No. 863,284. PATENTED AUG. 13, 1907.

H. I. KEEN.

GYRATORY CRUSHER.

APPLICATION FILED JAN. 30, 1906.

2 SHEETS—SHEET 1.

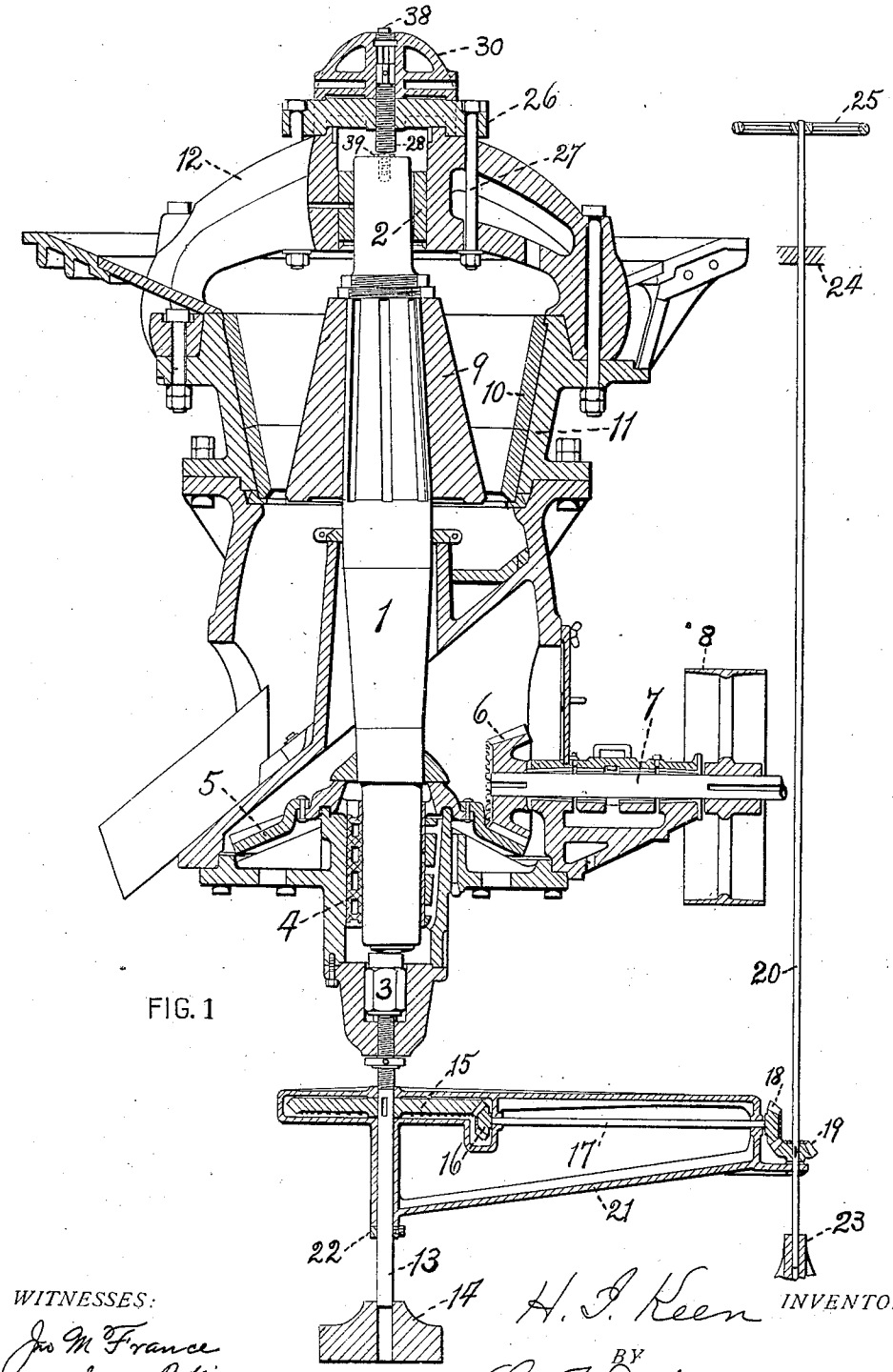


FIG. 1

WITNESSES:

Jno M France

Max Rotter

H. I. Keen INVENTOR

BY

G. F. DeWein ATTORNEY.

THE NORRIS PETERS CO., WASHINGTON, D. C.

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2 SHEETS—SHEET 2.

