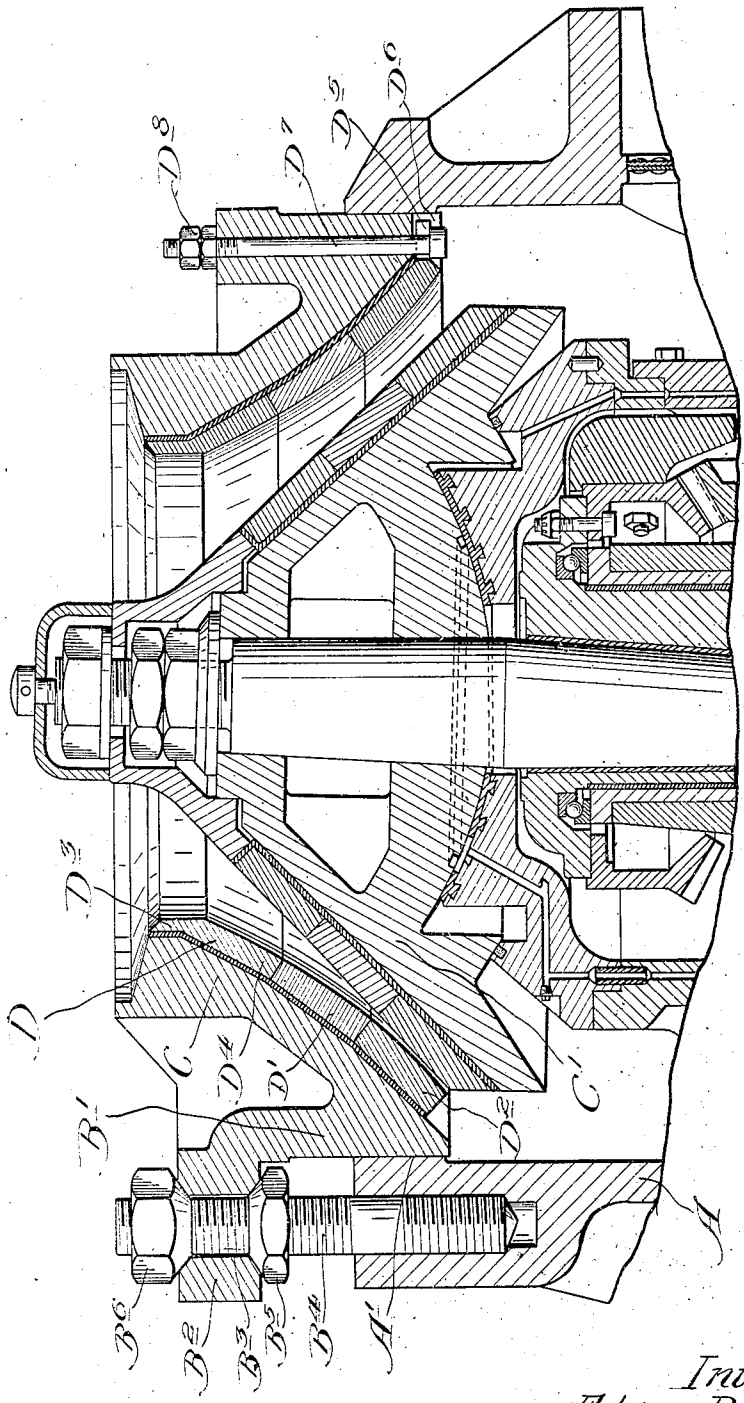
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CRUSHING CONCAVE AND MANTLE

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CRUSHING CONCAVE AND MANTLE.

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To all whom it may concern:

Be it known that I, EDGAR B. SYMONS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a certain new and useful Improvement in Crushing Concaves and Mantles, of which the following is a specification.

My invention relates to improvements in gyratory cone crushing machines, and relates particularly to the removable mantle which provides the crushing surface for the first concave. One object is to provide means for the easily secured attachment of the removable mantle to the concave. Another object is the provision of such securing means which shall be positioned outside of the crushing zone. Another object is the provision of a sectional mantle in which the rapidly wearing portions may be replaced more frequently than the rest of the mantle. Other objects will appear from time to time in the course of the specification and claims.

My invention is illustrated more or less diagrammatically in the accompanying drawing which is a vertical section taken through the axis of the crusher. Like parts are indicated by like characters throughout.

A is the crusher frame the details of which form no part of the present invention. It may have a cylindrical bearing surface A^1 in which is mounted a cylindrical portion B^1 of the spider B. B^2 are outwardly projecting lugs apertured as at B^3 to receive the supporting screws B^4. B^5 B^6 are adjusting and supporting nuts.

C is the concave proper which overhangs any suitable cone C^1.

