefore, the primary object of this invention to provide an improved roll structure whereby a more uniform product may be delivered through the crushing elements without reducing the efficiency or the capacity of the machine.

While the primary object of the machine has 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 vertical sectional view through the crusher.

Fig. 2 is a fragmentary top plan view of the roll.

Fig. 3 is a fragmentary sectional view of the roll taken along the line 3—3 of Fig. 1.

Fig. 4 is a view similar to Fig. 3 showing an old-style crushing roll.

Referring now in detail to the drawing, the crusher comprises a stationary frame or housing 2, having a hopper 4 into which the material is places. Below the hopper there is mounted a crushing roll 6, supported upon a shaft 8, which is in turn rotatably supported upon suitable bearings in the housing. Fixed to one end of the shaft 8 is a pulley 10 for rotating the roll, which may be operated by any convenient means.

Formed upon the outer surface of the roll 6 are a plurality of low and high teeth 12 and 14 respectively. Secured to the frame 2 is a breaker plate 16. This plate is pivoted upon a shaft 15 positioned at one side of the roll and above a horizontal plane passing through the roll axis. The plate 16 extends downwardly and the lower end 16' of the plate is adjustable inwardly and outwardly toward one side of the face of the roll, and forms a tapered pocket into which the material is fed.

Attached adjacent the movable end of the plate 16 is a member 20 for positioning the same relative to the surface of the roll. The member 20 having one of its ends attached to the plate 16 and its other end pivotally supported within a member 22, which is in turn carried on a member 24 slidably secured to the frame 2. The member 24 is adjustable relative to the frame 2 by the rod 26. One end of the rod 26 is attached to the frame and the other end is provided with a thread 28 and a nut 30, which supports the member 24 against outward movement. The weight and the outward force against the plate 16, caused by wedging of the material being crushed between the roll and the plate, causes the member 24 to be forced outwardly against the nut 30. By this arrangement it is readily seen that by moving the nut inwardly along the rod, the breaker plate 16 will be moved nearer the roll, and if the nut is moved outwardly along the rod the plate will be moved farther away from the roll. By adjusting the lower end of the crusher plate relative to the outer surface of the rotating drum it is possible to vary the size of the material being crushed and also take up the wear of the machine elements, such as will occur on the teeth and on the breaker plate.

To illustrate the improvement more clearly, special reference is made to Figs. 3 and 4. The lower end 16' of the breaker plate 16 is normally spaced outwardly from the roll at such a distance as to allow the shorter teeth 12 to pass beneath it, while the longer teeth 14 pass through slots 16'' within the plate. The purpose of the larger teeth is to feed the material down between the rod and the plate and also to contact the extremely large particles for dividing the same into smaller parts in order that they may be carried through the slots 16'', or be later contacted by the smaller teeth for further breaking up into such sizes as to allow them to pass beneath the edge of the plate and the outer surface of the roll.

Heretofore, the longer teeth 14 were formed upon the outer surface of the drum similar to the shorter teeth, leaving a space between the teeth into which particles would fall and be carried adjacent the surface of the drum into the slots 16'' as shown by the numeral 36' in Fig. 4. This old structure allowed an excessive amount of oversize material to pass out with the finished product. The opening 16'', as noted by the arrows in Fig. 4, plus the distance to the surface of the crushing roll 6, is substantially larger than the areas between the smaller teeth and the lower edge of the crushing plate which would allow the oversize particles to pass through.

To remedy this condition, the present apparatus has provided a continuous rib member 34, which is shown as having substantially the

same cross-sectional area as the shorter teeth 12. These ribs extend upwardly at a uniform height above the outer surface of the drum and in the same plane with the longer teeth to prevent the oversize material from passing through this larger area after the tooth has passed through the opening 16'' as explained more fully hereinbefore in reference to Figs. 3 and 4. It will be observed that with the use of the ribs the increased size of the opening caused by the slots is reduced in size to only permit the passage of materials of the desired size, as shown at 36 in Fig. 3, which is of the same size as the material passing between the shorter teeth of the end 16' of the breaker plate 16.

It has always been a rather difficult problem to crush material in uniform size. At present the usual requirement is that the oversize should not be more than 10%. To do this, it is, in many instances, necessary to employ additional separating equipment, which reduces the speed of the operation and increases the cost of production. With the present rib construction, the oversized particles may be kept below the minimum standard during the crushing operation and thereby eliminate screening, or other methods, to bring the product within the stipulated requirement.

While the invention has been 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 defined in the following claim.

I claim:

The combination with a crushing roller, a breaker plate adjacent one side of said roller, said roller having a plurality of spaced rows of short and long teeth, all of said rows of teeth extending entirely around the roller in a transverse plane in relation to the roller and at a right angle to the axis of the roller, all of the teeth of the long tooth rows being positioned to pass through slots in the breaker plate as the roller rotates, of continuous ribs connecting the adjacent sides of the long teeth and disposed in the plane of the long teeth, said continuous ribs being positioned whereby their outer peripheries will be adjacent the outer sides of the slots as the roller rotates.

GEORGE E. KRIDER.