(No Model.) 2 Sheets—Sheet 1.

C. & F. B. SKINNER.

CRUSHING MACHINE.

No. 591,891. Patented Oct. 19, 1897.

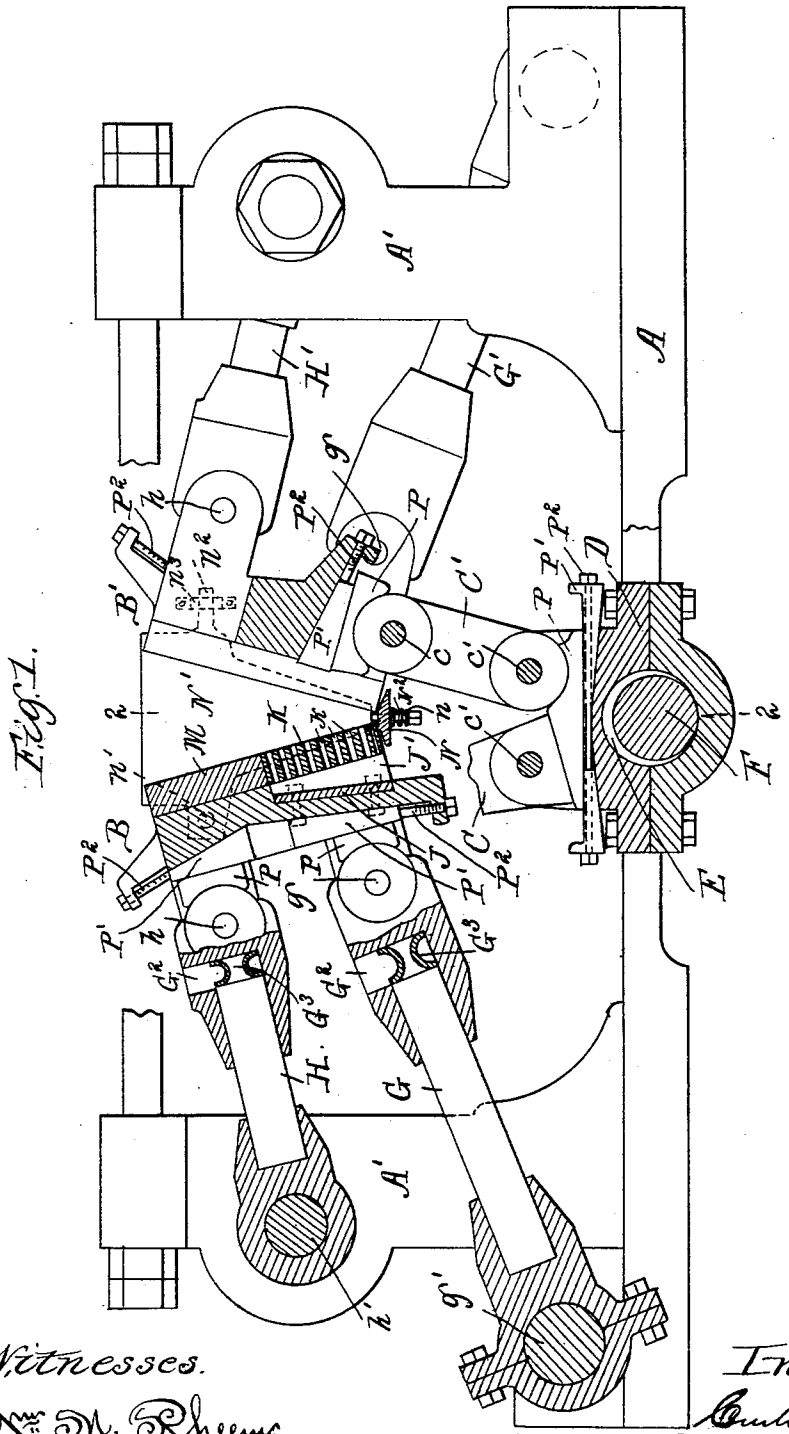


Fig. 1.

