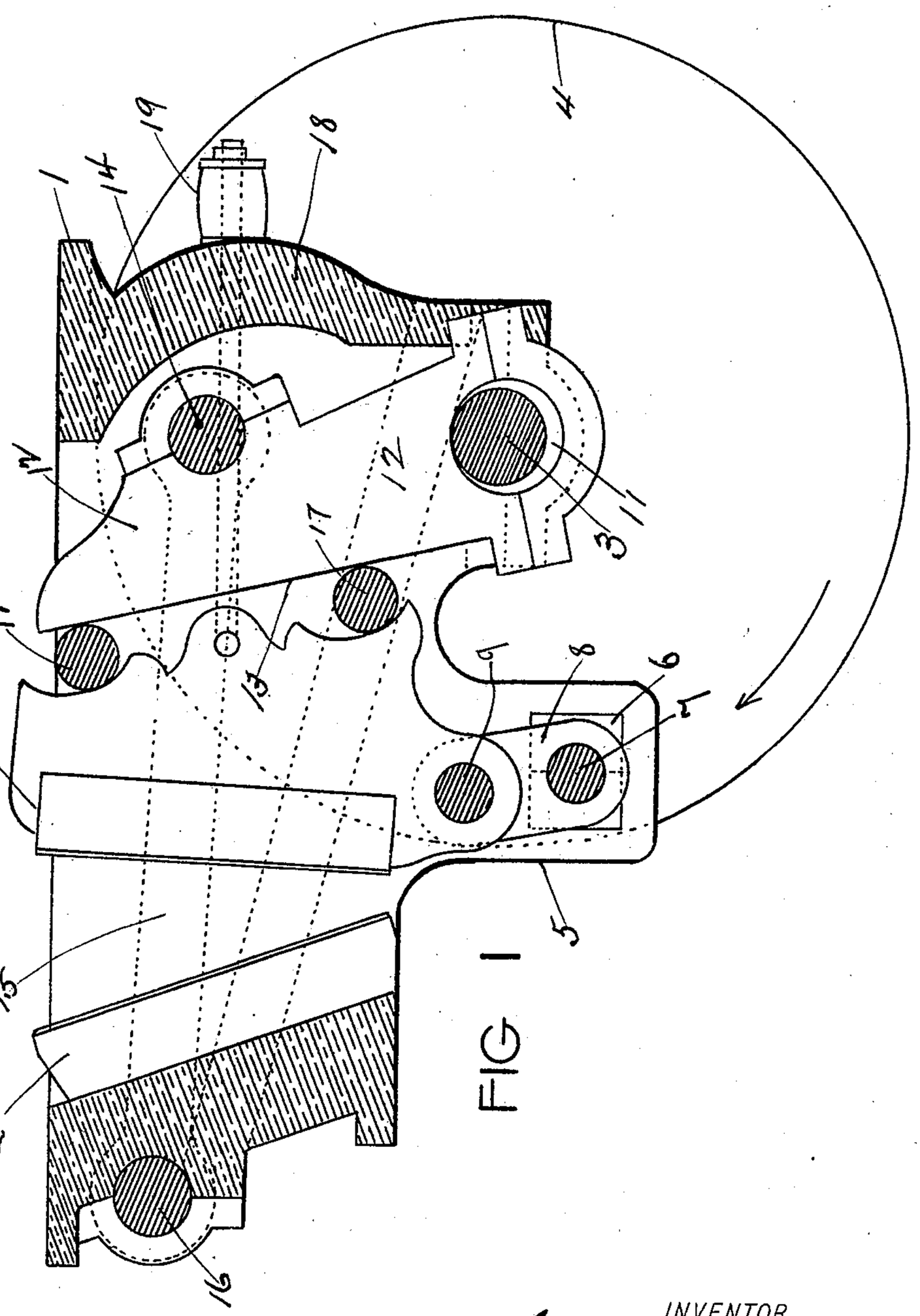
No. 621,755. Patented Mar. 21, 1899.

