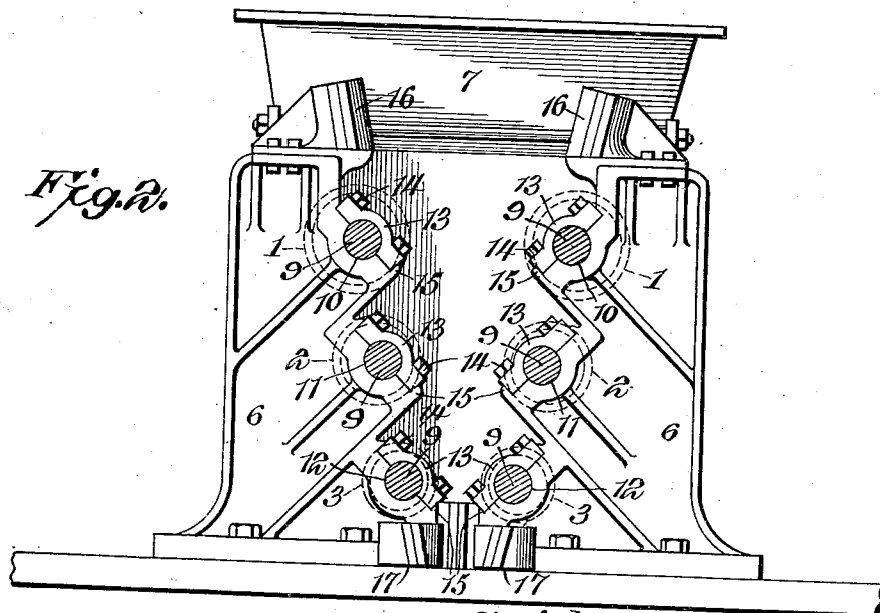
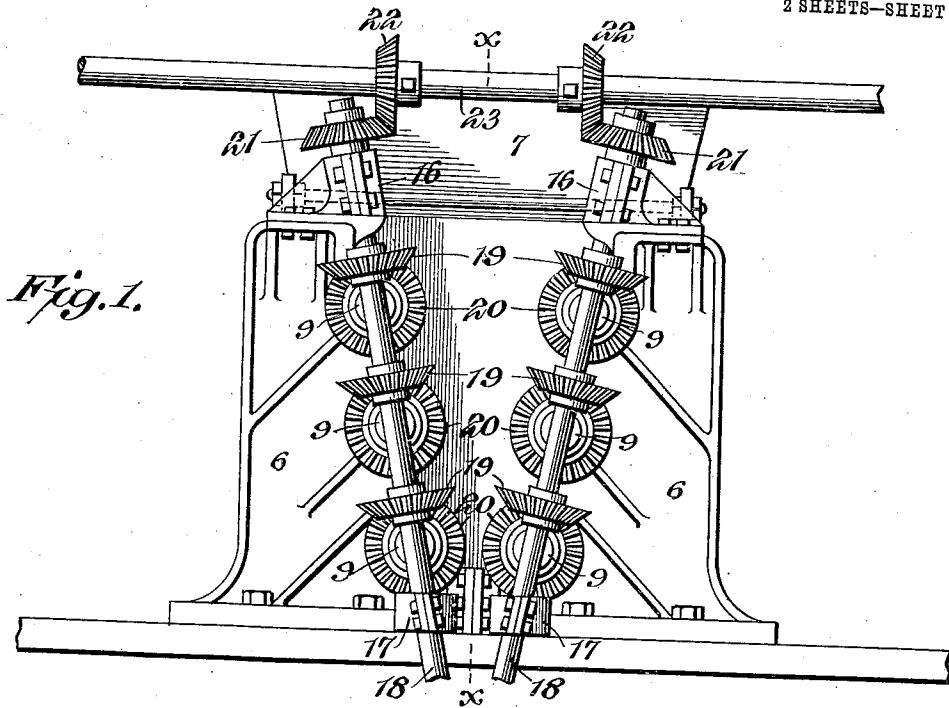


S. ABERNATHY.
ECCENTRIC ORE CRUSHER.
APPLICATION FILED AUG. 15, 1907.

935,630.

