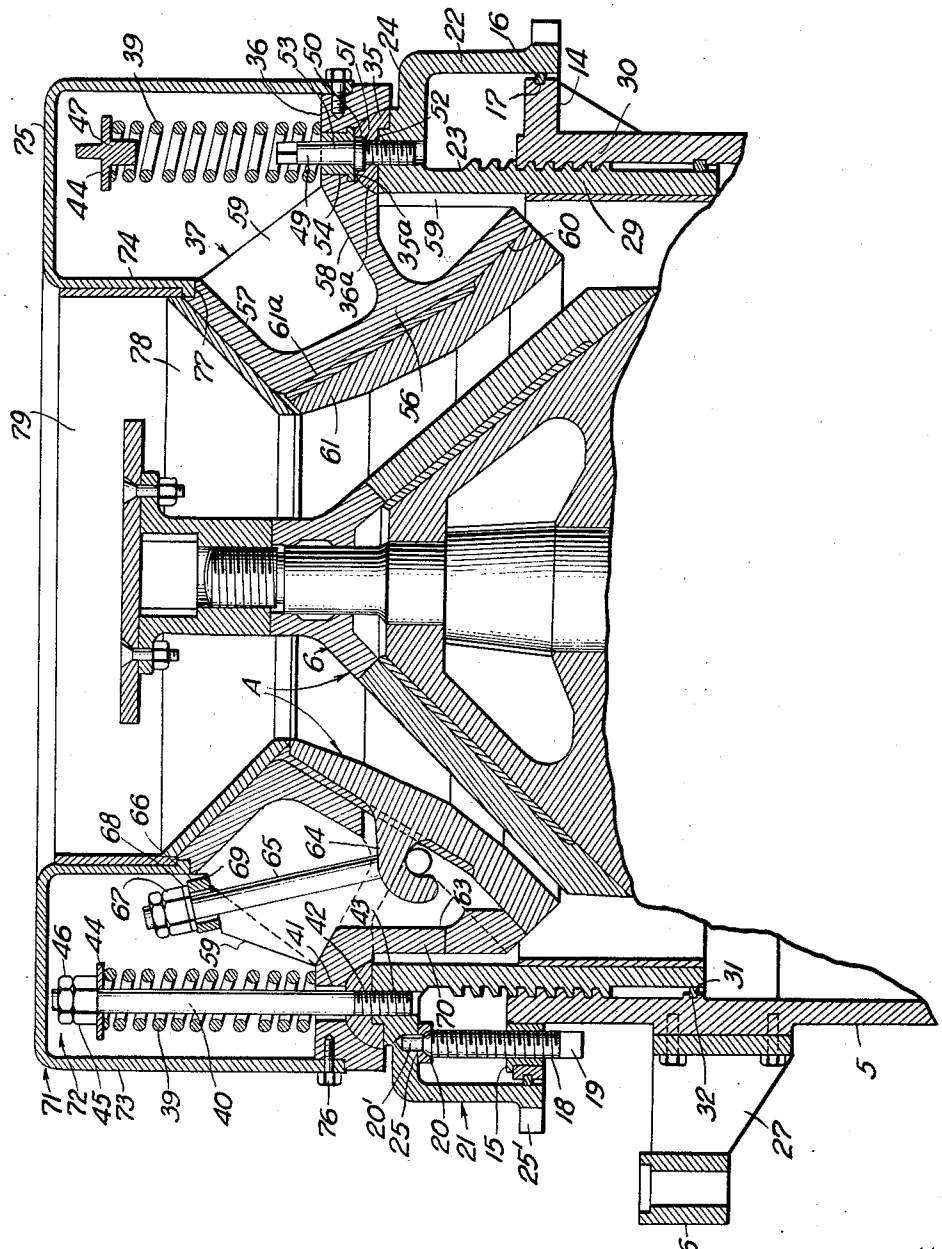
May 22, 1951 R. W. STEVENS 2,553,988

GYRATORY CRUSHER

Original Filed Nov. 29, 1946




Inventor:
Robert W. Stevens,
by Fetherstonhaugh & Co.
Attorneys.

Patented May 22, 1951 2,553,988

# UNITED STATES PATENT OFFICE

2,553,988

## GYRATORY CRUSHER

Robert W. Stevens, Montreal, Quebec, Canada, assignor to Dominion Engineering Works Limited, Lachine, Quebec, Canada

Original application November 29, 1946, Serial No. 712,841. Divided and this application February 5, 1947, Serial No. 726,495. In Canada November 18, 1946

4 Claims. (Cl. 241—290)

1

This invention relates to improvements in gyratory crushers in which the crusher-head is gyrated by rotation of an eccentric comprising a cylindrical member rotatable journalled in the frame structure of the crusher and provided with an inclined shaft-receiving bore in which the crusher-head shaft is rotatably journalled.

The present application is a division of my co-pending application Serial No. 712,841, filed Nov. 29, 1946.

