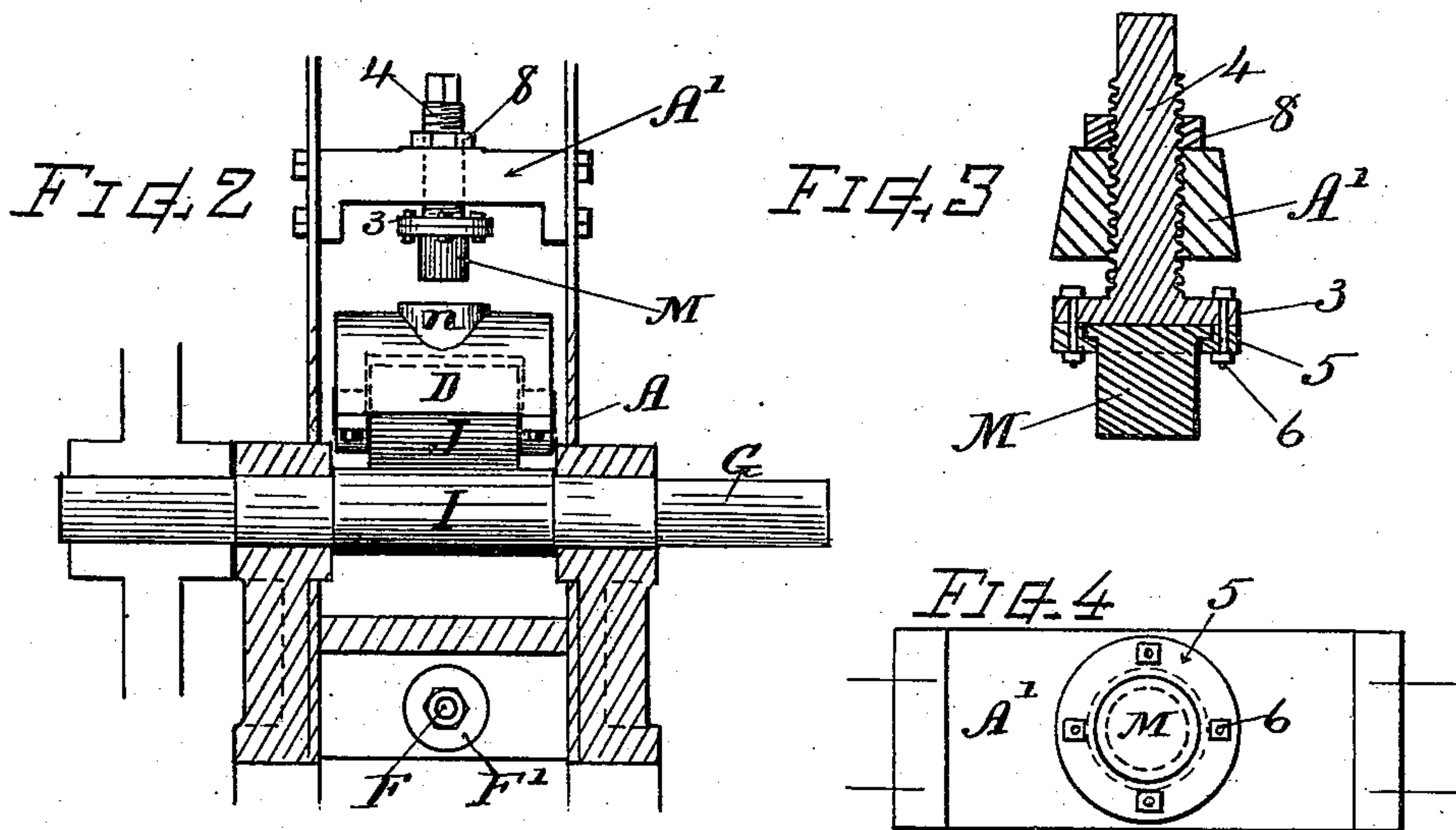


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UNITED STATES PATENT OFFICE.