Patented Oct. 5, 1909.
2 SHEETS—SHEET 1.



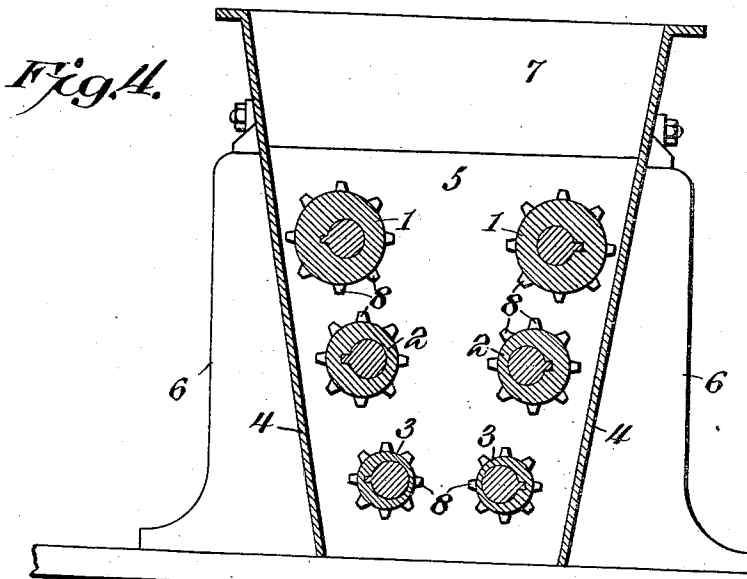
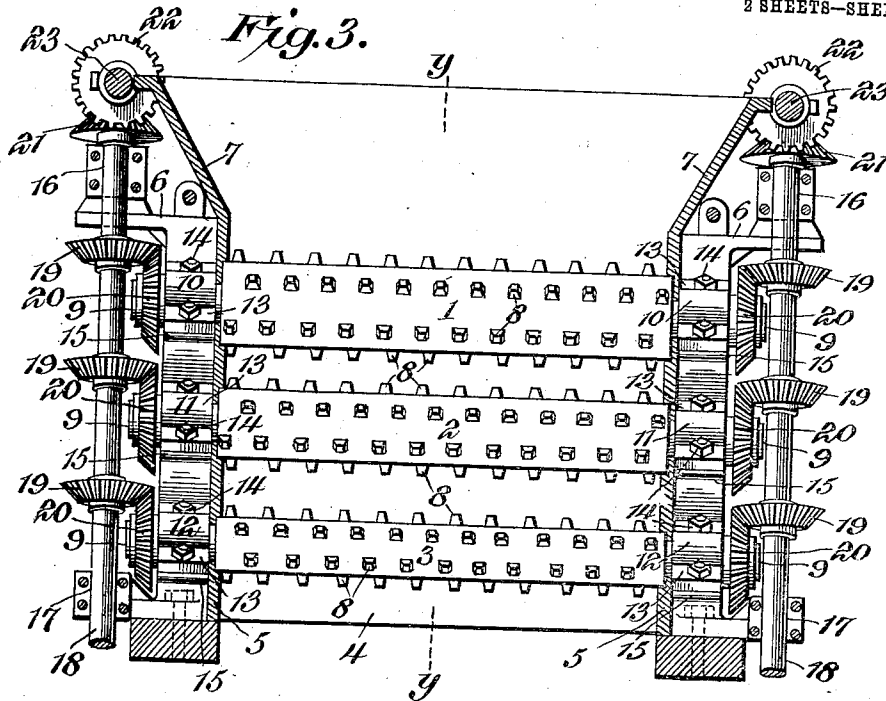
Witnesses
Howard D. Art.
J. J. Riley

Smith Abernathy, Inventor,
By *E. G. Figgers,*
Attorney

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 H. F. Riley

Smith Abernathy, Inventor,

By *E. G. Siggers*
 Attorney

UNITED STATES PATENT OFFICE.

SMITH ABERNATHY, OF PONOKA, ALABAMA.

ECCENTRIC ORE-CRUSHER.

935,630.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed August 15, 1907. Serial No. 388,668.

