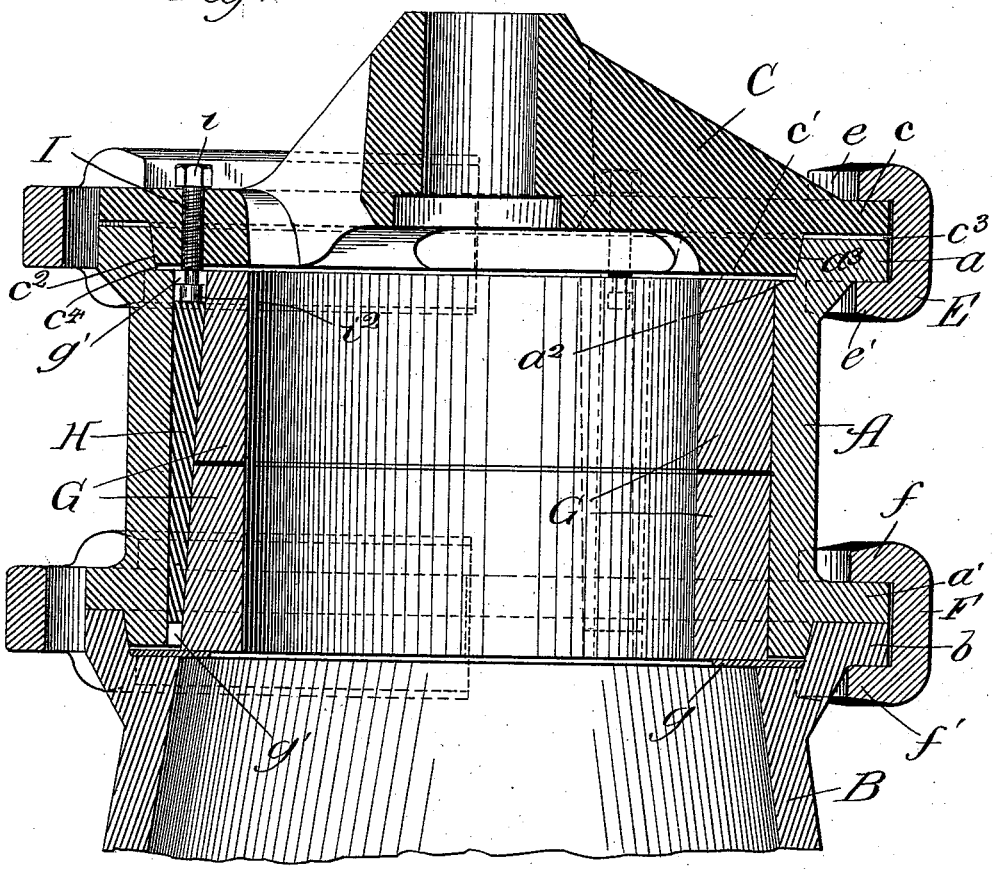
(No Model.) 2 Sheets—Sheet 1.

P. W. GATES.

GYRATING CRUSHER.

No. 525,408. Patented Sept. 4, 1894.

Fig. 1.



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(No Model.) 2 Sheets—Sheet 2.

P. W. GATES.

GYRATING CRUSHER.

No. 525,408. Patented Sept. 4, 1894.

Fig. 2.