GEORGE WARNER TAFT, OF KENNETT SQUARE, PENNSYLVANIA.

ROCK-CRUSHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 547,818, dated October 15, 1895.

Application filed April 15, 1895. Serial No. 545,731. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WARNER TAFT, a citizen of the United States, residing at Kennett Square, in the county of Chester and State of Pennsylvania, have invented a new and useful Improvement in Rock-Crushing Machines, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

My present invention relates to means for effecting quick recoil of the actuating-lever in rock-crushing machines of that class wherein a stationary jaw and a movable or swinging jaw are arranged to receive the rock at the top and deliver it broken from the bottom of the space between the jaw-faces and in which the swinging or movable jaw is operated by a vibrating lever pivoted at one end near said jaw and connected therewith by a suitable power transmitting joint or toggle, while the free end of said lever has movement imparted thereto by working in conjunction with a rotating cam, the objects being to render the mechanism more rapidly operative and capable of performing its work with comparative economy in power, while giving high efficiency of action. I attain these objects by the mechanism illustrated in the drawings, wherein—

Figure 1 is a vertical sectional view of a rock-crushing machine with my invention applied thereto. Fig. 2 is a transverse sectional rear view showing the power-shaft, the end of the actuating-lever, and the springs. Fig. 3 is a section, and Fig. 4 a bottom view, of my bump-spring and its adjusting device.

The prime feature of my invention consists in providing, in combination with the vibrating jaw-actuating lever in a rock-crusher of the class named, a bump-spring arranged to act in opposition to the lever-working cam at the outer limit of its throw, said bump-spring serving to arrest the upward momentum of said lever and assist its recoil or return movement without continuing its action thereon or pressing thereon after the change of direction has been effected or when the lever is at its lower position.

My invention also consists in the bump-

spring provided with means for its adjustment in combination with the jaw-actuating lever.

In the rock-crusher, A denotes the main frame, B the stationary jaw, C the swinging jaw pivoted at C', D the jaw-actuating lever pivoted at D', E the toggle, F the jaw-retracting rod, F' the retracting-spring, G the main operating-shaft with the cam I or elliptical swell thereon, and J the antifriction-roller in the end of the actuating-lever, which parts are arranged for operating in well-known or usual manner.

According to my present improvement I provide, in combination with the vibrating jaw-actuating lever D and acting thereon in opposite direction to the throw of the cam I', a bump-spring M, which is disposed above or at the back of the lever, with its engaging end near the outward limit of the action or sufficiently far from the lever to be free from contact, except when the lever is near its outer limit of movement, but so placed as to receive said lever with a bump or impact stroke as it is forced outward by the operating-cam I. Said bump-spring by its yielding resistance overcomes the momentum of the jaw-actuating lever D and imparts thereto a reactive impulse that will start or assist the lever on its return movement after the follower-roll J has passed the swell of the cam, the lever freeing itself or swinging clear of the bump-spring immediately after it has started on its return movement, so that there is no further action of the spring until the lever is again raised. This bump-spring is preferably made, as shown, consisting of a cylinder or block of elastic gum or india-rubber secured to the end or seat-plate 3 of a carrier or screw-threaded column 4 by means of a flanged ring 5, attached thereto by bolts or screws 6. (See Figs. 3 and 4.) The threaded column 4 is supported in a bar A', that extends across and is rigidly secured in the frame A above the actuating-lever D, as indicated in Figs. 1 and 2, or by other suitable means of support. The lever D is fitted with a suitable surface or seat *n* for the reception of or contact with the spring M. The bump-spring M can be adjusted toward or from the lever D by turning the screw-threaded part 4 up or down in the bars A'. The end of the carrier may be fitted

for a wrench or driver to facilitate such adjustment. A jam-nut 8 is arranged on the threaded carrier for binding the parts and retaining their adjustment.

