

(No Model.)

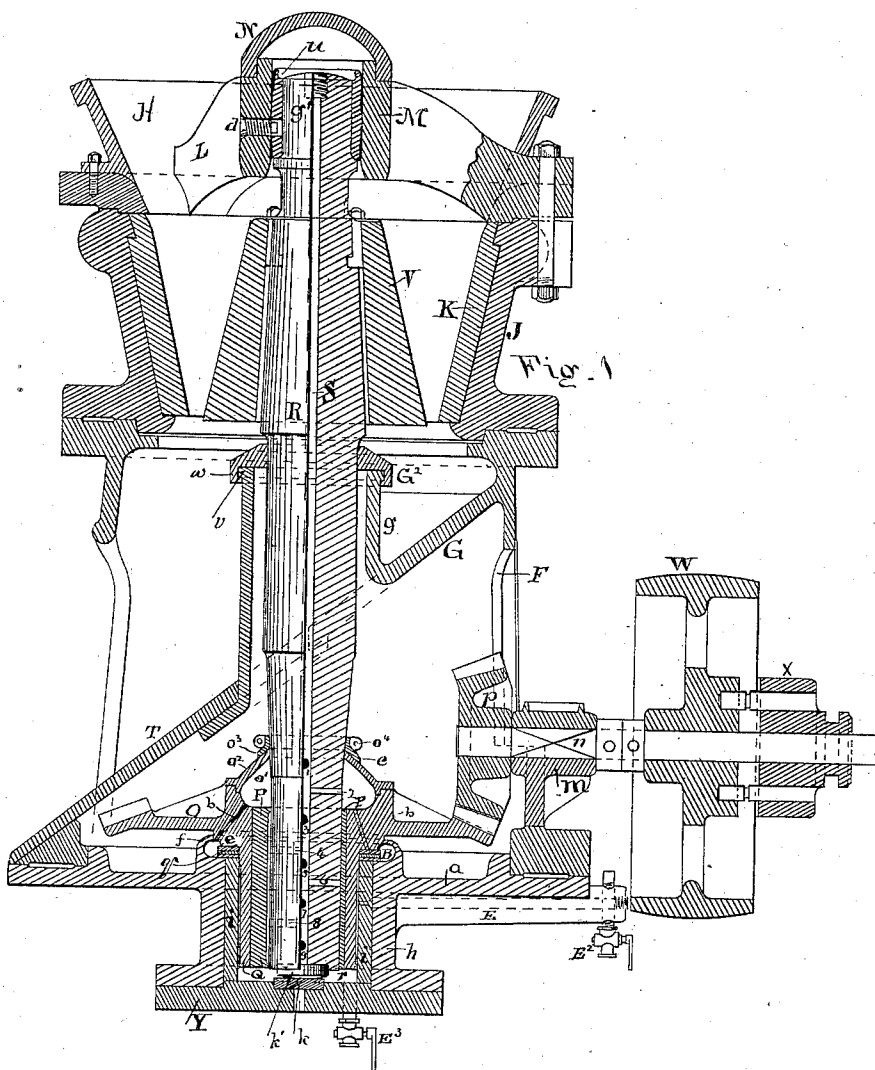
3 Sheets—Sheet 1.

D. R. FRASER.

ROCK AND ORE CRUSHING MACHINE.

No. 313,818.

Patented Mar. 10, 1885.



Attest.

J. C. Turner
W. Chapman

Inventor

David P. Fraser
By his Attorney
R.D. Juntz

(No Model.)