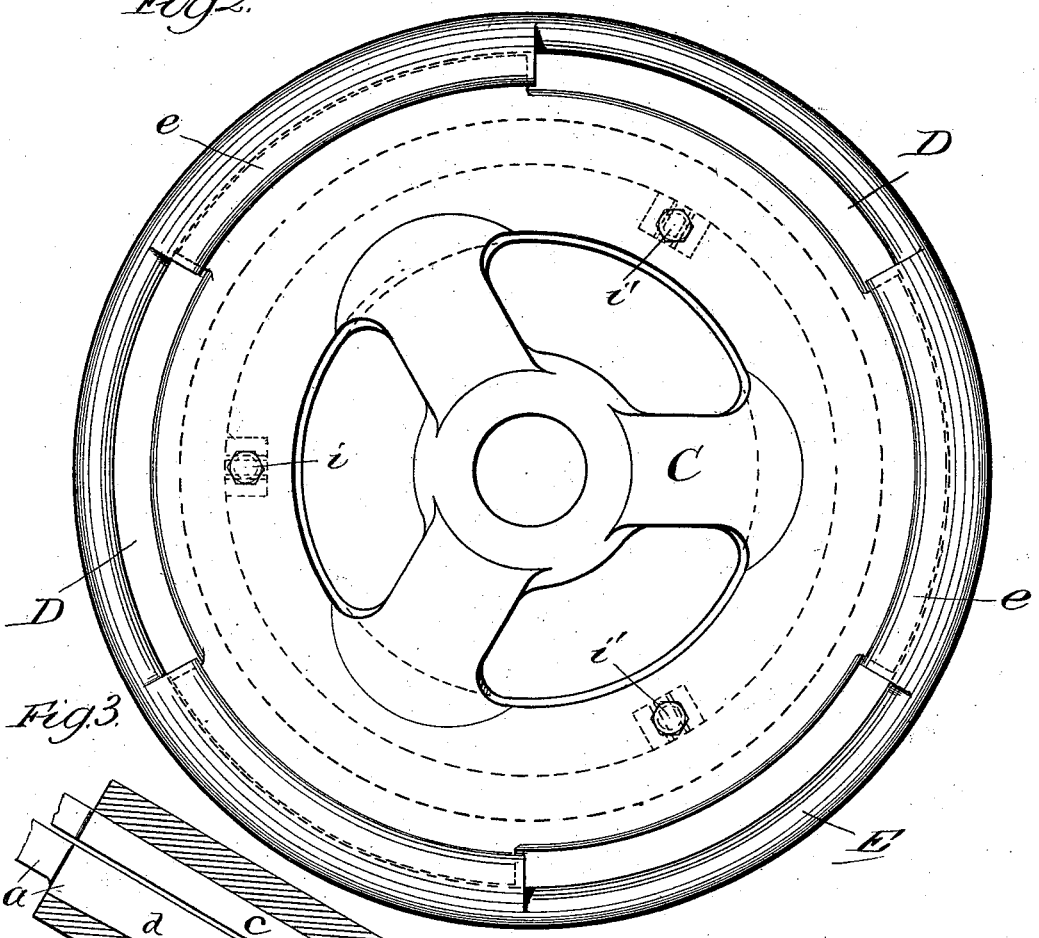


Fig. 3.

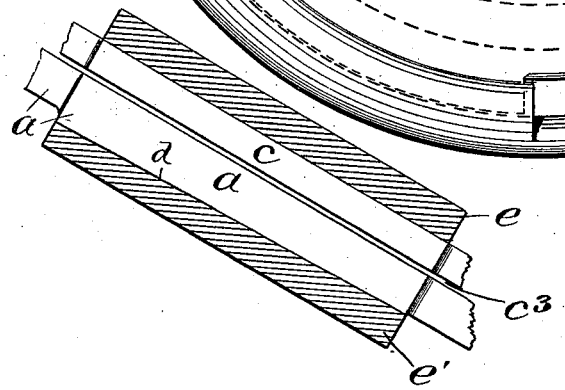
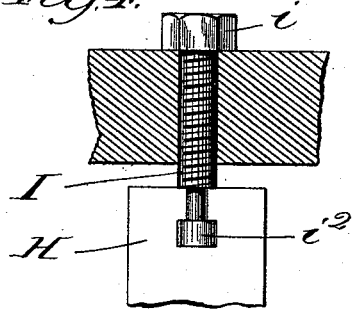


Fig. 4.



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UNITED STATES PATENT OFFICE.

PHILETUS WARREN GATES, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GATES IRON WORKS, OF SAME PLACE.

GYRATING CRUSHER.

SPECIFICATION forming part of Letters Patent No. 525,408, dated September 4, 1894.

Application filed November 3, 1893. Serial No. 489,943. (No model.)

To all whom it may concern:

Be it known that I, PHILETUS WARREN GATES, a citizen of the United States, residing at Chicago, Illinois, have invented certain new and useful Improvements in Gyrating Crushers, of which the following is a specification.

In the drawings, Figure 1 is a vertical longitudinal section of the upper portion of my improved crusher; Fig. 2 a plan view of the same; and Figs. 3 and 4 details hereinafter described.