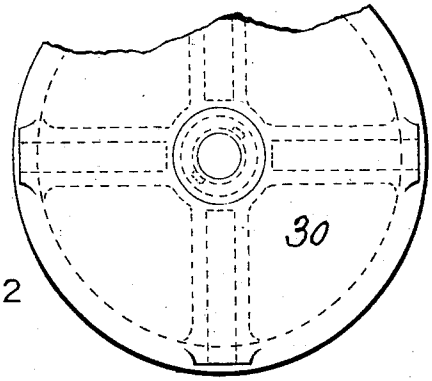


FIG. 2

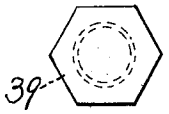


FIG. 5

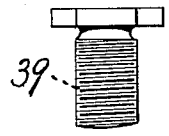
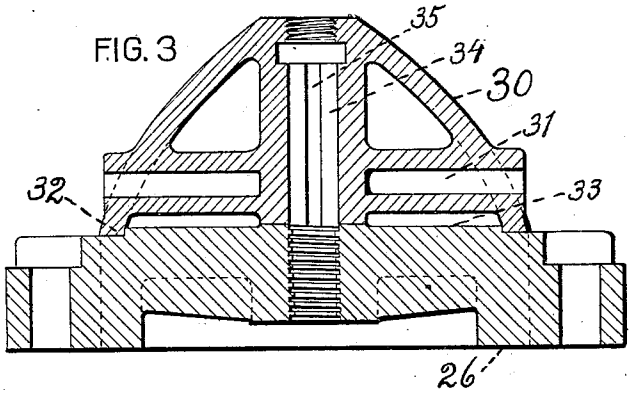


FIG. 6

FIG. 3



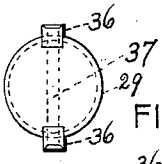


FIG. 7



FIG. 8

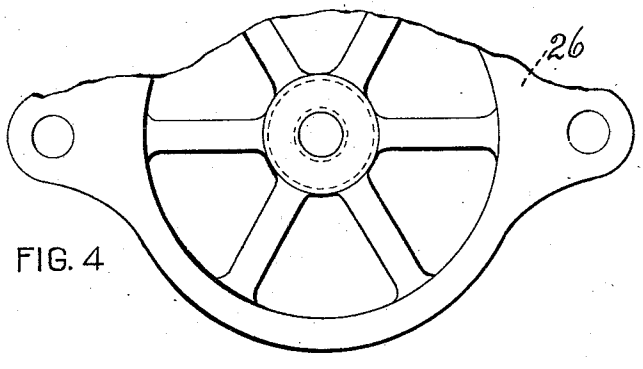


FIG. 4

WITNESSES:

Jno M. France

Max Rotter

INVENTOR

H. I. Keen

BY

G. F. DeWein ATTORNEY.

THE NORRIS PETERS CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HERBERT I. KEEN, OF CHICAGO, ILLINOIS, ASSIGNOR TO ALLIS-CHALMERS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF NEW JERSEY.

GYRATORY CRUSHER.

No. 863,284. Specification of Letters Patent. Patented Aug. 13, 1907.

Application filed January 30, 1905. Serial No. 243,387.

To all whom it may concern:

Be it known that I, HERBERT I. KEEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Gyratory Crushers, of which the following is a specification.

This invention relates to gyratory crushers.

The object of the invention is to provide special means for forcing down the shaft when the head is wedged in the shell or for any other reason.

Figure 1 is a vertical section of a crusher to which my invention is applied. Fig. 2 is a plan view of the dust cap at the top of the machine. Fig. 3 is a vertical section through the dust cap and supporting plate. Fig. 4 is a bottom view of the supporting plate. Fig. 5 is a plan, and Fig. 6 an elevation of the button bolt in the top of the gyratory shaft. Fig. 7 is a plan view, and Fig. 8 is an elevation of the jack screw for forcing down the gyratory shaft.

Referring particularly to Fig. 1, the gyratory shaft 1 is mounted as usual along the approximate vertical axis of the crusher and has an upper bearing 2, and a lower step bearing 3. The shaft 1 is actuated by the eccentric 4 by means of the horizontal bevel gear 5 and pinion 6. Pinion 6 is carried by the counter-shaft 7 operated by driving-pulley 8. The gyratory shaft 1 carries the crusher head 9 which coacts for crushing with the concaves 10 mounted in the crusher shell 11. The bearing 2 is supported by the spider 12 which is mounted upon and bolted to the crusher shell 11.

Thus far the specific description above is of a device well known in the art as the Gates' crusher. The wedging of the gyratory shaft and head takes place between the head 9 and the concaves 10.