C. F. HINMAN.

CRUSHING MACHINE.

(Application filed June 19, 1897.)

(No Model.) 2 Sheets—Sheet 1.



FIG

WITNESSES:
Melville L. Moody
Camilla F. Hinman

INVENTOR
Clement F. Hinman.

No. 621,755.

Patented Mar. 21, 1899.

C. F. HINMAN.

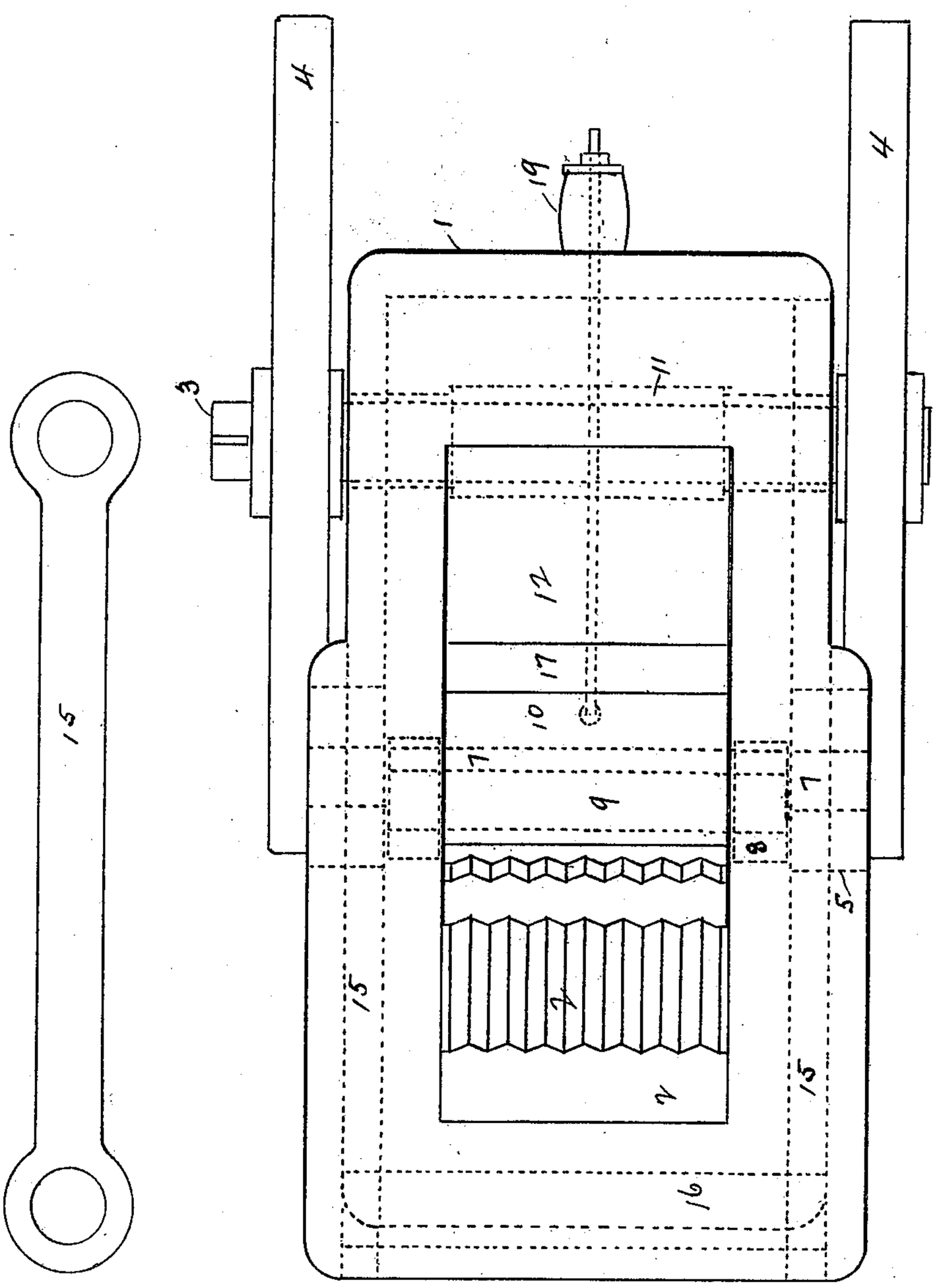
CRUSHING MACHINE.

