No. 693,580. Patented Feb. 18, 1902.

W. R. YOUNG.

ROCK CRUSHER.

(Application filed May 31, 1901.)

(No Model.)

Fig. 1.

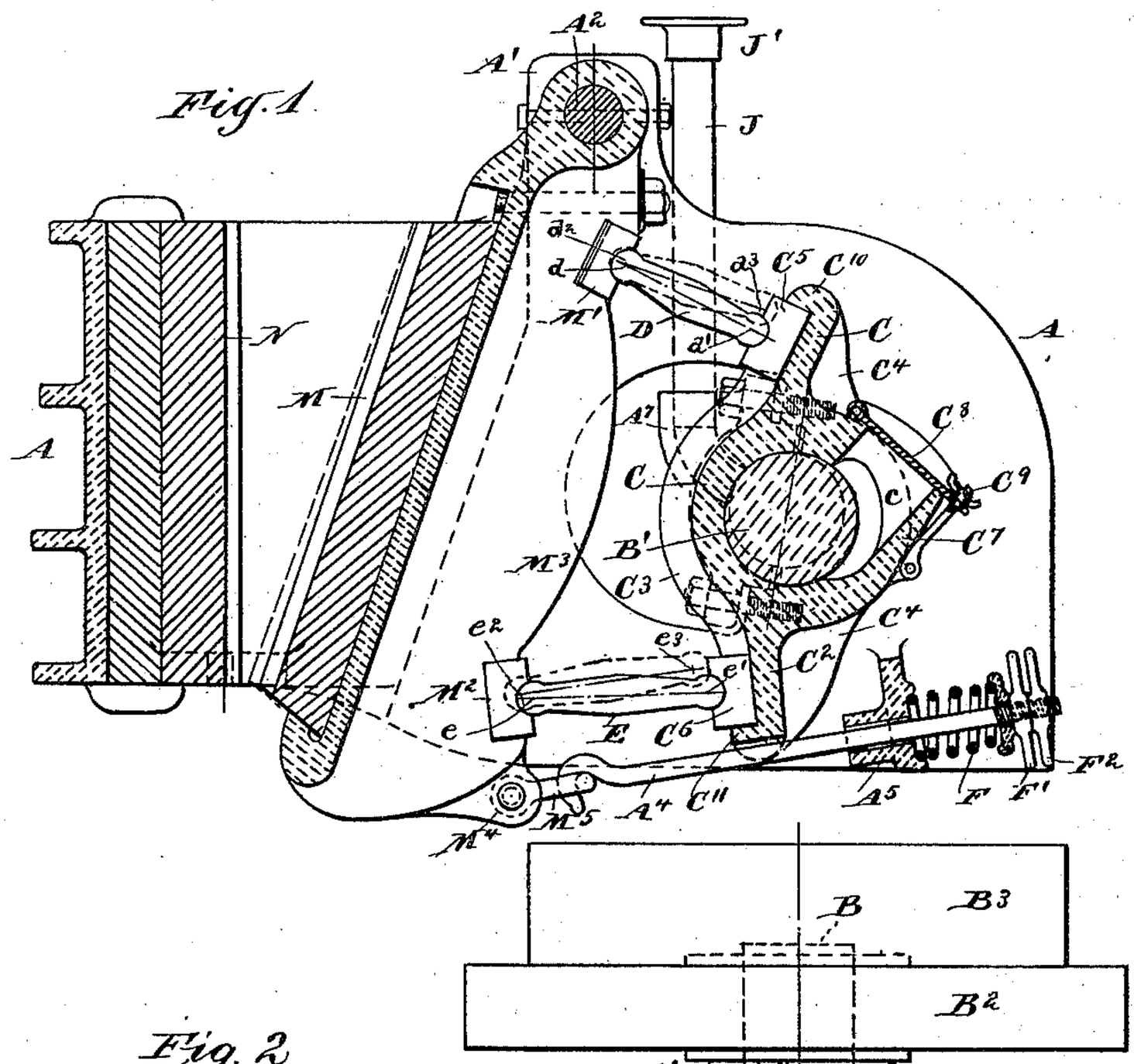

Fig. 2.

Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM R. YOUNG, OF BROOKLYN, NEW YORK.

ROCK-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 693,580, dated February 18, 1902.

Application filed May 31, 1901. Serial No. 62,525. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. YOUNG, a citizen of the United States, residing in the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Improvement in Rock-Crushers, of which the following is a specification.

The improvement is in crushers of the swing-jaw type; and the invention relates to the mechanism for imparting motion to the movable jaw.

The object of the invention is to provide a construction in which the working strains shall be better distributed and resisted and which shall be light and extremely strong, occupy little space, and allow easy access to the working parts.

The invention consists of a frame containing a fixed jaw and a swing-jaw suspended on a transverse shaft. The swing-jaw is operated by an eccentric on a transverse shaft and an eccentric-block of peculiar construction carried loosely on the eccentric and communicating motion to the swing-jaw by a novel arrangement of thrust-plates. The eccentric-block has two oppositely-extending arms reaching outwardly and serving as abutments for two thrust-plates, one on each side of the shaft, extending to two separated thrust-blocks on the swing-jaw. One plate exerts its force near the jaw-shaft and the other nearer the free end of the jaw. The revolutions of the eccentric correspondingly move the eccentric-block and cause the thrust-plates to swing the jaw. The difference in the lengths of arcs described by the two points of contact is equalized or permitted by a partial rotation or reverse movement of the eccentric-block on the eccentric at each advance of the jaw.

The invention also consists in certain details of construction and arrangement of parts to be hereinafter described.

The accompanying drawings form a part of this specification and show the invention as I have carried it out.

Figure 1 is a longitudinal vertical section through a crusher constructed in accordance with the invention, and Fig. 2 is a corresponding plan view.

Similar letters of reference indicate the same parts in both figures.

A is the main frame, comprising two side portions joined at the front and supporting the fixed jaw N.

A′ A′ are upwardly-extending lugs on the side frames, in which is keyed the shaft A^2, on which the swing-jaw M is carried with freedom to oscillate.

A^3 A^3 are bearings for the main shaft B, carrying on its overhung end the balance-wheel B^2 and pulley B^3 and having an eccentric B′ occupying the space between the side frames.

The eccentric-block is marked C. The main portion is cylindrical and has two outwardly-extending wide arms C′ C^2, one above and the other below, strengthened by the ribs C^3 on the forward face and by the rear ribs C^4. Each arm carries a thrust-block near its outer edge, the upper marked C^5 and the lower C^6, and on the rear face of the cylindrical portion of the eccentric-block is a swell C^7, forming a large recess or pocket *c*, provided with a hinged cover C^8 and locking means C^9 therefor. The pocket serves as a liberal passage through which grease or other lubricant may be supplied to the inclosed eccentric.

Near the upper part of the swing-jaw at the rear is a thrust-block M′, opposite to the thrust-block C^5, and between them lies the upper thrust-plate D. Near the bottom of the swing-jaw is another transverse thrust-block M^2, opposite the lower thrust-block C^6, and between them is the lower thrust-plate E. The swing-jaw is stiffened by the usual ribs M^3, which are cut away to form suitable supports for the thrust-blocks, and the ribs C^3 on the eccentric-block are similarly recessed and, with the flanges C^{10} C^{11}, serve as seats for the eccentric thrust-blocks C^5 C^6. At the lower rear portion of the swing-jaw is an eye M^4, carrying a loop M^5, in which is engaged the hook of a spring-rod A^4, extending rearwardly through a spring-bar A^5, serving as an abutment for a strong spring F, the tension of which is adjusted by hand-nuts F′ F^2, as usual, and serves the usual function of retracting the swing-jaw.

The ends of the thrust-plates are semicylindrical and are received in correspondingly

smoothly rounded recesses in the several thrust-blocks.