Witnesses.
Wm. N. Rheems
Wm. F. Fleming

Inventors:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

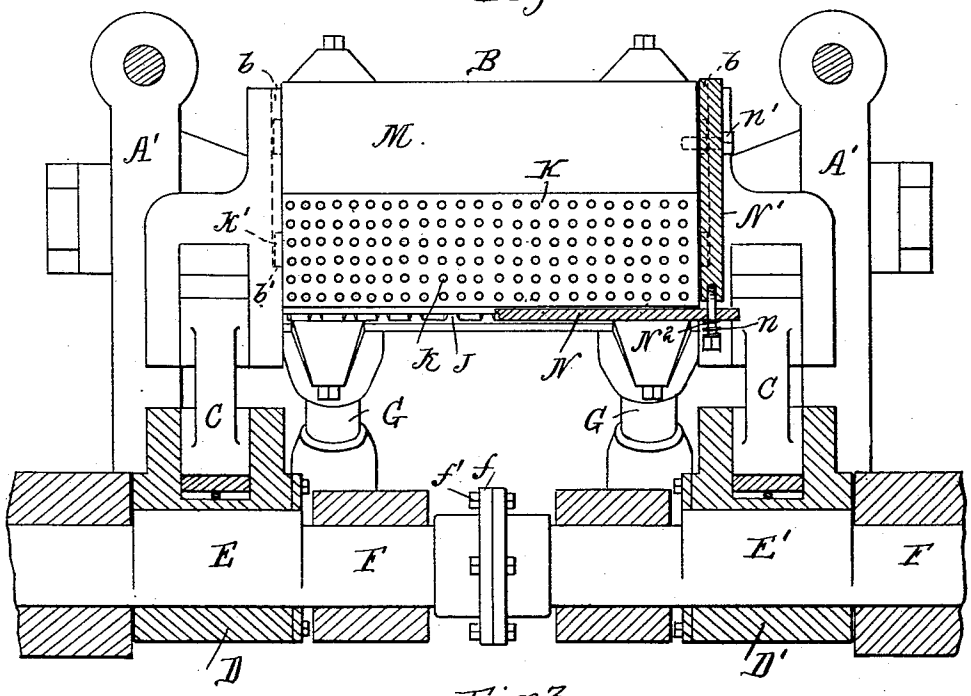


Fig. 3.

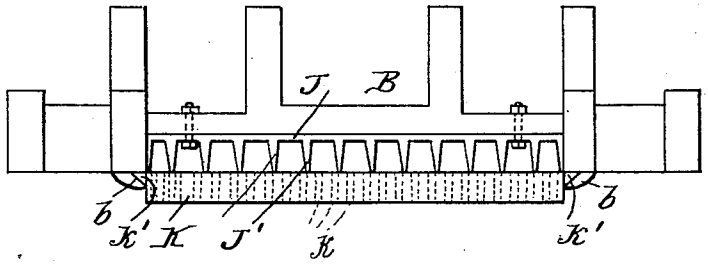
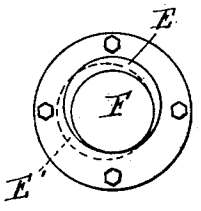


Fig. 4



Witnesses.
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UNITED STATES PATENT OFFICE.

COURTLAND SKINNER AND FANNIE B. SKINNER, OF CHICAGO, ILLINOIS.

CRUSHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 591,891, dated October 19, 1897.

Application filed January 18, 1896. Serial No. 576,037. (No model.)

To all whom it may concern:

Be it known that we, COURTLAND SKINNER and FANNIE B. SKINNER, citizens of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Crushing-Machines; and we declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention has for its object certain improvements in that class of crushing-machines wherein reciprocating jaws are employed to crush the desired substance.

It consists in a combination of devices and appliances, hereinafter described and claimed.

In the drawings, Figure 1 is a vertical section of the apparatus embodying our invention. Fig. 2 is a section with parts in elevation on the line 2 2 of Fig. 1. Fig. 3 is an edge plan of one of the jaws. Fig. 4 is a detail illustrating a variation in the form of the driving-shaft.

In carrying out the invention, A represents the main frame or bed-plate, having suitable uprights A′ engaged thereto.

B B′ represent the main frames or plates of the crushing-jaws, supported vertically by the links C C′, pivoted at *c* to the jaws and pivoted at *c′* to the boxings D D′ on the eccentrics E E′ on the shaft F, both links at one end being pivoted to one boxing and both links at the other end being pivoted to the other boxing.

G G′ are brace-rods pivoted at *g*, one set to the lower edge of each jaw, and pivoted at *g′* to the bed-plate.

H H′ are brace-rods pivoted at *h*, one set to the upper edge of each jaw.

The general operation is obvious. The shaft F with its eccentrics E E′ is revolved, the eccentrics, through the links C C′, raising and lowering the jaws, while the braces G G′ H H′ cause the jaws to approach and recede from each other, thus enabling them to crush the substance between them.

We will now describe more particularly the improvements constituting our invention. In a recess in the face of each jaw-plate B B′ is engaged a plate J, having a series of vertical ribs J′.

K is the lower face-plate of the crushing-jaw, provided with perforations *k*. On each end of the plates B B′ a channel is formed by the projection *b*, and on the plate K is a projection *k′*, fitting said channel. The projections *k′* resting on the lower ends *b′* of the channels, as shown by dotted lines, Fig. 2, the plate K is held in position, and yet is removable at will. Above the plate K is the upper face-plate M, held to the plate B in a similar manner.

