No. 731,866. PATENTED JUNE 23, 1903.

E. DEANE.

STONE BREAKER.

APPLICATION FILED OCT. 15, 1902.

NO MODEL.

Fig. 1.

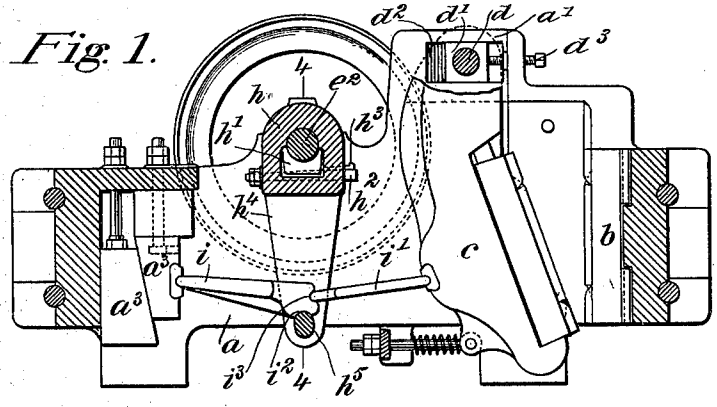


Fig. 2.

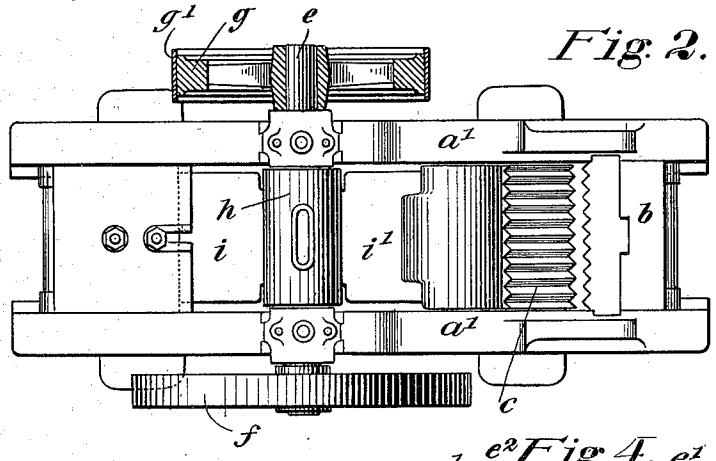


Fig. 3.

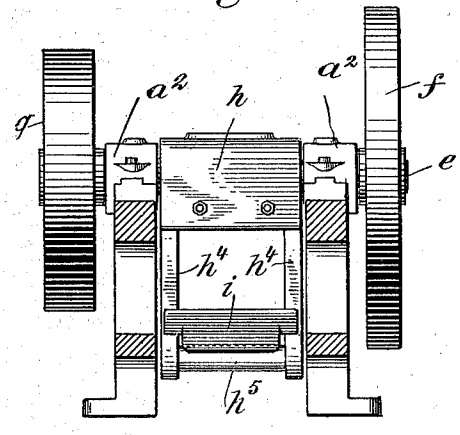
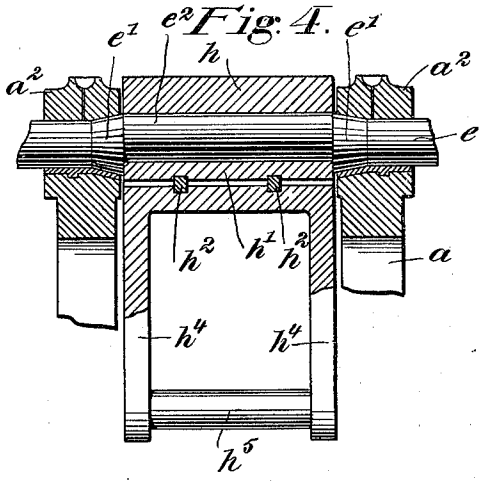


Fig. 4.



WITNESSES:

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No. 731,866. Patented June 23, 1903.

UNITED STATES PATENT OFFICE.

EDWIN DEANE, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO JAMES COX, OF NEW YORK, N. Y.

STONE-BREAKER.

SPECIFICATION forming part of Letters Patent No. 731,866, dated June 23, 1903.

Application filed October 15, 1902. Serial No. 127,357. (No model.)

To all whom it may concern:

Be it known that I, EDWIN DEANE, a subject of the King of Great Britain, residing in the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Stone-Breaker, of which the following is a full, clear, and exact description.

This invention relates to a stone-breaker of that class in which are provided a stationary jaw, a movable jaw swinging toward and from the stationary jaw, and a suitable mechanism for imparting the necessary movement to the movable jaw.

My invention resides in certain improvements in the construction of a crusher of this sort. These improvements reside especially in the means for imparting movement to the movable jaw; and they consist in a peculiarly-constructed crank-shaft carrying a pitman which hangs from the crank-shaft and is of essentially rectangular form, the lower portion being in the form of a horizontal bar which coacts with a peculiarly-constructed toggle, so that as the pitman is raised and lowered the toggle is actuated to impart the necessary movement to the movable jaw.

The invention also resides in a peculiarly-arranged bearing-block for the shaft on which the movable jaw is mounted, this bearing block or box enabling the said shaft to be adjusted toward and from the stationary jaw at will, thus to regulate the degree to which the stone is to be crushed.