It will be observed that the eccentric-block C is free to assume any position required by the action of the eccentric in forcing the swing-jaw forward against the resistance of the spring F. The swing-jaw is held at the line of oscillation only, and the difference in the lengths of the arcs described by the thrust-blocks M′ M² is equalized by the movement of the eccentric-block, the upper arm C′ receding and the lower arm C² correspondingly advancing, as will be understood. The extreme positions are shown by the full and dotted outlines of the thrust-plates D and E in Fig. 1. The full lines show the condition when the jaw is in the retracted position. The forward center of the rounded end of the upper plate is marked *d* and rear center *d′*. The forward and rear centers of the lower plate are marked, respectively, *e* and *e′*. When the eccentric is turned to the extreme in forcing the swing-jaw forward, the centers of the upper plate move to the new positions indicated by d^2 d^3 and the lower plate to e^2 e^3.

In practice the point of greatest strain in each forward movement of the jaw may be at any portion of its face, depending upon the size and location of the piece of rock offering the greatest resistance. In my improved construction such strains are always between the lines of the upper and lower thrust-plates and the eccentric-block shifts itself to the position at which the strain is proportionately divided, and the arms are so proportioned and the thrust-blocks so placed as to present the plates as nearly as possible in the lines of strain.

Large openings are provided in the side frames, through which the main shaft passes, and the semicircular bearings for the shaft are arranged at an angle calculated to best receive the strains and relieve the caps A⁶ A⁶.

The entire rear portion of the frame is open, the usual end frame being unnecessary, and therefore omitted, thus allowing easy access to the eccentric-block and other portions and greatly simplifies the labor of assembling the crusher or the removal and introduction of parts.

J J are large tubes extending above the side frames and closed at the upper ends by suitable caps or covers J′ J′. The lower ends are screwed into swells A⁷ A⁷ on the main bearings and communicate through liberal passages to the shaft within. They serve in receiving and supplying lubricant to the bearings and are sufficiently above the frame to be easily accessible without danger of accident to the attendant, and the open ends are also less exposed to the dust and grit than would be the case if ordinary grease-passages were employed.

Modifications may be made in the forms and proportions of the several parts in constructing various sizes of crushers or in adapting the invention for service in reducing various qualities of rock or ore.

I claim—

1. In a rock-crusher of the character set forth, a movable jaw, a shaft and an eccentric thereon, an eccentric-block loosely mounted on the latter, oppositely-extending arms on said block, and thrust-plates extending from said arms to said jaw, all combined substantially as herein specified.

2. In a rock-crusher, a frame and fixed jaw therein, a swing-jaw carried on a shaft in said frame, a main shaft in rear of said swing-jaw and having an eccentric thereon, in combination with an eccentric-block inclosing said eccentric and having oppositely-extending arms thereon, a thrust-block carried by each of said arms, and thrust-plates extending therefrom to correspondingly-separated thrust-blocks on said swing-jaw, all substantially as herein specified.

3. In a rock-crusher of the character set forth, a swing-jaw, a thrust-block on the latter near the line of oscillation, a thrust-block carried by said jaw at a distance from the first, a main shaft in rear of said jaw, an eccentric, an eccentric-block thereon having oppositely-extending arms, and thrust-plates extending from the latter to said thrust-blocks, the said eccentric-block mounted loosely on said eccentric whereby said eccentric-block may move relatively to said eccentric as required in equalizing the difference in lengths of arc described by said thrust-blocks, all combined and arranged to serve substantially as herein specified.

4. In a rock-crusher, a frame, a fixed jaw N, the shaft A² and swing-jaw M thereon, and the thrust-blocks M′ M² on said swing-jaw, in combination with a main shaft B, eccentric B′ thereon, eccentric-block C and its oppositely-extending arms C′ C², thrust-blocks C⁵ C⁶ carried by said arms, the thrust-plates D and E between said arms and swing-jaw, and a spring-rod and its spring serving to retract said swing-jaw, all substantially as herein specified.

5. In a rock-crusher, the frame A open at the rear end, a fixed jaw, a swing-jaw, an eccentric and eccentric-block thereon having the oppositely-extending arms C′ C² and the recess *c* and cover C⁸ for the latter, in combination with thrust-plates extending from said arms to said swing-jaw, all substantially as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

WILLIAM R. YOUNG.

Witnesses:
CHARLES R. SEARLE,
FRED H. ADAMS.