Oct. 20, 1925.

1,558,302

B. H. SMARTT

CRUSHER

Filed Nov. 22, 1923

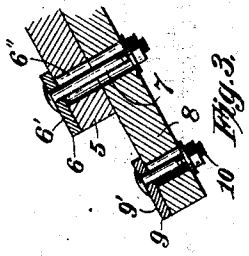


Fig. 3.

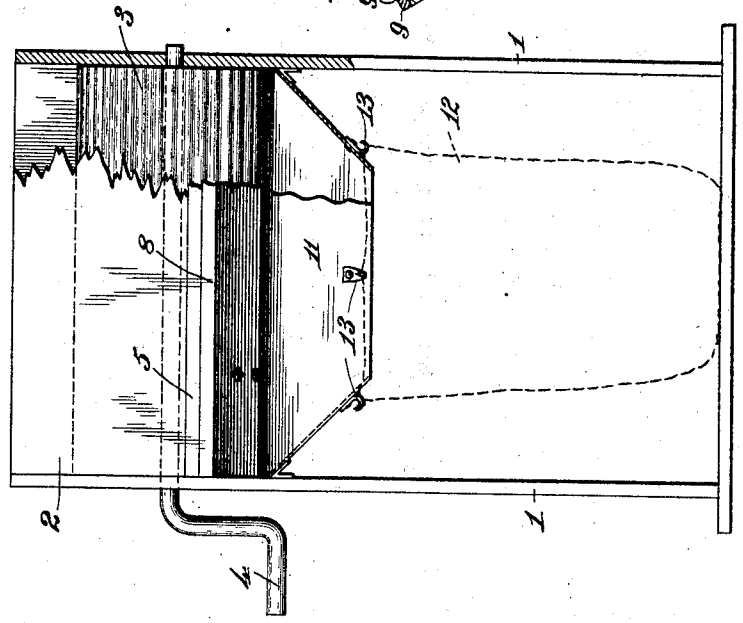


Fig. 1.

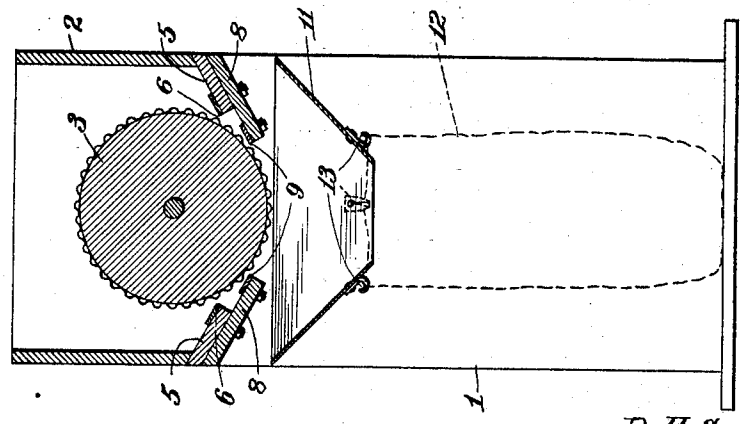


Fig. 2.

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UNITED STATES PATENT OFFICE.

BEN HILL SMARTT, OF FIVE POINTS, ALABAMA.

CRUSHER.

Application filed November 22, 1923. Serial No. 676,266.

To all whom it may concern:

Be it known that I, BEN HILL SMARTT, a citizen of the United States, residing at Five Points, in the county of Chambers and State of Alabama, have invented certain new and useful Improvements in Crushers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled to the art to which it appertains to made and use the same.

This invention relates to improvements in crushers, and more particularly to such as are especially adapted for use in pulverizing fertilizer.

The primary object in view is the production of a crusher especially well adapted for use in pulverizing nitrate of soda and other fertilizer of moist, lumpy character.

With this and further objects in view as will in part hereinafter become apparent and in part be stated, the invention comprises certain novel constructions, combinations and arrangements of parts as subsequently specified and claimed.

In the accompanying drawings,—

Figure 1 is a view in side elevation of an apparatus embodying the features of the present invention, parts being broken away and parts being seen in vertical section.

Figure 2 is a vertical, central, transverse section through the structure seen in Figure 1, parts being seen in elevation.

Figure 3 is an enlarged, detail, view of one of the crushing edges detached.

Referring to the drawings by numerals, 1 indicates a frame or other appropriate support on which is mounted the container 2 in the end walls of which is journaled a crushing roller 3. The shaft of roller 3 extends through one of the end walls and is provided with an operating crank or other driver 4 for actuation of the roller.