D D^1 and D^2 are removable mantle sections in the form of tapered or conic rings. The upper ring D has a cylindrical portion D^3 and is downwardly and inwardly inclined as at D^4. The lower ring D^2 is provided with outwardly projecting lugs or ears D^5 which seat in the apertures D^6 in the spider whereby rotation of the ring is prevented. D^7 are holding bolts passing upwardly through said lugs and secured by the bolts D^8.

It will be realized that whereas I have described and shown an operative device that nevertheless many changes might be made in the size, shape, number and disposition of parts without departing from the spirit of my invention and that I wish my description and drawings to be taken as in a broad sense diagrammatical, rather than as limiting me to the specific structure shown.

The use and operation of my invention are as follows:

In cone crushers of the type herein illustrated the wear of the crushing contact is so steady and so severe that it is necessary to provide removable crushing members. With the concave herein shown, I employ a multiple section mantle, each mantle being a conic ring. The upper section is centered by means of a cylindrical upper edge, and the top of the cylindrical portion is downwardly and inwardly inclined in continuation of the downwardly and inwardly inclined upper surface of the concave, the two together serving as a directing chute to direct the material which falls thereupon downwardly toward the top of the cone.

The lowest section of the mantle serves as the securing section to hold all the sections above it in place. It is, therefore, provided with outwardly projecting lugs through which pass bolts whereby it is positively locked to the spider. These lugs set in notches about the bottom of the spider. Thus any rotation of the concave is positively prevented, and all shearing strain upon the supporting bolts is prevented.

The mantle may be made in one piece, if desired, but I prefer to make it in two or more sections, since under most conditions the wear is heaviest about the bottom of the mantle, and it is desirable to be able to replace the lowest section, when it wears down, without having to waste the metal of the sections which are less worn.

I claim:

1. In a gyratory crusher, a downwardly flared concave, a conical lining therefor and means for holding the lining in place comprising a plurality of lugs integral with the lining projecting laterally therefrom outside the crushing area and holding bolts engaging said lugs and adapted to draw them upwardly toward the support against which the mantle is seated.

2. In a gyratory crusher, a concave forming a downwardly and outwardly flared hopper, a mantle therefor, having outwardly projecting lugs at the bottom thereof and holding bolts adapted to suspend the mantle by means of said lugs.

3. A lining for gyratory concaves comprising an outwardly and downwardly flared mantle of generally uniform thickness having at the top a cylindrical extension substantially parallel with the axis of the machine and at the bottom a series of spaced outwardly projecting holding lugs removed from the crushing area.

4. A removable lining for gyratory concaves, comprising a downwardly and outwardly flared mantle, and means adjacent the bottom thereof for securing said mantle to the concave, comprising spaced lugs, integral with the mantle, and outwardly projecting therefrom.

5. A removable lining for gyratory concaves, comprising a downwardly and outwardly flared mantle of generally uniform thickness, and means adjacent the bottom thereof for securing said mantle to the concave, comprising a series of spaced outwardly projecting integral holding lugs about the bottom of the mantle and removed from the crushing area.

6. A removable lining for gyratory concaves comprising a downwardly and outwardly flared mantle, the upper portion of said mantle being cylindrically formed and substantially parallel with the vertical axis of the machine, and means adjacent the outwardly flared bottom of the mantle for securing said mantle to the concave.

7. A removable lining for gyratory concaves comprising a downwardly and outwardly flared mantle, the upper portion of said mantle being cylindrically formed and substantially parallel with the vertical axis of the machine, and means adjacent the outwardly flared bottom of the mantle for securing said mantle to the concave, the upper surface of said cylindrical portion being downwardly and inwardly inclined.

8. A removable lining for gyratory concaves comprising a downwardly and outwardly flared mantle, the upper portion of said mantle being cylindrically formed and substantially parallel with the vertical axis of the machine, and means adjacent the outwardly flared bottom of the mantle for securing said mantle to the concave, the crushing surface along the lower portion of the mantle being outwardly inclined in relation to the rest of the mantle.

9. A mantle for use with the concave of a gyratory crusher, comprising a plurality of downwardly and outwardly flared conic rings and securing means upon the lowest of said rings, integral with said ring, for drawing it and the rings above it upwardly against the concave.

10. A mantle for use with the concave of a gyratory crusher comprising a plurality of conic rings, lugs outwardly projecting from the lowest of said rings, the concave being provided with apertures to receive said lugs and to limit their lateral movement, and securing means adapted to pass through said lugs and to prevent downward movement of said rings.

11. A mantle for use with the concave of a gyratory crusher, comprising a plurality of downwardly and outwardly flared conic rings and a plurality of lugs about the lowest of said rings, outwardly projecting therefrom and spaced about its periphery.

Signed at Los Angeles, county of Los Angeles and State of California, this 15 day of January, 1925.

EDGAR B. SYMONS.