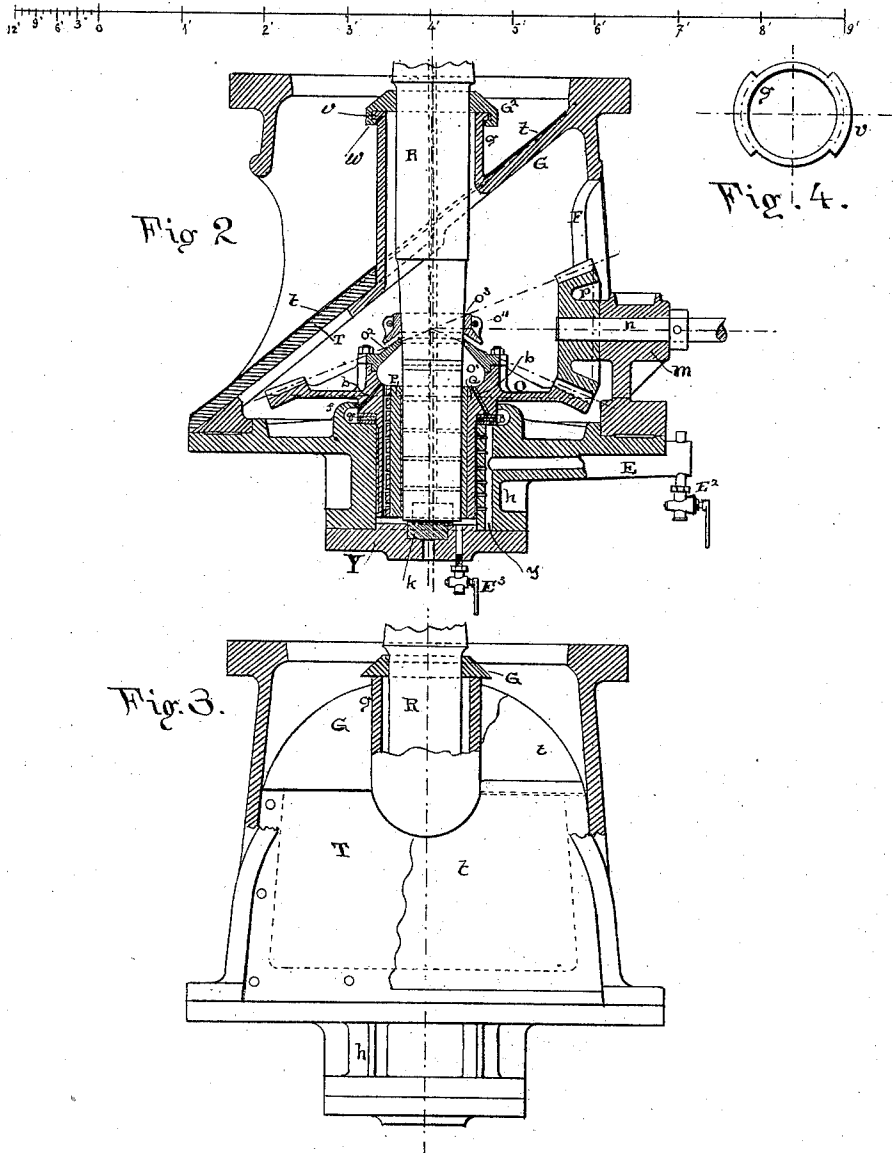
3 Sheets—Sheet 2.

D. R. FRASER.

ROCK AND ORE CRUSHING MACHINE.

No. 313,818.

Patented Mar. 10, 1885.



Attest

J. C. Turner
W. E. Chappin

Inventor

David R. Fraser
By his Attorney
R. D. Smith

(No Model.)

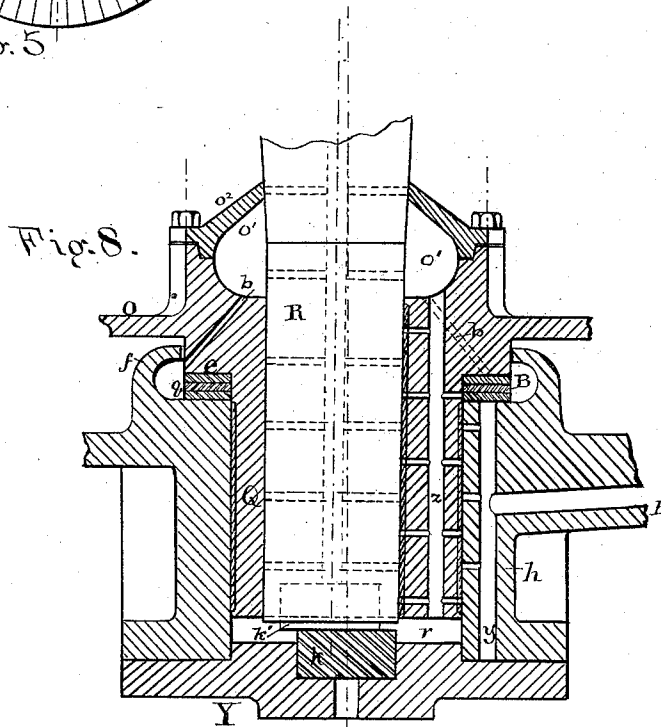
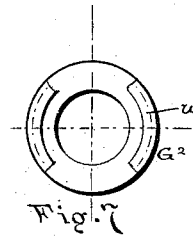
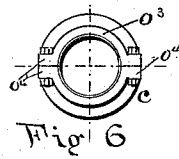
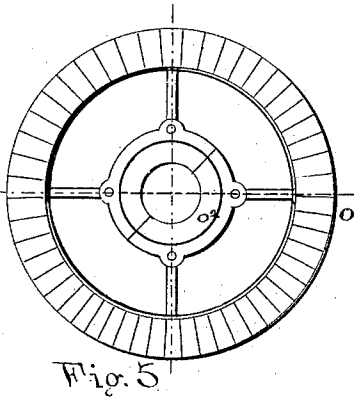
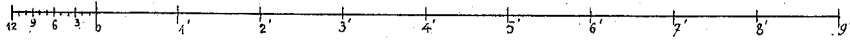
3 Sheets—Sheet 3.