This specification is an exact description of one example of my invention, while the claims define the actual scope thereof.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a vertical section of the machine. Fig. 2 is a plan view showing the combined drive and balance wheels in section. Fig. 3 is a rear elevation of the pitman and toggle, showing the frame in section; and Fig. 4 is a section on the line 4 4 of Fig. 1.

a indicates the framing of the crusher, which may be of the usual or any desired form.

b indicates the stationary jaw, and *c* indicates the movable jaw, which are adapted to coact in the usual manner.

d indicates the shaft on which the movable jaw *c* is hung, this shaft extending horizontally across the upper part of the frame and being mounted in boxes *d'*. The boxes *d'* are arranged to slide longitudinally of the machine in guideways *a'*, formed at each side of the frame thereof. Back of the boxes are placed a number of spacers d^2, and working against the front sides of the boxes are adjusting-screws d^3, which press the boxes tightly against the spacers. It is clear that by adding to or subtracting from the number of spacers and by properly adjusting the screws d^3 the position of the jaw *c* with respect to the jaw *b* may be regulated at will, and at the same time a thoroughly solid and effective means for mounting the jaw *c* is provided.

Formed on the frame rearward of the guides *a'* and at each side thereof are the boxes a^2 for the drive-shaft *e*. This shaft extends transversely across the frame and may be provided at one end with a balance-wheel *f*. At the other end the shaft is provided with a balance-wheel *g*, formed of cast metal and covered with a forged plate or hoop *g'*, formed of steel or iron. This band or hoop *g'* enables a driving-belt to be applied directly to the balance-wheel *g*, and, further, it materially strengthens the wheel, so that the crusher may be driven at a high speed without danger of breaking the balance-wheel.

As shown best in Fig. 4, the shaft *e* is provided at the inner portion of each box a^2 with a frusto-conical part or enlargement *e'*, these parts *e'* being concentric to the axis of the shaft, and therefore fitting concentrically in correspondingly-formed portions of the boxes a^2. A wrist-pin e^2 connects the coned ends *e'* and is internally tangent to the periphery of the bases of said ends. As here shown, the wrist-pin is of the same diameter as the shaft. These parts *e'* and e^2 therefore form, essentially, a double crank of small throw. This peculiar construction provides for great strength, and by employing a crank of this character instead of an eccentric-like element the surface friction of the engaging parts is reduced materially.

The pitman comprises a box h, in which is fitted a brass h', secured properly against the cranked portion e^2 of the shaft e by means of wedges h^2 passing transversely of the shaft under the brass. These wedges h^2 are in turn secured in place by keys h^3, which are driven in between the walls of the box h and the wedges h^2, as indicated by the dotted lines in Fig. 1. By means of these keys the wedges or cotters h^2 are fastened securely to the abutment, but nevertheless exert their proper influence on the brass h'. The said brasses h' may be of the usual or any preferred form and are here shown as placed in the lower portions of the boxes, so as to bear on the under side of the cranked portion e^2 of the drive-shaft e. The pitman further comprises downwardly-extending parallel side portions h^4, which lie inside of the frame a and are connected at their lower ends by a cross-bar h^5, these parts h, h^4, and h^5 giving the pitman the rectangular form above referred to. The two members i and i' of the toggle are engaged, respectively, with abutment-blocks a^2 at the rear of the frame a and with the rear side of the moving jaw c. These toggle members are in the form of horizontally-disposed plates dipping downward toward each other, so that the toggle is set by an upward movement of the meeting ends of the toggle-sections. The toggle-section i has a transversely-disposed cavity i^2 therein, which is adapted to receive the upper edge of the bar h^5, and said member i also has a transversely-disposed cavity i^3 in its inner end, this cavity forming a seat to receive the rolling inner end of the toggle-section i'. It will thus be observed that the two members of the toggle are jointed directly without the aid of an intervening part, and by this construction, in connection with the arrangement of the pitman-bar h^5 below the toggle-joint, the power and durability of the machine are very greatly increased.

The operation of the apparatus will be fully understood by persons skilled in the art, and it needs no special description here. The stone is fed to the jaws in the usual manner and the shaft e rotated. The action of the pitman on the toggle causes the moving jaw to be operated toward and from the fixed jaw, and in connection with the toggle action it will be observed that the pitman does not on its upward movement actually set the toggle—that is to say, it does not move the toggle members i i' into actual alinement or plane with each other, but into a position closely approaching this set or alined position. Therefore as the pitman returns or moves downward the weight of the parts c, i, and i' causes the toggle to drop and follow the movement of the pitman.

Various changes in the form, proportions, and minor details of my invention may be resorted to at will without departing from the spirit and scope thereof. Hence I consider myself entitled to all such variations as may lie within the intent of my claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A crank-shaft, comprising a main part, a frusto-conical part disposed concentrically on the main part and joined thereto at its small end, and a wrist-pin joined to the base of the frusto-conical part, said wrist-pin lying eccentrically to the main and frusto-conical parts.

2. A double-crank shaft, comprising main end parts, frusto-conical parts carried respectively thereby and disposed concentrically thereto, the small end of the frusto-conical parts joining the main parts of the shaft, and a wrist-pin extending between the bases of the frusto-conical parts and disposed eccentrically thereto.

3. In a stone-crusher, the combination with the frame, of a fixed jaw, a movable jaw, means for operating the movable jaw, and a drive-shaft for actuating said means, the drive-shaft comprising main end parts, circular enlargements carried respectively thereby and disposed concentrically thereto, said end parts and enlargements having bearing in the frame, and a wrist-pin extending between the adjacent faces of the enlargements and disposed eccentrically thereto and to the said main end parts of the shaft.

4. A stone-crusher, comprising the combination with the frame and stationary jaw, of a movable jaw, toggle members respectively engaged with the movable jaw and with the frame, one of said toggle members having a transversely-disposed cavity in its inner end, said cavity receiving the corresponding end of the other toggle member and the first-named toggle member also having in one side adjacent to said end a second transverse cavity, a pitman comprising a part placed in the second-named cavity, and means for operating the pitman.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWIN DEANE.

Witnesses:
ISAAC B. OWENS,
EVERARD BOLTON MARSHALL.