(Application filed June 19, 1897.)

(No Model.)

2 Sheets—Sheet 2.

FIG. 2.



WITNESSES:

Melville L. Moody

Camilla F. Hinman

INVENTOR

Clement F. Hinman.

UNITED STATES PATENT OFFICE.

CLEMENT F. HINMAN, OF CHICAGO, ILLINOIS.

CRUSHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 621,755, dated March 21, 1899.

Application filed June 19, 1897. Serial No. 641,417. (No model.)

To all whom it may concern:

Be it known that I, CLEMENT F. HINMAN, 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 Crushing-Machines, of which the following is a full, clear, and exact specification.

My invention relates more particularly to that class of crushing-machines employed for crushing rock and similar substances and commonly known as "jaw-crushers," in which are usually employed two jaws—a stationary jaw and a movable jaw, the latter being given alternate propulsive and receding movements, so that the material deposited between the jaws, as in a hopper, is crushed or broken by the impact. My improvements have more especial reference to that species of this class originated by me in which the propulsive action of the movable jaw is effected through the operation of a pitman carrying a wedge or incline and being restrained or resisted on one side by a rocking abutment, while its other or wedge-shaped side is arranged in operative relation to the movable jaw, whereby the movable jaw will receive an oscillatory and bodily movement through the combined leverage and wedging action of the reciprocating vibratory pitman. Claims for the generic invention embodying crushers operating upon this principle constitute the subject-matter of my application for United States Letters Patent, Serial No. 622,485, filed February 8, 1897.

The primary object of my present invention is to reduce the dimensions, particularly the length, of machines constructed upon the principle hereinbefore described without correspondingly reducing their capacity.

A further object of my present invention is to provide the oscillatory and reciprocatory wedge-shaped pitman with an abutment or fulcrum which shall move to an fro with reference to the movable jaw as a result of the pitman's reciprocation.

With these ends in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said object and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawings and more particularly pointed out in the claims.

In the said drawings, Figure 1 is a vertical longitudinal section of a crushing-machine constructed according to my invention. Fig. 2 is a plan view thereof, and Fig. 3 is an end elevation.

My invention comprises a crushing-machine having two jaws, at least one of which is capable of both bodily and oscillatory movement, a reciprocatory and oscillatory member which for convenience in description and illustration I shall term a "pitman" and which is so arranged with relation to the movable jaw that its edge shall act upon the movable jaw both as a lever and a wedge, and a movable abutment or fulcrum for this pitman which moves to and fro with reference to the movable jaw and as a result of the pitman's reciprocatory movement, so that in addition to the wedging and leverage action of the pitman the latter will also crowd against the movable jaw as a result of the travel of the abutment or fulcrum.

Referring now more specifically to the drawings, which illustrate a simple embodiment of my invention, 1 represents the main frame, at one end of which is secured in any suitable manner the fixed jaw 2, while in the opposite end is journaled the main driving-shaft 3, upon which the fly-wheels 4 are detachably keyed, so that the latter may be utilized as ground-wheels in transporting the machine. At about the mid-length of the main frame are a pair of pendants or brackets 5, serving as supports for the journal-bearings 6 of a shaft 7, upon which latter is secured a pair of links 8, whose upper ends are connected together by a shaft 9, constituting a pivotal support whereby the other jaw 10 is made capable of both oscillatory and bodily movement.

