United States Patent

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[54] **CONE CRUSHER WITH ADJUSTABLE BOWL**
4 Claims, 2 Drawing Figs.

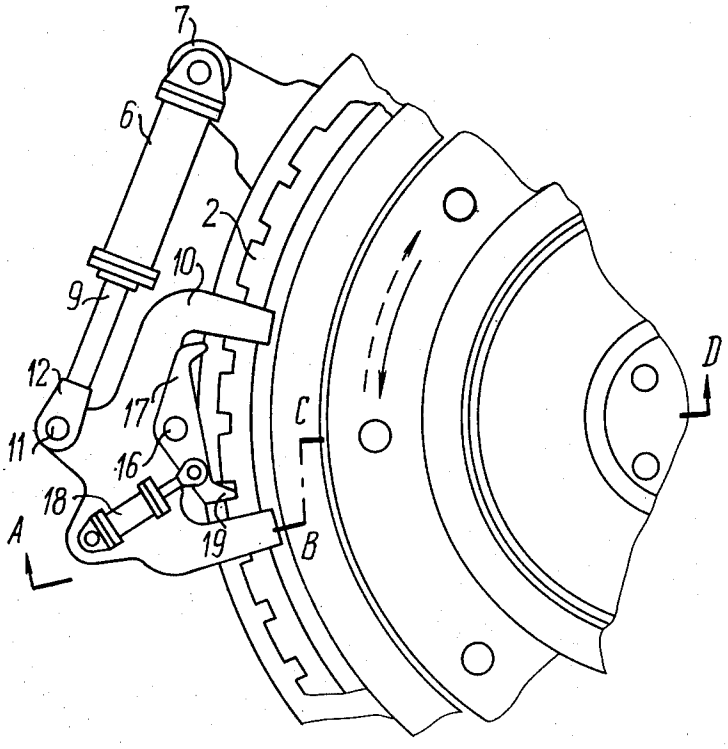
[52] **U.S. Cl.** **241/207,** 241/286, 241/299
[51] **Int. Cl.** **B02c 2/04**
[50] **Field of Search** ..... 241/286, 290, 299, 207—212, 214—216

[56] **References Cited**
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ABSTRACT: A crushing bowl of a cone crusher is adjustable to vary the discharge slot formed between the bowl and an inner crushing cone. The bowl is connected to an adjusting ring which is threadably mounted within a supporting ring. A toothed rim is mounted on a casing carrying the adjusting ring and bowl, and the rim is turned by a hydraulic cylinder through a pivotal pusher mounted on a slide block. The turning of the ring causes the adjusting ring to travel in the supporting ring and adjust the size of the discharge slot. The pusher is actuated by a second hydraulic cylinder mounted on the slide block to engage the toothed rim during an adjusting operation and to disengage from the rim when the first hydraulic cylinder idles to an initial position.