5 The position of the jaw-actuating lever D is not the same in all rock-crushing machines in which a pivoted jaw-actuating lever is employed; but it is obvious that the bump-spring and devices for supporting and adjusting said spring may be varied to accord
10 with the arrangement or position of said actuating-lever or to meet the particular requirements of the individual rock-crushing machine whereon the same is used without departure from the invention, the essential feature of which is a bump-spring in combination with the vibrating jaw-actuating lever and its operating cam in arrangement and mode of operation, substantially as described—that is
15 to say, with the spring disposed at the back of or adjacent to said lever and supported in disconnected relation to the surface against which it impinges and adapted for contact by a bump-stroke in opposition to the throw of
20 the cam for arresting the momentum of said vibrating lever at or near the outer limit of the lever movement.

By the improvement described a more efficient and serviceable mechanism is produced,
30 since the arrest of the momentum of the heavy moving parts comprising the jaw-actuating lever and its roller is effected at the point required and there is no loss or power due to the drag of heavy springs in constant connection.
35

The invention sought to be secured is the mode of operation in this style of crusher, whereby the jaw-actuating lever is controlled for following back upon the cam at high
40 speed without excessive loss of power, the control being by an instantaneous impulse applied at the moment of its requirement, and not a continued retarding force constantly acting upon such lever. This is effected by the spring arranged in disconnected
45 relation to the part against which it exerts its force, as described, and acting only as the cam reaches its outer limit of throw and at an instant when the momentum of the lever and quick movement of the cam would naturally tend to carry the roll away from the face of the cam, in which event it would come back thereon with a thump or pounding action. This combination can be run smoothly
50 at higher limit of rotation. Consequently much greater power and speed and greater efficiency in the working of jaw-crushers of this class are attained, and a larger out-put of product is obtained in a given time and for a
55 given expense as results of the combination; also, high speed of operation can be maintained without liability of breaking springs or derangement in the mechanism. If in any instance preferred, other material than india-
60 rubber can be used for the spring M, and said

spring may be fixed upon the lever to bump against the column or bar, instead of being fixed on the column or bar for the lever to bump against it, the action being substantially the same as described.

What I claim, and desire to secure by Letters Patent, is—

1. In a rock-crushing machine of the character described, the combination, substantially as described, with the movable or swinging
75 jaw, and a vibrating jaw-actuating lever pivoted near said jaw, and connected therewith by a suitable bearing joint or toggle; the cam-shaft, and cam engaging a roller at the free end of said jaw-actuating lever, of a non-
80 movable support near the back of said lever, and a bump-spring between said jaw-actuating lever and support disposed in disconnected relation to the surface against which it impinges; and adapted for contact, and action
85 in opposition to the throw of the cam, by the lever movement, when at the outer limit of its vibration, for the purposes set forth.

2. In a rock-crushing machine of the character described, in combination with the
90 frame, the swinging jaw, the vibrating jaw-actuating lever pivoted adjacent to said jaw and connected therewith by a suitable joint or toggle, and the cam-shaft, and cam operating said lever and crushing jaw; of a support
95 or transom-bar fixed in the frame adjacent to said lever, and a bump-spring arranged upon said support at position for contact with said actuating-lever, in opposition to the throw of said cam, at the outer limit of the lever
100 movement, and means for adjusting said spring toward or from said lever, for the purpose set forth.

3. In a rock-crushing machine, in combination with the vibrating jaw-actuating lever,
105 the operating cam, and the crusher-jaw; a bump-spring arranged in detached relation to said actuating lever at position to receive its stroke near the outer limit of its movement, a carrier for said spring having a threaded
110 body adjustable toward or from said lever, and a support for said spring and its carrier attached to the frame of the machine, substantially as set forth.

4. In a rock-crushing machine the bump-spring composed of india rubber or elastic
115 gum, the spring carrier having a flanged ring embracing said gum-spring, and a supporting column threaded into the frame transom disposed at the back of the jaw-actuating lever,
120 in combination with the jaw-actuating lever, the lever-operating cam, the movable crusher jaw and means for retracting the crusher-jaw, substantially as set forth.

Witness my hand this 8th day of April, 125
A. D. 1895.

GEORGE WARNER TAFT.

Witnesses:

WM. LLOYD LANG,
W. E. VOORHEES.