

UNITED STATES PATENT OFFICE

2,656,123

CRUSHER WITH COMBINATION FEED AND CRUSHING SCREW

Hubert L. Smith and Arnold A. Gustafson, Port Sulphur, La., assignors to Freeport Sulphur Company, Port Sulphur, La., a corporation of Delaware

Application December 23, 1950, Serial No. 202,463

12 Claims. (Cl. 241—276)

1

This invention relates to a crusher, particularly to a crusher of the type that uses a helical screw in the bottom of a hopper.

Although a crusher made according to this invention has been specifically applied to the crushing of block sulphur, it will be evident to those skilled in the art that a crusher made according to this invention can be used on other similar materials. In the mining operations in which a crusher made according to this invention has been used, the sulphur is cooled in large vats, and has to be broken up for convenience in transporting. It soon became evident from practice that hand methods using picks had to be abandoned in favor of mechanical crushing owing to a number of reasons, including the hazard of explosions caused by sparks raised in the course of hand operations by the steel picks striking the steel grids.

It is accordingly an object of this invention to provide a crusher which will take large blocks of sulphur or other mineral or the like and will break up the blocks to a convenient handling size. This and other objects are accomplished in a crusher which is of the hopper type with a combination crusher and feed screw in the bottom of the hopper. The crusher further has a discharge section secured to the hopper, with a discharge gate having openings at the end of the discharge section. A discharge mouth opens outward and downward in the end of the discharge section ahead of the discharge gate. In addition, a plurality of small openings is provided throughout the length of the bottom of the hopper in order to permit small sizes to drop out of the hopper and not require these small sizes to be fed by the screw to the discharge mouth. A conveyor belt or other convenient conveying means is provided below the hopper and receives the discharged material. The small particles dropping through the holes serve to cushion the belt or other conveying means against the large lumps which may drop out through the discharge mouth or through the discharge openings in the gate.

In the drawings:

Fig. 1 is a top plan view of a crusher made according to this invention.

Fig. 2 is a side elevation view of the crusher shown in Fig. 1.

Fig. 3 is an end elevation view (the motor drive end) of the crusher shown in Fig. 1.

Fig. 4 is a view in section on line 4—4 of Fig. 1.

Fig. 5 is a view in section substantially on line 5—5 of Fig. 4.

2

Fig. 6 is a view in section on line 6—6 of Fig. 4.

Fig. 7 is a view from the plane 7—7 of Fig. 4 in the direction indicated by the arrows.

A crusher made according to this invention is preferably mounted to be mobile on tracks 2 by means of wheels 4. Any suitable framework may be provided, comprising I-beams, channels, and angles or the like, suitably braced with tubing or other structural material. Inasmuch as the details of the frame do not form any part of this invention, those details will not be described here.

Any suitable conveying means such as a conveyor belt 6, suitably supported beneath the hopper, may be provided to carry away the crushed sulphur or other mineral.

A hopper indicated generally at 8 consists of a plurality of sloping walls and a curved bottom wall. Thus, the hopper is provided with opposed sloping side walls 10 and other opposed sloping end walls 12. As is best seen in Figs. 3, 5 and 7, the two opposed sloping side walls 10 are tangent to the curved bottom wall 14. In fact, the two side walls 10 and the bottom wall 14 are preferably all one piece, either made of one sheet of steel or other suitable sheet material and rolled into shape, or fabricated by welding a number of pieces together, or made in any other suitable manner.

A discharge section indicated generally at 16 is secured to one end of the hopper. The discharge section preferably comprises a substantially tubular shell 18 having substantially the same curvature as the bottom wall 14 and in fact preferably being made integral therewith. A discharge gate 20 having discharge openings 22 therein is secured to the end of the discharge section in any suitable manner, as for example by threaded members 24.

An auxiliary discharge mouth 26, opening downward and outward, is provided in the discharge section ahead of the discharge gate 20. The discharge mouth 26 is provided in the discharge section by means of recesses in the bottom wall portion of the discharge section and in the tubular portion thereof. The recesses consist of a vertical, substantially plane cut 28 in the bottom wall of the discharge section and a horizontal, also substantially plane cut 30 in the tubular shell. Relatively small openings 32 are provided in substantial number in the bottom of the hopper, namely, in the bottom wall throughout the length of the hopper.

The rear of the end walls 12 joins with a vertical plane portion 34 (Fig. 4). Any suitable