Any means of quickly adjusting the step bearing 3 may be used in connection with my invention. Preferably, a means is to be used operable from near the upper level of the crusher. I have shown by way of illustration a lighter-screw 13 extending downwardly and provided below with a guide 14 within which the screw slides during adjustment. Upon the lighter-screw 13 is keyed a bevel gear 15, meshing with a pinion 16, on shaft 17. At the outer end of shaft 17 is a bevel pinion 18, in mesh with a bevel pinion 19, on a vertical shaft 20. The pinions 16, 18, 19 and the shafts 17, 20, are supported from a skeleton frame-work 21 loosely mounted on the lighter-screw 13, and prevented from vertical motion relative thereto by a collar 22 fast to the lighter-screw 13, and on which the parts are supported. The frame-work 21 is prevented from rotating about the lighter-screw 13 by the shaft 20 which is mounted to slide in guide 23 and upper deck 24. An operating hand wheel 25 serves as a means of manual application of power to operate the step bearing adjusting means. The hand wheel 25 is located adjacent the upper end of shaft 1.

The superstructure of the crusher includes the spider 12, and referring to Figs. 2 to 8 inclusive, the means more particularly embodying my invention are disclosed. Upon the spider 12 is mounted plate 26 fastened thereto by bolts 27. A jack-screw 28 is threaded through plate 26 with its head 29 extending above the plate. The jack screw 28 forms a step bearing for the upper end of shaft 1. Upon the plate 26 is positioned the dust-cap 30. The dust-cap is manually rotatable by any convenient means as by bars inserted in radial bores 31. The cap 30 is cored out and has its circumferential edge 32 overlapping a circular elevated portion 33 of the plate 26. The dust-cap 30 is bored vertically 34 and at opposite sides of the bore are slots 35. The head 29 of the jack-screw 28 fits the bore 34 of the dust-cap 30 and is slidable vertically therein. It also has two opposite slots formed therein in which are rigidly mounted two splines 36 by riveting 37. The splines 36 of the head 29 of the jack-screw 28 coact with the slots 35 in the bore 34 of the dust-cap 30, and when the dust-cap is rotated, the screw is rotated. The upper end of the bore 34 is closed by an ordinary pipe plug 38. The jack-screw 28 may contact at its lower end with a button-bolt 39 screwed into the upper end of the gyratory shaft 1. The jack screw 28 is adjusted by the dust cap 30 operable from a location adjacent the end of the shaft 1. The hand wheel 25 is operable from the same location. The operator can operate the adjusting means for both the upper and lower step bearings without changing his location adjacent the upper end of shaft 1.

The operation is as follows: When the crusher becomes clogged by any substance wedging between the head 9 and the concaves 10, the step-bearing is quickly dropped by turning the hand wheel 25 in the proper direction. Power is thus communicated through the gearing to the lighter-screw 13 which unscrews and allows the step-bearing 3 to descend away from the gyratory shaft 1. A bar is then inserted in the radial bores 31 of the dust-cap 30, and operated to turn the cap, and thus by means of the slots 35 and splines 36, the jack-screw 28 is turned and in such direction as to contact with the button bolt 39 in the end of the gyratory shaft 1, and force the shaft 1 and its attached head 9 down, thus releasing the substance wedged in the crusher and allowing it to be removed. The jack-screw 28 is then returned to its former position by turning the cap 30 in the opposite direction, and the shaft 1 and head 9 raised by forcing up the step-bearing 3 by reversing the operation on the hand-wheel 25.

In accordance with the provisions of the patent stat-

utes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire it to be understood that the apparatus shown is merely illustrative and that the invention can be carried out by other means.

What I claim is,—

1. In a gyratory crusher, a shaft, a lateral bearing for the end of the shaft, means for forcing the shaft down, and a dust cap covering and operating said means.

2. In a gyratory crusher, a shaft, a spider for the upper end of the shaft, a plate covering the spider hub, a jack screw threaded through the plate for forcing down the shaft, and a dust cap for turning the screw and shedding debris away from the same.

3. In gyratory crusher, a shaft, a spider for the upper end of the shaft, a plate covering the spider hub, a screw extending through the plate for forcing the shaft down, and a cap recessed underneath for coaction with the screw for operating the same, the cap also serving to keep dust away from the screw and spider bearing.

In testimony whereof I affix my signature in presence of two witnesses.

HERBERT I. KEEN.

Witnesses:
MAX W. BABLE,
VICTOR KURZ.