Mounted upon or secured to the driving-shaft 3 is an eccentric enlargement 11, and journaled upon this is the aforesaid pitman 12, whose edge 13 on one side is so inclined with reference to the movable jaw 10 as to constitute a wedge, preferably tapering toward its lower end. This inclination or degree of incline of the wedge 13 may be determined either by the location of the abutment or fulcrum of the pitman 12 or by the angularity

of the edge 13 with reference to the line of reciprocation of the pitman. The said fulcrum is constituted by a stud-shaft 14, journaled in any suitable manner in the back of the pitman 12 and connected at each end by one of a pair of links 15, which are carried forwardly, preferably outside of the frame 1, and pivotally secured, preferably to another stud-shaft 16, at the forward side of the frame, so that both jaws and the pitman 12, as well as the portion of the frame against which the fixed jaw 2 takes its abutment, will be tied togther, as it were, by these links and the frame itself relieved of the enormous strain produced between the jaws. It will thus be seen that as the pitman 12 reciprocates it also oscillates by virtue of its fulcrum against the abutment 14, and hence it acts both as a lever and a wedge against the movable jaw 10.

In order to relieve the wear between the wedge 13 and the jaw 10, I interpose a number of antifriction-rollers 17 or other suitable antifriction devices between the wedge and the rear side of the jaw 10, two of such rollers being shown and each being located in a suitably-rounded seat in the back of the jaw to prevent dislodgment. These rollers 17 are also located one on each side of the line of strain between the abutment or fulcrum 14 and the pivotal point 16, so that at no time will the edge of the wedge have a tendency to move out of contact with either of the rollers.

When the pitman 12 is at the limit of its upward stroke, the links 15 are supposed to be horizontal, or, in other words, substantially at right angles to a line passing through the center of the shaft 3 and the fulcrum 14, so that at the commencement of the downward stroke of the pitman, which produces bodily propulsion of the jaw 10, the fulcrum or abutment 14 will be given a bodily movement toward the jaw 10, and this movement will continue until the pitman begins to oscillate. Thus while the pitman is moving downwardly its upper end is being thrown inwardly by the bodily movement of the fulcrum, and its lower end is also being thrown inwardly or toward the jaw 10 by the action of the eccentric 11. In addition to these two movements it receives an oscillatory movement due to the rocking of the pitman on the abutment or fulcrum 14 as a result of the difference in the movements produced by the bodily travel of the abutment and by the eccentric 11, and this oscillatory movement acts as a lever against the jaw 10, while the general downward movement of the pitman, carrying its inner edge at an angle to the general line of its reciprocation, causes a fourth movement or wedging action of the edge 13 against the jaw 10.

In order that the movable jaw 10 may be held up to its place in operative relation to the pitman, I connect the two together by any suitable connection, but preferably by means of a pair of tie-rods 18, whose inner ends are suitably pivoted to the jaw 10, while their outer ends are carried through the frame 1 and held in place with capability of endwise movement by means of rubbers or other cushions 19 of sufficient elasticity to permit the jaw to go through its various movements and of sufficient inertia to pull the jaw back to its place in operative contact with the pitman.

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

1. A crushing-machine having in combination a pair of jaws one of which is capable of bodily and oscillatory movement; a pitman having one edge arranged to form a wedge; a fulcrum or abutment for said pitman movable to and fro with relation to said movable jaw, on an arc curving away from or around said movable jaw; antifriction-rollers interposed between said wedge and movable jaw and bearing thereagainst at points located at all times on both sides of the main line of strain between said fulcrum and the face of the movable jaw, substantially as set forth.

2. A crushing-machine having in combination a fixed jaw, a reciprocating pitman having one edge arranged to form a wedge, a pair of links pivoted to said pitman and having pivotal connection at the opposite side of said fixed jaw, a bodily-movable pivotal jaw arranged between said fixed jaw and pitman and antifriction-rollers located above and below the plane of said links, substantially as set forth.

CLEMENT F. HINMAN.

Witnesses:
F. A. HOPKINS,
EDNA B. JOHNSON.