D. R. FRASER.

ROCK AND ORE CRUSHING MACHINE.

No. 313,818.

Patented Mar. 10, 1885.



Attest
J. C. Turner
W. B. Chapin

Inventor
David R. Fraser
By his attorney
R. D. Smith

UNITED STATES PATENT OFFICE.

DAVID R. FRASER, OF CHICAGO, ILLINOIS.

ROCK AND ORE CRUSHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 313,818, dated March 10, 1885.

Application filed October 29, 1884. (No model.)

To all whom it may concern:

Be it known that I, DAVID R. FRASER, of Chicago, in Cook county, Illinois, have invented new and useful Improvements in Rock and Ore Crushing Machines; and I do hereby declare that the following is a full and accurate description of the same.

My invention relates to that class of crushers wherein there is a concave bed and a gyrating breaker-head; and it relates, first, to the structure of the frame and chute; second, to the bearing for the head of the gyrating spindle; third, to the provision for lubricating the bearings.

In the accompanying drawings, Figure 1 is a vertical central section of my machine. Fig. 2 is a similar section of the lower part, showing a slight modification. Fig. 3 is a front elevation of the lower part, partly in section. Figs. 4, 5, 6, and 7 are details. Fig. 8 is an enlarged section of the spindle-step.

The frame is made in two parts, J and F, which are fitted and bolted together. The upper part, J, contains the breaker-segments K, which are removable when worn or broken, and is surmounted by hopper H, which is provided with the spindle-head box M, supported on said hopper by the three arms L. The lower section, F, is provided with the inclined diaphragm G and sleeve g, cast integral with section F, and thereby the fitting and securing of separate pieces of irregular form are avoided, and also the pressure of joints in which particles of ore will lodge and be lost. The diaphragm is made integral with the frame, and adds strength and stiffness to the same. When the diaphragm G is extended entirely across the section F, as has heretofore been done, so as to constitute a complete chute for the crushed mineral, it prevents access to the main wheel O, whereby motion is communicated to the gyrating spindle R and breaker V, which is carried thereon. I therefore do not extend said diaphragm entirely across the frame, but leave an opening on the front or lower side, which I close with the removable plate T, which may be made of cast-iron; and, to increase the durability of the diaphragm G and plate T, a covering or skin, t, of boiler-iron, may be employed. The base-plate a is securely bolted to the section F, and at its center it is provided with the hub h and

the bottom plate, Y. The hub h is bored out true, and is fitted with a bushing, i, which constitutes the bearing for the hub Q of the main bevel-wheel O, though said bushing may be dispensed with without changing the operation of the machine. The hub Q is hollow, and is also bored out true and concentric with the axis of said wheel, and is fitted with a bushing, P, in which there is bored an eccentric bearing for the bottom of the gyrating spindle R. This bearing is slightly inclined to the vertical, so that its axis will intersect the axis of said wheel at a point within the box M where the spindle R has its upper bearing. On the bottom plate, Y, I place a wearing-plate, k, for the step for the spindle R. A corresponding wearing-plate, k', is inserted in the end of the spindle. At the rear side of the frame there is a pillow-block, m, secured to the frame, and bored for a bearing for the counter-shaft n, on which are placed the pulley W, with its clutch x, and the pinion p, which is in mesh with the wheel O. The upper end of the spindle has sometimes been provided with a spherical journal and sometimes with a tapered bearing-wrist gyrating in a cylindrical bearing-box. My improvement differs from these in having a cylindrical journal fitted to a cylindrical box, free to gyrate in the frame, whereby I make the bearing cheap, durable, and easily repaired by substituting a new box for a worn one. Therefore the upper journal or wrist of the spindle R is made cylindrical, and the bearing bush or box u is properly fitted thereto. The exterior surface of the box u is fitted to the frame-box M at one point of its length, but is free at all other points by being made tapering. Thereby the revolving motion of the spindle is in its long-surfaced bearing in the box u, and the limited gyrating motion is between said box and the box M. A pin or screw, d, inserted through the box M into the box u prevents said box from revolving with the spindle. The outer edges of the box u are extended upward, to form a cup to retain the lubricating-oil, and the whole is covered by a cap, N, which prevents the entrance of dust, dirt, or water.