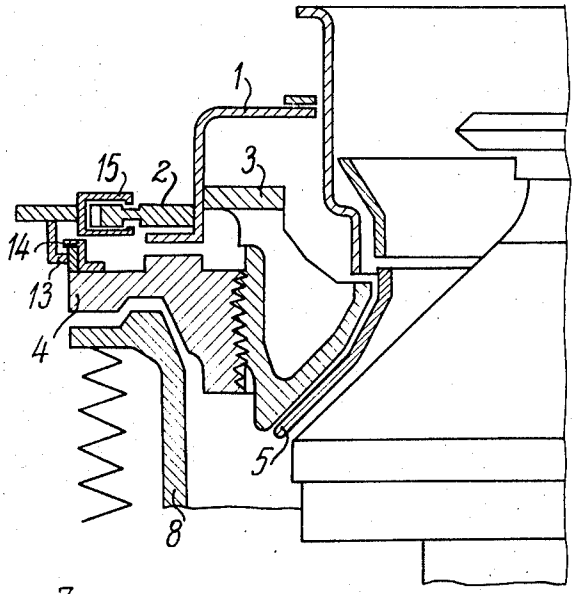


FIG. 2

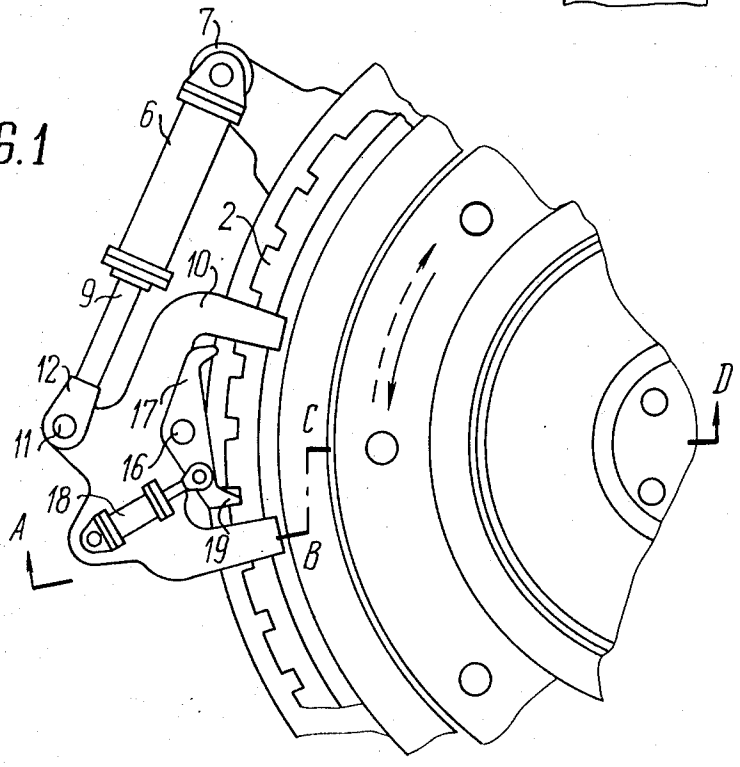


FIG. 1

CONE CRUSHER WITH ADJUSTABLE BOWL

This invention relates to cone crushers having a discharge slot which is variable in size by means of an adjustment ring carrying a crushing bowl and threaded in a supporting ring of the crusher and rigidly fastened to a crusher casing turnable by means of a power cylinder.

Prior art crushers have lugs in the casing for the rod of the power cylinder, which is forked at one end, to engage the lugs.

When turning the adjustment ring, the rod is fixed alternately on the lugs, by hand, and thus transmits the force of the power cylinder to the casing of the crusher (cf. British Patent No. 835,472, cl. 59 A13 B02d, and the U.S. Pat. No. 3,009,660, cl. 241—290).

When changing the size of the discharge slot the crusher should be stopped. This is a disadvantage of the known crushers.

Another disadvantage of these crushers is that they do not have a size and automatic control of the operations of the crusher.

Other known crushers have a regulating ring which is turned manually by means of a ratchet and lever (cf. the crusher in U.S. Pat. No. 2,687,257, cl. 241—215).

This crusher has all the disadvantages of the above-mentioned crushers.

An object of the present invention is the elimination of said disadvantages.

This and other objects of the present invention are achieved by installing on the casing of the crusher a toothed rim which is actuated by the power cylinder by means of a two-way pusher fixed on a slide block, said pusher turning around a vertical axle on the side block so as to permit the rotation of the toothed rim in either direction by the power cylinder.

The pusher is turned by means of an independent power cylinder mounted on the slide block.

Given below is a detailed description of an embodiment of the invention, with reference to the accompanying drawing in which:

FIG. 1 is a plan view schematically showing a part of the crusher with the unit for adjusting the discharge slot; and

FIG. 2 is a sectional view taken along line ABCD of FIG. 1.

Rigidly mounted on a casing 1 of the crusher is a toothed rim 2. Rigidly fastened to the casing is a regulating or adjustment ring 3, threaded into a supporting ring 4 and carrying crushing bowl 5.

The body of a hydraulic cylinder 6, for turning the toothed rim 2 is turnably fixed in a lug 7 of a body 8 of the crusher. A rod 9 of the hydraulic cylinder 6 carries on its end a slide block 10. The latter is connected to the rod 9 by means of a pin 11 entering a fork 12 of the rod 9.

The slide block 10 has a roller or support element 13 movable in a guide 14 of the supporting ring 4. Provided on the ends

of the slide block 10 are gripping forks 15, by means of which the slide block is mounted on the toothed rim and may slide along the latter.

Placed on the slide block 10 on a vertical axle 16 is a two-way turnable pusher 17. The turning of the pusher 17 in order to reverse for the return motion of the toothed rim is performed by another hydraulic cylinder 18, whose body is fixed on the slide block 10.

The discharge slot may be adjusted in the course of the crusher operation.

The pusher 17, turning around axle 16 by the hydraulic cylinder 18, moves into a position for pushing the toothed rim 2 in the required direction. Then the hydraulic cylinder 6 is operated, and, via the slide block 10, acts on the pusher 17 whose lug 19 meshes with the gearwheel 2.

In the reverse motion of the cylinder, the pusher 17 is pressed away and slides on the gearwheel until it meshes with the next tooth of the rim 2.

The slide block 10, owing to its gripping forks 15, slides freely on the rim 2. Thus, the turning of the rim 2 takes place, and with it that of the casing 1 and the regulating ring 3 with the bowl 5. Turning in the threads of the supporting ring 4, the regulating ring 3 moves in a vertical direction causing a change in the size of the discharge slot between bowl 5 and the inner rotatable crushing cone.

We claim:

1. a cone crusher comprising a casing; a crushing cone mounted in said casing; a crushing bowl disposed around said crushing cone so that the bowl forms with the cone a crushing chamber passing into a discharge slot; a supporting ring having an inner thread; an adjustment ring with an external thread screwed into the inner thread of said supporting ring and rigidly connected with said crushing bowl to adjust the size of the discharge slot when turned relative to said supporting ring; a toothed rim rigidly connected to said casing outside said adjustment ring; power cylinder means for turning said toothed rim together with the crushing bowl; a slide block on said toothed rim and hinged to said cylinder means; a two-way pusher pivotably mounted on said slid block for engaging said toothed rim; and an auxiliary cylinder on said slide block engaging said pusher for selective engagement of said pusher with said toothed rim.

2. A cone crusher as claimed in claim 1 wherein said power cylinder means comprises a hydraulic cylinder including a rod pivotably connected to said slide block.

3. A cone crusher as claimed in claim 1 wherein said auxiliary cylinder includes a rod pivotably connected to said pusher at a location offset from the pivotal connection of the pusher to said slide block.

4. A cone crusher as claimed in claim 1 wherein said slide block includes forks slidably and guidably mounted on said toothed rim.