Nov. 5, 1940. P. W. HOGE 2,220,153

RING-ROLL CRUSHER

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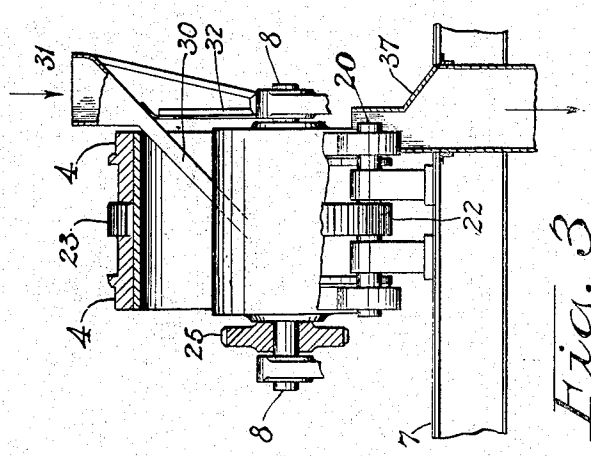
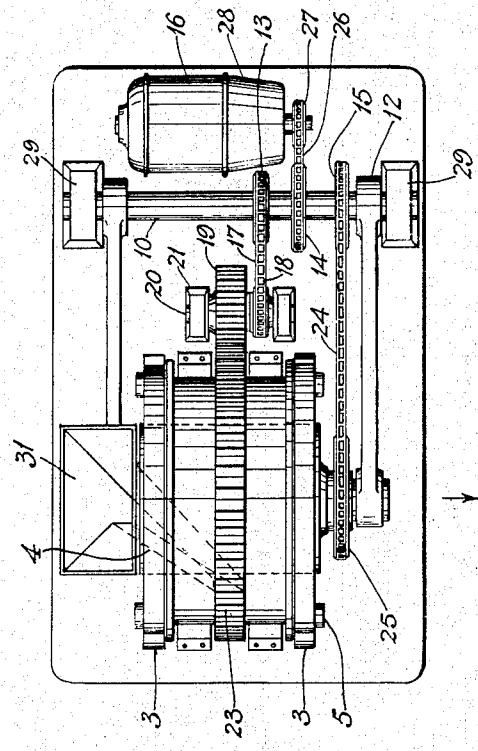


Fig. 3

Fig. 1



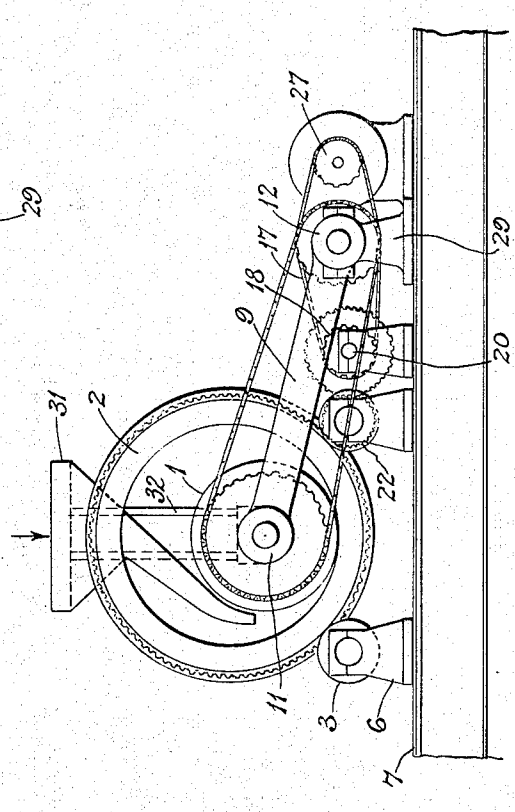


Fig. 2

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RING-ROLL CRUSHER

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Application December 28, 1937, Serial No. 182,085

1 Claim. (Cl. 83—9)

This invention relates to crushing mills and has for its principal object the provision of ring-roll crushers of economical and efficient design and of simple and rugged construction which are useful for crushing or grinding a wide variety of materials, the construction and operation of which, together with further objects and advantages, may be best understood from a consideration of the following description given in connection with the accompanying drawing wherein:

Figure I is a plan view illustrating one embodiment of the invention;

Figure II is a side elevation, and

Figure III is an end elevation in vertical section of the embodiment illustrated in Figure I.