The object of the present invention is to provide improved means for mounting and adjusting the bowl assembly with which the crusher head co-operates.

Other objects, advantages and characteristic features, as well as the preferred details of construction, will be apparent from the following detailed description taken in connection with the accompanying drawing in which the single figure is a vertical sectional view of a portion of a crusher embodying my improved bowl mounting and adjusting means.

Referring more particularly to the drawing, 5 and 6 designate, respectively, the main frame and the crusher head assembly of my improved crusher. The crusher head assembly is not shown in all its details since this assembly forms no part of the present invention and may conform to conventional practice. It is preferred, however, that the crusher head assembly be of the type described in my aforesaid co-pending application.

An outwardly directed flange 14 is provided at the upper end of member 5. This member is bored to receive a number of inserts 15 and carries a packing 16 fitted in groove 17. Locking studs 18 extend upwardly through inserts 15 in screw threaded engagement therewith. These locking studs are provided with non-circular lower ends 19 so that they may be turned to jam their upper ends against wearing rings 20 carried by a bowl adjusting ring 21.

Ring 21 comprises outer and inner cylindrical portions 22 and 23 having their upper edges joined by an integral horizontal section 24 provided with tapped openings 25 into which the cap screws 20' are screwed to support wearing ring 20.

The outer cylindrical portion 22 of ring 21 constitutes a dust guard which overlies the outer edge of frame flange 14 in sliding contact with packing 16 and is provided with a circular series of outwardly directed projections 25'. These projections 25' are adapted to be engaged by a ring-turning lever (not shown) which is removably fulcrumed in a fulcrum bearing 26 carried by a bracket 27 which is bolted to frame member 5.

The inner cylindrical portion 23 of ring 21 is provided with a threaded section 29 engaging a correspondingly threaded section 30 of frame

2

member 5. A packing 31 is arranged in groove 32 provided in frame member 5 below threaded section 29 and engages the inner cylindrical portion 23 of ring 21 to exclude dust and foreign material from the interior of said ring. The inner cylindrical portion 23 of ring 21 also carries a plate steel liner 33 suitably fastened thereto.

The locking studs 18, when jammed against the wearing ring 20 carried by the horizontal section 24 of bowl-adjusting ring 21, serve as a ring locking means for securing said bowl-adjusting ring in its different positions of adjustment.

A wear ring 35 of annular form is arranged on horizontal section 24 of adjusting ring 21 and supports the outwardly directed flange 36 of bowl member 37. As viewed in cross section the wear ring 35 presents a convex, toroidal bearing surface 35a engaging and supporting a complementary concave toroidal bearing surface 36a of bowl flange 36.

Flange 36 of bowl member 37 is yieldingly held down on wear ring 35 by the lower ends of compression springs 39 arranged in groups of three each. The outer springs 39 of each group encircles studs 40 which extend through holes 41 in flange 36 and holes 42 in wear ring 35 into tapped openings 43 provided in section 24 of ring 21. The upper ends of the three springs of each group bear against a pressure applying plate 44 which is slidably mounted on the studs 40 beneath the spring adjusting nuts 45 and locking nuts 46. The upper end of the central spring 39 of each group is held in position by a downward projection 47 of plate 44. The openings 41 of bowl flange 36 are made large enough to permit the flange to have a certain degree of tilting or angular movement relative to studs 40.

The intermediate spring 39 of each group is held in place at its lower end by the upper portion of a dowel 49 having its lower portion screwed into a tapped hole 50 provided in adjusting ring 21. The principal functions of dowel 49 are to guide bowl flange 36 and to hold the wear ring 35 down on adjusting ring 21. In this connection it will be noted that each dowel is provided with a hold down flange 50 countersunk in a recess 51 formed by enlarging the upper end of a dowel-receiving opening 52 provided in wear ring 35. It will also be noted that a conical portion 53 of each dowel located immediately above flange 51 is slidably fitted in a complementary conical bore provided in a hardened steel bushing insert 54 carried by bowl flange 36.

Bowl 37 comprises three conical sections 56, 57 and 58 which are stiffened by a plurality of ribs 59 formed integral therewith. The bowl flange 36 is formed as a horizontal continuation of bowl

section 58. The main bowl section 56 is a downwardly and outwardly flaring conical annulus having the lower portion of its inner surface machined to provide a seat 60 for the lower portion of the bowl liner 61. Bowl section 56 and liner 61 are designed to leave an intervening space which is filled with ductile metal 61a to provide a yieldable seat for the liner.

At each of a plurality of points around its circumference bowl 37 is cored out to provide a pocket 63 receiving therein a hook-shaped lug 64 projecting outwardly from bowl liner 61. Each lug 64 is supported on the central portion of a U-bolt 65, the side legs of which extend upwardly through supporting bar 66 and are equipped with adjusting nuts 67 bearing on washers 68 carried by said bar. The ends of bar 66 rest on seats 69 provided at the upper edges of two ribs 59 between which the pocket 63 is formed. Each pocket 63 includes an outer dust excluding wall 70 which prevents dust passing upwardly through the pocket 63 into the spring housing hereinafter referred to.