Fixed to the walls of container 2 and extending inward of the side walls at each side of the roller 3 is a plate or plank 5 arranged at an incline for causing the gravity feeding of contained material toward the surface of the roller 3. Each plank 5 thus has a longitudinal edge 6 presented toward the roller 3 and preferably spaced a short distance therefrom below the axis of the roller 3. The edge 6, as best seen in Figure 3, is preferably re-enforced by a bar 6′ whose edge functions somewhat similarly to a cutter bar and serves as the co-operating crushing element. The bar 6′ is anchored to plate 5 by bolts 7 extending through appropriate adjusting slots, such as 6″.

Beneath each of the planks or plates 5 is arranged a similarly inclined plate or plank 8 of sufficiently greater width than the width of the adjacent plate 5 to cause the edge 9 of the respective plate 8 presented toward the roller 3 to lie closer to the roller than does the edge 6. Each of the edges 9 is preferably rendered more effective by being formed of a bar of metal, as indicated at 9′ in Figure 3, adjustably clamped in position by appropriate bolts 10 extending through adjusting slots in the respective plate 8.

Plates or planks 5 and 8 with their cutter bars 6′ and 9′ form an inclined or hopper bottom for the container 2, and thus in addition to providing the cooperating crushing or cutting edges 6 and 9 also provide for gravity feeding of the material to the drum 3. The relative location of the plates or planks 5 and 8 beneath the horizontal plane of the axis of the drum 3 aids in this result, and also enables the drum to be rotated in either direction for effecting crushing action. Should material clog at one side, the drum is revolved in the opposite direction, and the crushing thus continued without interruption.

The roller 3 may be formed of any appropriate material, and is preferably provided with a roughened exterior surface, as by having the body of the roller formed of wood and covered with corrugated iron. Beneath the roller and also beneath the plates or planks 8 is arranged a hopper 11 for concentrating the discharge past the plates 8 and delivering the same into an appropriate container, such as the bag 12, indicated in dotted lines. The hopper 11 is provided with hooks or other appropriate hangers 13 for receiving and sustaining the bag 12 during use.

In operation, the nitrate of soda or other fertilizer is delivered into the container 2 and the roller 3 is revolved in either direction, causing the fine particles of the material being treated to find their way to the hopper 11 and into the bag 12. As the spacing between the edges 6 and the periphery of roller 3 is greater than that between the

edges 9 and said periphery, the larger lumps of material will be crushed between the roller and the edges 6, or one of them, according to the direction of travel of the roller, and then, when the material has moved past the respective edge 6, the finer lumps will be brought into contact with the respective edge 9 and there effectively crushed to the requisite fineness.

The structure described is especially effective for nitrate of soda, or other fertilizer, or other substance, of a moist character which packs readily, and it is to be observed that with such substance the smaller the area of the actual crushing surface the greater the effiiciency and the less the likelihood of adherence. With sticky, moist fertilizer, a large crushing surface would become packed, clogged and inoperative, but with the structure shown such an objectionable condition could not arise. While the structure shown has been illustrated as especially well adapted for manual actuation, and while this form of construction is especially useful for relatively small quantities of production, such as required on the one-man farm or the like, it is obvious, of course, that any other appropriate actuator may be substituted for the crank 4, and more speedy operation and larger quantities of production attained.

What I claim is:—

1. In a crusher, the combination of a drum roller, superimposed plates arranged at the sides thereof beneath the horizontal plane of the axis of the roller and inclined to serve as a hopper for directing material toward the roller, each of the superimposed plates having a cutting or crushing edge presented toward the roller and adapted to cooperate therewith for enabling the roller to effectively crush material fed thereto when the roller is revolved in either direction.

2. In a crusher, the combination, with a container, of a drum roller revolubly mounted therein, inclined plates in the lower portion of the container having their edges spaced from and directed toward the drum at opposite sides thereof and at places beneath the horizontal plane of the axis of the drum for providing a hopper bottom for the container and also for providing cutting edges cooperating with the roller.

3. In a crusher, the combination of a drum roller having a corrugated surface, a pair of superimposed plates arranged at opposite sides of the roller and beneath the axis thereof, each pair of plates having substantially the same relation to the roller as that of the other pair and each plate of each pair having an edge presented toward the cylindrical surface of the roller as the crushing element cooperating therewith, each of such presented edges being nearer the roller than any other part of the respective plate, and the edge of one plate of each pair being nearer the roller than the edge of the other plate of such pair.

4. In a crusher, the combination of a roller, superimposed plates extending toward the roller, a bar adjustably carried by one of said plates and presenting an edge toward the roller for affording a cooperating crushing element, and retaining means for said bar extending through and connecting the superimposed plates.

In testimony whereof I affix my signature.

BEN HILL SMARTT.