Referring now particularly to the embodiment illustrated in Figures I, II, and III, it will be seen that the principal elements of the invention comprise a roll 1 disposed within and adapted to roll on the lowermost inner periphery of a rotatable hollow cylinder or drum 2 which is mounted with its axis of rotation in a horizontal position. These two elements provide opposed crushing surfaces defined by the juxtaposed surfaces of the roll and the drum.

The drum is rotatably supported in a horizontal position by the horizontal rollers 3, which engage annular tracks 4 provided on the outer periphery and near the edges of the drum. The rollers 3 are mounted on shafts 5 which are journaled in suitably rugged supports 6, which are in turn mounted on a suitable frame 7. This provides a simple and rugged construction capable of sustaining heavy loads and yet provides for ready assembly or disassembly as desired and easy access for inspection, cleaning, and repair.

The roll 1 is provided with axial trunnions 8, journaled in the arms or links 9, adapted to pivot on the shaft 10. These arms are provided with suitable journals 11 and 12 to provide bearings for the trunnions 8 and the shaft 10. This arrangement provides a means for restraining the roll against rocking back and forth on the inner surface of the drum, and yet allows the roll to rise and fall as may be required to pass uncrushable particles.

Preferably, the arm is disposed at an angle so that its point of pivot, the shaft 10, is below the horizontal plane of the trunnions 8. This shifts the effective component of the crushing force applied by the roll toward the incoming material and accordingly reduces the power required to pass an excessively large uncrushable particle.

The shaft 10 besides acting as a pivot for the arms 9 operates as a drive shaft and to this end is provided with a series of sprockets 13, 14, and 15, operatively connecting the roll and the drum with a motor 16 so that both the roll and drum may be driven positively. The sprocket 13 by means of a chain 17 drives a sprocket 18 keyed to a spur gear 19 mounted on a shaft 20 journaled in suitable supports 21. The spur gear 19 meshes with a second spur gear 22 and is mounted on the roller shaft 5, and the spur gear 22 in turn meshes with a ring gear 23 affixed to the periphery of the drum. The sprocket 15, thru a chain 24, drives a sprocket 25 mounted on the roll trunnion 8, and the sprocket 14 is driven thru a chain 26 by means of a sprocket 27 keyed to a reducing gear mechanism 28 built in the motor 16. The shaft 10 is supported by and journaled in the supports 29 which in turn, together with the supports 16 and 20, are mounted on the frame 7.

It will be seen that this provides a unitary structure in which the several parts are simply and ruggedly associated and yet freely accessible for such purposes as may be required. Moreover, mounting of the drum on external rollers, while providing a suitably rugged mounting for the drum, admits of removing the drum and the roll as a unit after disconnecting the arms 9 and the chain 24.

As previously indicated, the material to be crushed is fed into the horn angle between the roll and the inner periphery of the drum. This is effected by the chute 30 projecting into the horn angle from the hopper 31. The chute is preferably trough-shaped and open at the top but may, if desired, be entirely enclosed and preferably is so constructed as to deposit the material at or near the center of the drum so that the material deposited in the horn angle will spread evenly over the crushing surface. The hopper is mounted on the support 32 affixed to the journal box 11 of the arm 9. In this manner advantage is taken of the vibration of the apparatus and the vertical movement of the roll during crushing to facilitate the feed of material from the hopper and to minimize arching and jamming therein.

As illustrated in Figure III, a discharge chute 37 is provided adapted to discharge material to a suitable conveyor or screen. While the chute is shown at one side of the drum only, it may be duplicated at the other side of the drum to

accommodate discharge of the crushed material from both sides or the drum may be partially closed on the side opposite the hopper so that discharge of the material is directed to one side of the drum only.

It will be understood that the principles of the invention may be embodied in many different forms of which the embodiments illustrated and described above are given for the purpose of illustration only, and that variations, refinements, and advancements may be made within the scope of the invention without departing from the spirit and principles thereof as outlined above.

I claim:

A ring-roll crusher comprising a rotatable drum, a roll disposed within said drum and adapted to roll on the inner surface thereof and adjacent the lower-most portion thereof, means for maintaining the axis of said roll parallel with the axis of said drum, said means comprising parallel arms journaled to the axial extremities of said roll and to points external of said drum located substantially in the common tangent plane of said drum and said roll, the plane of said arms being inclined to said common tangent plane at an angle less than 45 degrees, a hopper support mounted on one of said arms above the axial extremity of said roll, a hopper mounted on said support and arranged exteriorly of said drum and having a chute projecting into the horn angle formed between said drum and said roll which is most remote from said external points whereby the roll, hopper and chute move as a unit about said external points.

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