To all whom it may concern:

Be it known that I, SMITH ABERNATHY, a citizen of the United States, residing at Ponoka, in the county of Bibb and State of Alabama, have invented a new and useful Eccentric Ore-Crusher, of which the following is a specification.

The invention relates to improvements in ore crushers.

10 The object of the present invention is to improve the construction of ore crushers, and to provide a simple and comparatively inexpensive one having an increased capacity to take large rocks and handle foreign matter without choking, and adapted to successively reduce the material operated on, and capable of agitating the ore, so that it may be more easily cleaned.

20 A further object of the invention is to provide an ore crusher of this character, designed especially for operating on brown ore mined with steam shovels, and capable of effectually crushing the large rock and of tearing up the stiff clay thereby preparing the material for the screen.

25 Another object of the invention is to provide an ore crusher in which repairs may be easily installed without disturbing parts other than those repaired.

30 With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended.

35 In the drawings:—Figure 1 is an end elevation of an eccentric ore crusher, constructed in accordance with this invention. Fig. 2 is a similar view, partly in section, illustrating the arrangement of the bearings of the standards. Fig. 3 is a vertical sectional view, taken substantially on the line $x-x$ of Fig. 1. Fig. 4 is a transverse sectional view, taken substantially on the line $y-y$ of Fig. 3.

40 Like numerals of reference designate corresponding parts in all the figures of the drawings.

50 The ore crusher consists of upper, intermediate and lower grinding and crushing rolls 1, 2 and 3, arranged in pairs within a downwardly tapered hopper or hopper-shaped casing, which is formed by side and end plates 4 and 5, suitably secured together and supported by corner standards 6, provided with bearings for journals or gudgeons of

the said rolls. The plates 4 and 5 are constructed of heavy sheet steel, or other suitable material and are provided at their upper edges with outwardly projecting horizontal flanges. The side plates, which are inclined from the top to the bottom of the hopper, are located in rear of the grinding and crushing rolls, and the end plates 5, which are vertical from the bottom of the hopper to a point above the rolls, are provided with inclined upper portions 7, which form an enlarged flaring mouth. The crushing rolls, which are located at opposite sides of the hopper or hopper-shaped casing, are arranged at different elevations, and they decrease in size from the top to the bottom of the series and form a crushing throat. The space or distance between the rolls also decreases from the top to the bottom of the series, so that the material falling upon the top rolls will be reduced by the same and will drop between the top rolls to the intermediate rolls, which will further reduce the size of the material. The material is reduced by the upper rolls and then drops to and is acted upon by the intermediate rolls, and finally drops to the bottom rolls, which reduce the material to the proper dimensions for the furnace.

85 The crushing rolls are provided with roughened surfaces consisting of knobs or projections 8, preferably formed integral with the rolls and tapered as shown. The end faces of the knobs or projections are flat, and the side faces are inclined, the knobs or projections being tapered outwardly from the rolls to the said flat outer faces. The knobs or projections of the rolls are adapted to engage and exert a grinding and crushing action on the material, and the journals or gudgeons 9 of the rolls are eccentrically arranged, so that when the rolls are rotated, the engaging faces of the members of each pair of rolls will be carried inwardly and outwardly with relation to the center of the hopper to cause the rolls to positively crush the material by gradually reducing the space between them. The knobs or projections positively engage the material and cause the same to be carried downward between the rolls as the latter, through the medium of their eccentric arrangement, approach each other and crush the material passing between them. By this operation, the rolls are adapted to crush larger rock than heretofore, and they are

capable of handling the same without becoming choked by any foreign matter. The eccentrically mounted rolls are especially adapted for operating on ores mined with a steam shovel, and are adapted to crush the rock and tear the stiff clay and prepare the same to be operated on by a screen.