In making my improved gyrating crusher for crushing ores, rocks and similar substances, I make an outside upper shell, A, of cast iron or other suitable material and of the desired height and diameter. This shell terminates at the top in a lateral flange, a, and at the bottom in a lateral flange, a', which are, of course, cast integrally with the shell. The shell, A, is intended to be supported by a lower shell, B, which terminates at the top in a lateral flange, b, so that the lower flange of the shell, A, rests on the upper flange of the shell, B, as will be apparent from an inspection of Fig. 1. The upper shell is provided with a circumferential shoulder, a^2, from which the lateral flange, a, extends outwardly and upwardly in an oblique direction, as shown at a^3, in Fig. 1. On the top of the upper shell is arranged a spider, C, which is provided with a lateral flange, c, and with a downwardly circumferential flange, c', that slopes inwardly and downwardly, as at c^2, so that when the spider is placed on the upper shell the outer inclined surface of the flange, c', will bear against the inner inclined surface of the flange, a, forming a dovetail fit between them. The sizes of the parts are so proportioned that when the spider is in place and the inclined surfaces tightly wedged together, there will be a space, c^3, between the flange, c, of the spider, and the flange, a, of the shell, and also a space, c^4, between the flange, c', of the spider and the shoulder, a^2, of the shell. This causes the pressure of the spider to be exerted in a lateral direction on the shell instead of bearing directly downwardly upon the same. As the parts become worn, the spider simply settles down enough to compensate for the wear, so that a tight joint between the shell and spider is always secured.

In order to bind the flange of the upper shell and the flange of the spider together, I cut out, as it were, from the two flanges segmental sections, leaving spaces, D, intended to be in the same vertical plane when the shell and spider are together. These segmental spaces are shown in Fig. 2. I then arrange a ring, E, provided with inwardly extending flanges, e, and e' above and below. By terming this part a ring, I do not mean that it must be a continuous piece or circle, as I simply make it that way as a convenience, and may, if I desire, make it in parts which contain the inwardly extending flanges. These flanges, e and e', are also made segmental, and are intended to be introduced into place by fitting them into the segmental spaces, D, of the flanges, and then turning the ring sufficiently to bring its upper and lower segmental flanges upon and in contact with the segmental flanges, a and c. The under surface of the segmental flange, a, is inclined from one end of the segment to the other, as shown at d in Fig. 3, and the lower segmental flange, e', has its upper surface correspondingly and oppositely inclined, so that when it is turned into place, as shown in Fig. 3, the oppositely inclined surfaces will bear against each other and produce a wedging action, by which a perfectly secure joint or fit is secured, and the sections at every point held and preserved in their proper relative horizontal positions, and the liability of the cocking of the sections prevented. When it is desired to remove the spider for any purpose, all that is necessary is to turn the ring in the reverse direction until it can be removed, when the parts will be loosened so that the spider can be lifted off. The flanges, a' and b, by which the upper and lower shells are connected together, may, in like manner, be provided with a ring, F, having flanges, f and f', clasping or clamping the flanges a' and b securely together. As the arrangement is the same whether a shell and a spider or two shells be fitted together, I shall claim the arrangement in a way applicable to both.

I arrange in the upper shell a lining in-

tended to offer the outer crushing surface on which the material is to be broken. Instead of making this lining or crushing surface of vertical staves, as is customary, I make it of one or more horizontal rings, G, resting at the bottom on the removable ring, *g*, which ring I do not desire to claim in this application. I provide the ring, G, with a desired number of vertical slots or channels, *g'*, extending from the top to the bottom. The channels are inclined from the top outwardly as they descend, so that when the channel in the upper ring is vertical over the channel in the lower ring, there will be a continuous wedge-shaped channel or groove from the top to the bottom of the rings. I insert a wedge-shaped block, H, in the channel, as shown in Fig. 1. I arrange in this wedge block a threaded bolt, I, provided with a head, *i*, seated in a recess in the upper end of the wedge, as shown in Fig. 4. I make an internal screw-threaded hole through the spider, through which the bolt, I, passes. The upper end of the bolt is provided with a head, *i*, by which it may be turned in the one direction or the other. As turned, it moves the wedge block up or down, so as to tighten or loosen it in its wedge-shaped channel or groove. When turned down the wedge is forced in so as to hold the rings forming the lining or crushing surface securely together and in their down position and properly centered, and when turned up the wedge is withdrawn so that the rings may be taken apart and removed to admit of the insertion of new ones in their place, as they become worn or defective.

Of course, it will be understood that the improvements that I have described above are intended to be used with the other parts usually employed in the construction of gyrating crushers, but which parts, as they are well known and understood, I have not considered it necessary to illustrate or describe.

What I regard as new, and desire to secure by Letters Patent, is—

In stone crushers, the combination of an outer shell, a removable inner lining forming the crusher surface, consisting of a horizontal ring or rings provided with vertical channels inclined from end to end, wedge blocks inserted in such channels, means on the crusher frame for supporting the crushing rings, means for moving the wedge blocks in one direction or the other for centering, tightening or loosening the ring or rings, and means for removably securing such parts together and to the crusher frame, substantially as described.

PHILETUS WARREN GATES.

Witnesses:
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