Between the shoulder e of the hub Q and the end of bush i, I place two or three wearing plates or washers, g, which sustain the weight

of the wheel O, and also afford easy means for adjusting its height and mesh with the pinion *p*.

At the upper end of the hub *h* there is a flange, *f*, preferably turned over inward at its upper edge and fitted to the side of the hub Q, so as to constitute a closed channel, B, to receive and distribute the lubricant to the wearing-surfaces of the hub Q. There is also an oil-receptacle, *o'*, at the top of the wheel O, constituted by the upwardly-extended edges of the hub Q and the cap *o''*, which is secured in place and to the spindle R, and closed at its top by the leather collar *c*, and a divided strap-clamp, *o'''*, having ears *o''''* for bolts to unite the parts of said strap. Holes *b b* permit the oil to flow from the chamber *o'* to the chamber B and the hub-bearing. The spindle R has an axial perforation, S, whereby oil may pass from its upper end down to the bearings at the lower end, and transverse perforations 1 2 3 4 5 6 7 8 9, (shown in Fig. 1,) more or less in number, are made to permit the oil to escape from the perforation S to the wearing-surfaces, and when the perforation S is filled with oil the pressure of the liquid column will force oil through the transverse perforations and insure the proper lubrication of the wearing-surfaces, and if the pressure of the liquid column is insufficient a box may be attached to the upper end of the spindle, which is threaded, as at *g'*, for that purpose, and a pump may be applied with any pressure required. The action of the machine of this kind is so violent that the wearing-surfaces require lubrication more freely than is required by machines of ordinary duty, and it is also desirable to store and return to the bearings the partly-worn oil. For this purpose I provide the chamber *r* at the bottom of the hub *h*, and provide a draw-off cock, *E''*, whereby all the free oil may be drawn off. A lateral inlet, E, is also provided, through which air may be admitted to facilitate the exit of the oil, and to force it out, if necessary, by air under pressure. The top of the sleeve *g* is closed by a cap, *G''*, through which the spindle R passes. Interlocking lugs *v w* prevent said cap being lifted by the stone or mineral becoming jammed in passing down the chute.

In Figs. 2 and 8 modifications of the hub of wheel O and the oil-dispensing ducts are shown. In Fig. 2 the bushing *i* is dispensed with, and a vertical hole, *y*, intersecting the duct E, is bored in the hub *h* and connected with the wearing-surfaces of the hub Q by several holes, as shown. In Fig. 8 both bushings *i* and P are dispensed with, the wheel O turning directly in the socket in *h*, and the

spindle turning directly in its socket of the wheel O. Said wearing-surfaces may be bab-bitted, if desired. A vertical oil-hole, *z*, extends from the chamber *o'* to the space *r*, with lateral holes extending therefrom to the wearing-surfaces, as shown.

Having described my invention, I claim as new—

1. The frame-section F of a gyrating stone-breaker, provided with the inclined partial diaphragm G, having the sleeve *g*, and cast integral with said frame-section, combined with the removable plate T, whereby the chute is completed and the wheel O made easily accessible.

2. The gyrating spindle R, provided with a cylindrical journal or wrist at each end, and the wheel O, having the eccentric bearing for the lower end of said spindle, combined with the box M, and the bearing-box *u*, fitted to the upper end of said spindle, and adapted to gyrate in said box M, as set forth.

3. The stationary box M, combined with the box *u*, having the interior cylindrical bearing, and adapted to gyrate in said box M, the pin *d* to prevent rotation of said box *u*, and the gyrating spindle R, substantially as set forth.

4. The box M and spindle R, combined with the box *u*, provided with a cylindrical perforation fitted to the cylindrical wrist of the spindle R, its upper edges extended upward to constitute an oil-cap, as set forth, and with its diameter slightly smaller at its upper than at its lower end, and thereby adapted to rock and gyrate in the box M, as set forth.

5. The wheel O, provided with the oil-chamber *o'*, and the internal bushing, P, provided with an eccentric bearing for the lower end of the spindle R, combined with the oil-chamber B in the upward extension of the hub *h*, and the spindle R, with a longitudinal perforation, S, and transverse outlets 1 2 3 4 5 6 7 8 9, whereby oil received at the top of the spindle is delivered to the wearing-surfaces at and near its bottom.

6. The wheel O, combined with the hub *h*, provided with a hollow flange, *f*, fitted at its upper end to the side of said wheel O, and thereby constituting an oil-chamber, B, substantially as and for the purpose set forth.

7. Combined with the spindle R, the wheel O, provided with the cap *o''*, collar *c*, and clamp *o'''*, to constitute a tight oil-chamber, *o'*, around said spindle, as set forth.

DAVID R. FRASER.

Witnesses:

PAUL BLATCHFORD,
WM. D. McILVAINE.