The journals or gudgeons of the crushing rolls are arranged in upper, intermediate and lower bearings 10, 11 and 12 of the standards 6. The bearings at each end of the ore crusher are arranged different distances apart to correspond to the arrangement of the crushing rolls, which are located within the hopper, and the distance between the end bearings decreases from the top to the bottom, as clearly illustrated in Fig. 2 of the drawings. The inclined series of rolls at opposite sides of the hopper form a tapering space between them, and all of the rolls act on the material in the hopper. The journals of each pair of horizontal rolls are disposed in the same horizontal plane, and the members of each pair of rolls are arranged so that through their eccentric action they simultaneously advance upon the material to crush the same, and simultaneously recede from the material to permit the same to fall from between them. The bearings are arranged in a step-like series and are provided with detachable bearing blocks 13, set at an inclination and secured to the standards by means of screws 14, or other suitable fastening devices. The standards have inclined faces to receive the bearing blocks and are provided with projecting lugs 15, extending beyond such inclined faces and forming abutments for the lower ends of the bearing blocks.

The standards are provided with upper and lower aligned bearings 16 and 17, set at an inclination and receiving shafts 18; and motion is communicated from the latter to the crushing rolls through the medium of bevel gears 19 and 20, mounted on the shafts 18 and on the journals or gudgeons of the rolls. The inclined shafts, which converge downwardly, are also equipped with bevel gears 21, located at the upper ends of the said shafts and meshing with corresponding gears 22 of a horizontal drive shaft 23. The horizontal shaft 23 extends across the inclined shafts, and the said gearing is adapted to impart a uniform rotary movement to the grinding and crushing rolls. The gearing may be arranged at either or both ends of the crushing rolls and may be operated by any suitable means.

The material may be delivered into the mouth of the hopper by any suitable means, and after being operated on successively by the several pairs of rolls, it is discharged at the bottom of the hopper.

Although three sets of rolls are illustrated in the accompanying drawings, it will

be apparent that the number and the arrangement may be varied to adapt the ore crusher to the kind of material operated on.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In an ore crusher including a casing, opposite crushing rolls eccentrically mounted within the casing, and operating means for the rolls to cause them to simultaneously advance toward each other to crush the material and simultaneously recede from each other to permit the material to fall between them.

2. An ore crusher comprising a casing, rotary crushing rolls eccentrically mounted within the casing at corresponding opposite points and spaced from each other both vertically and horizontally to form a downwardly-tapered crushing throat, and operating means for the rolls to cause them to simultaneously advance upon the material to crush the same and simultaneously recede from the material to permit the same to fall between them to the next pair of rolls.

3. An ore crusher including a casing, horizontal shafts piercing the casing, rotary crushing rolls located within the casing and eccentrically mounted on the shafts and spaced from each other both vertically and horizontally to form a crushing throat, and gearing for rotating the shafts to cause the crushing rolls to advance simultaneously upon the material to crush the latter and to recede simultaneously from the material to permit the same to fall between them.

4. An ore crusher comprising a hopper having side and end plates, standards supporting the plates at the corners of the hopper and arranged exteriorly of the latter and provided with opposite corresponding step-like series of bearings, the bearings at each end of the hopper being arranged in pairs and located at different elevations, the members of the several pairs being arranged different distances apart, an inclined series of crushing rolls located within the hopper at opposite sides thereof and forming a downwardly tapered crushing throat and having journals arranged in the said bearings, and gearing for rotating the rolls.

5. An ore crusher comprising a hopper, standards arranged at the corners of and supporting the hopper and provided with opposite corresponding step-like series of bearings and arranged in pairs and provided with removable inclined bearing blocks set at an inclination, said standards having projecting lugs forming abutments for the lower ends of the bearing blocks, crushing rolls operating within the hopper and journaled in the said bearings and forming an open downwardly tapered space between them, and means for rotating the rolls.

6. An ore crusher comprising a hopper

having side and end plates, standards supporting the plates at the corners of the hopper and provided with opposite corresponding step-like series of bearings, the bearings
5 at each end of the hopper being arranged in pairs and located at different elevations and the members of the several pairs being arranged different distances apart, inclined series of crushing rolls located within the
10 hopper to form a crushing throat and having journals arranged in the said bearings, opposite downwardly converging inclined shafts located at each end of the rolls, gears

mounted on the rolls and on the inclined shafts and meshing with each other, opposite horizontal shafts located above the upper end of the inclined shafts, and gears connecting the inclined and horizontal shafts.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

SMITH ABERNATHY.

Witnesses:

GUY A. LIGON,
C. P. MARTIN.