A cover 71 is preferably secured to bowl member 37 to provide a spring housing 72 enclosing the springs 39. This cover comprises an outer cylindrical portion 73 and an inner cylindrical portion 74 having their upper edges integrally joined to a horizontal connecting portion 75. The lower edge of the outer portion 73 of cover 71 is fastened to the outer periphery of bowl flange 36 by cap screws 76. The lower edge of the inner cylindrical portion 73 of cover 71 is supported on a seat 77 provided at the upper edge of bowl section 57.

The conical section 57 of bowl 37 is an upwardly and outwardly flaring section which provides a hopper from which the material to be crushed is fed into the crushing zone A between the bowl liner 61 and the crusher head assembly generally indicated at 62.

When cover 71 is used the inner cylindrical portion 74 thereof forms a cylindrical side wall extension of the hopper provided by bowl section 57 and is preferably equipped with a removable liner 79.

Having thus described the important characteristics of my invention and a preferred embodiment thereof, it will be understood that various modifications may be resorted to within the scope and spirit of the invention as defined by the appended claims.

I claim:

1. In a gyratory crusher, a stationary frame having an integral internally threaded upper section provided with an outwardly directed flange, a bowl adjusting ring comprising outer and inner cylindrical portions having their upper edges joined to a horizontal section overlying said flange, the inner cylindrical portion of said ring being provided with an externally threaded section in direct screw threaded engagement with the internally threaded upper portion of said frame and the outer cylindrical portion of said ring being disposed to overlie the outer edge of said flange, means for releasably locking said bowl adjusting ring against turning movement relative to said frame structure, a wear ring arranged on the horizontal section of said bowl adjusting ring, a bowl member provided with an outwardly directed flange tiltably supported on said wear ring, studs extending upwardly from the horizontal section of the bowl adjusting ring through openings in the wear ring and the bowl flange, a spring encircling each of said studs and confined in compression between the bowl flange and pressure applying means carried by the upper end of the stud.

2. In a gyratory crusher, a stationary frame, having an integral screw threaded upper portion a bowl adjusting ring in direct threaded engagement with the screw-threaded upper portion of said frame, whereby said ring may be raised and lowered by turning the ring relative to the frame, means for releasably locking said ring against turning movement relative to said frame, a wear ring mounted on said bowl adjusting ring, a bowl member provided with an outwardly directed flange resting on said wear ring, relatively short studs extending downwardly through the wear ring and having their lower ends threaded into openings provided in said bowl adjusting ring, said studs having portions thereof bearing against the wear ring to hold the latter down on the bowl adjusting ring and means for yieldingly holding the flange of the bowl member down on the wear ring comprising a plurality of groups of coil springs, spring positioning studs extending upwardly from the bowl adjusting ring through openings in the wear ring and the bowl flange and through the terminal springs of said groups of springs, pressure applying means carried by the upper ends of the spring positioning studs associated with each group of springs and bearing against the upper ends of all the springs comprising said group.

3. In a gyratory crusher, stationary frame member having an integral, internal screw-threaded upper section provided with an outwardly directed flange, a bowl-adjusting ring comprising outer and inner cylindrical portions having their upper edges joined by an integral horizontal section overlying said flange, the inner cylindrical portion of said ring being provided with an externally threaded section in direct screw-threaded engagement with the internally threaded upper section of the frame member and the outer cylindrical portion of said ring being disposed to overlie the outer edge of said flange, sealing means carried by the outer edge of said flange in sliding contact with the outer cylindrical portion of said ring, locking screws threaded upwardly through the flange of said frame member and adapted to be jammed against the overlying horizontal section of the bowl-adjusting ring, a bowl member provided with an outwardly projecting flange overlying and supported by said bowl-adjusting ring and yieldable pressure applying means bearing against the upper surface of the flange of the bowl member and connected to the bowl-adjusting ring and serving to yieldingly urge the flange of the bowl member downwardly toward said ring.

4. A gyratory crusher as set forth in claim 3, in which the locking screws project below the lower surface of the flange of the frame member and are provided with non-circular lower ends.

ROBERT W. STEVENS.

**REFERENCES CITED**

The following references are of record in the file of this patent:

UNITED STATES PATENTS

| Number | Name | Date |
|---|---|---|
| 1,993,900 | Rumpel | Mar. 12, 1935 |
| 2,110,276 | Rumpel | Mar. 8, 1938 |
| 2,254,425 | Fahrenwald | Sept. 2, 1941 |
| 2,359,987 | Gruender | Oct. 10, 1944 |
| 2,409,391 | Rumpel | Oct. 15, 1946 |