N is a plate held in position at the lower edges of the jaws by the supporting-bolts *n* entering the end plate N′. The latter are pivoted at one side *n′* to one jaw and the other side has a projection n^2, that enters a a socket n^3 in the other jaw. Thus the plates N N′ travel with the jaws. The spring N^2 enables the plate N to give sufficiently to prevent breakage of the parts.

By reference to Fig. 1 it will be observed that we have provided in the sockets G^2 of the brace-rods pieces G^3 of peculiar construction against which the rods proper bear. These pieces may be any suitable shape, size or material, so that they will be weaker than the weakest other part of the machine on which the strain is thrown, the idea being to provide them so that should some substance harder than the machine is designed to stand get between the jaws these pieces G^3 will break before any other part of the machine gives. By reference also to Fig. 1 it will be observed that we have provided at each of the joints wear-blocks P and between these and the adjacent stationary part wedges P′ with set-screws P^2 to move the blocks and thus take up the wear.

By reference to Fig. 2 it will be observed that the shaft F is divided and provided with flanges *f*, which are engaged together by the bolt *f′*, so that by removing the bolts one portion of the shaft can be revolved and the eccentrics thus be thrown out of alinement with each other.

By reference to Fig. 4 it will be observed that instead of the eccentrics E E′ being on a line with each other, as in Fig. 1, they are quartered—that is, one is at an angle of ninety

degrees with the other—as above explained. The result of this is that, if they are so placed, in the downward motion of the jaws one end of each jaw will be brought downward and inward slightly in advance of the other end, the result being a compound motion that is very effective in crushing the substance being operated upon while it also distributes the strain as to time.

The operation is as follows: The stone or any other substance to be broken is placed between the jaws. As the latter approach and recede from each other the stone is broken until it is small enough either to pass through the orifices *k*, when, through the channels formed by the ribs J′, it drops down to any suitable receptacle below or to pass between the lower edges of the jaws and the plate N. The plates K M being removable, a plate K with any desired size of openings *k* may be easily placed in position, thus regulating the size of the product and the plate N being adjustable vertically may be adjusted to correspond. Again as the lower edge of the plate K wears (this being the point where most of the wearing is done) the plate can be removed and reversed to bring the former upper edge at the bottom.

We do not wish to be understood as claiming herein the invention set forth in the concurrently-pending application of Courtland Skinner, filed January 6, 1894, Serial No. 495,987.

What we claim is—

1. In a crushing-machine having a reciprocating crushing-jaw, a perforated crushing-plate having a series of vertical bracing-ribs behind the plate said ribs forming channels through which the product is delivered substantially as described.

2. In a crushing-machine two crushing-jaws reciprocating toward and from each other each having on its face a perforated crushing-plate, a series of vertical bracing-ribs behind the plates and channels between the ribs by which the product that is forced through the plate is delivered substantially as described.

3. In a crushing-machine the combination with a reciprocating crushing-jaw, the brace-rods for said jaw, and the sockets pivoted to the jaw and receiving the ends of the rods, of weak pieces placed in said sockets and directly receiving the thrust of the rods substantially as described.

4. In a crushing-machine the combination of two reciprocating jaws, means for moving them vertically, brace-rods for causing them to approach and recede from each other as they are moved vertically, end plates engaged to the jaws and traveling therewith a bottom plate engaged to the end plates, and perforated crushing-plates through which the product is delivered substantially as described.

5. In a crushing-machine the combination with a reciprocating crushing-jaw of a shaft consisting of two portions each portion provided with an eccentric for reciprocating one end of the jaw, said eccentric located below and supporting said jaw, and said two shaft portions adjustable in a rotary direction with respect to each other so that the eccentric may be thrown to a greater or less degree out of alinement with each other and thereby operating the opposing ends of the jaw out of unison with each other, substantially as described.

6. In a crushing-machine the combination with a reciprocating crushing-jaw of a yielding spring-supported stop-plate below the same and extending the width of the jaw and adapted to hold the product where it can be acted upon by the jaw until reduced to the desired size said plate adapted to yield in a vertical direction only substantially as described.

7. In a crushing-machine the combination with two reciprocating crushing-jaws moving toward and from each other of a yielding spring-supported stop-plate for substantially closing the opening between the lower edges of the jaws throughout their width until the product has been reduced to the desired size substantially as described.

8. In a crushing-machine the combination with a crushing jaw or jaws, of a stop-plate vertically spring-supported and means for varying the tension of the spring-support, substantially as described.

In testimony whereof we sign this specification in the presence of two witnesses.

COURTLAND SKINNER.
FANNIE B. SKINNER.

Witnesses:
W. H. CHAMBERLIN,
DE WITT W. CHAMBERLIN.