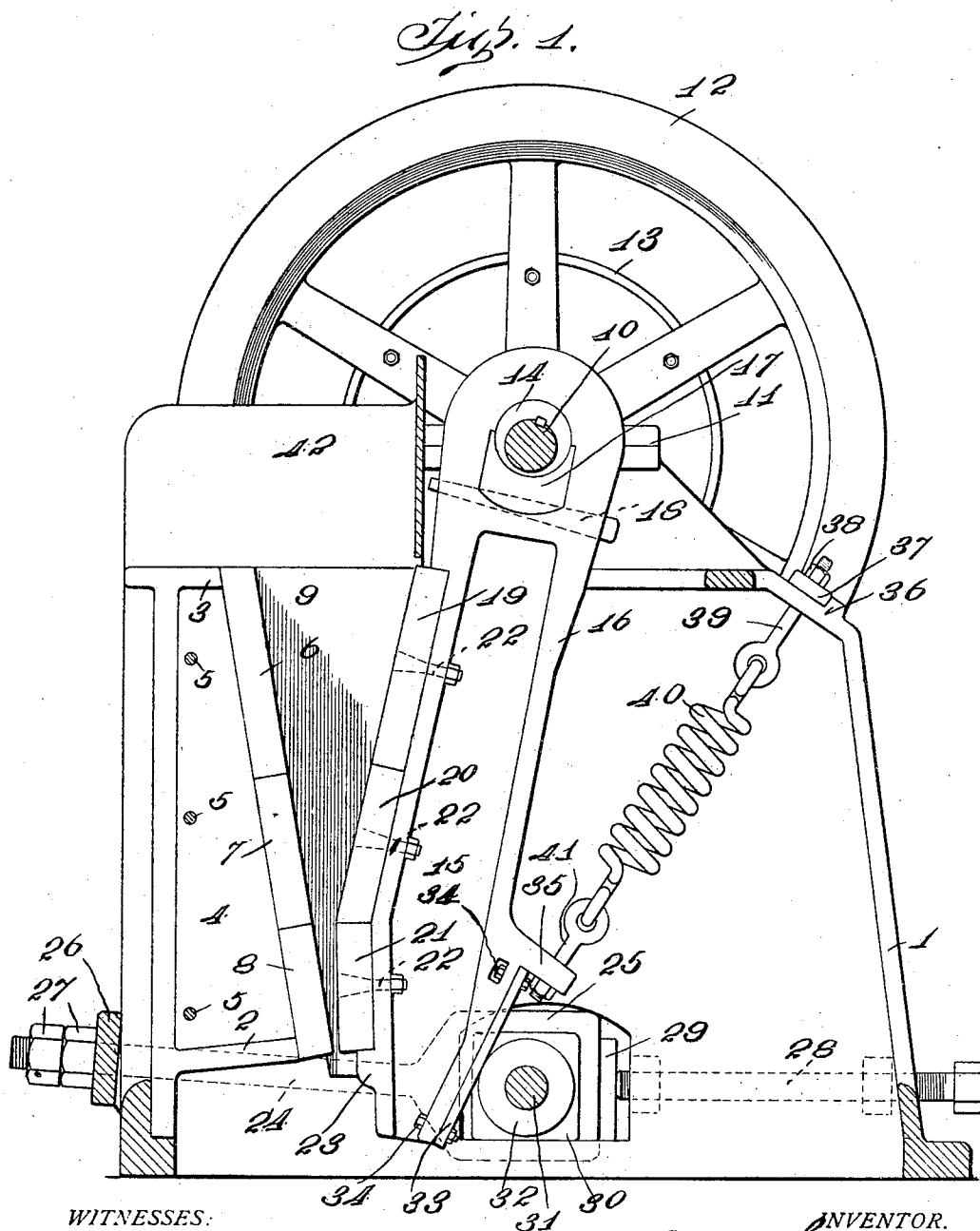


No. 794,876.

PATENTED JULY 18, 1905.

E. S. MOULTON.
ORE OR ROCK CRUSHER.
APPLICATION FILED JAN. 5, 1904.

3 SHEETS—SHEET 1.



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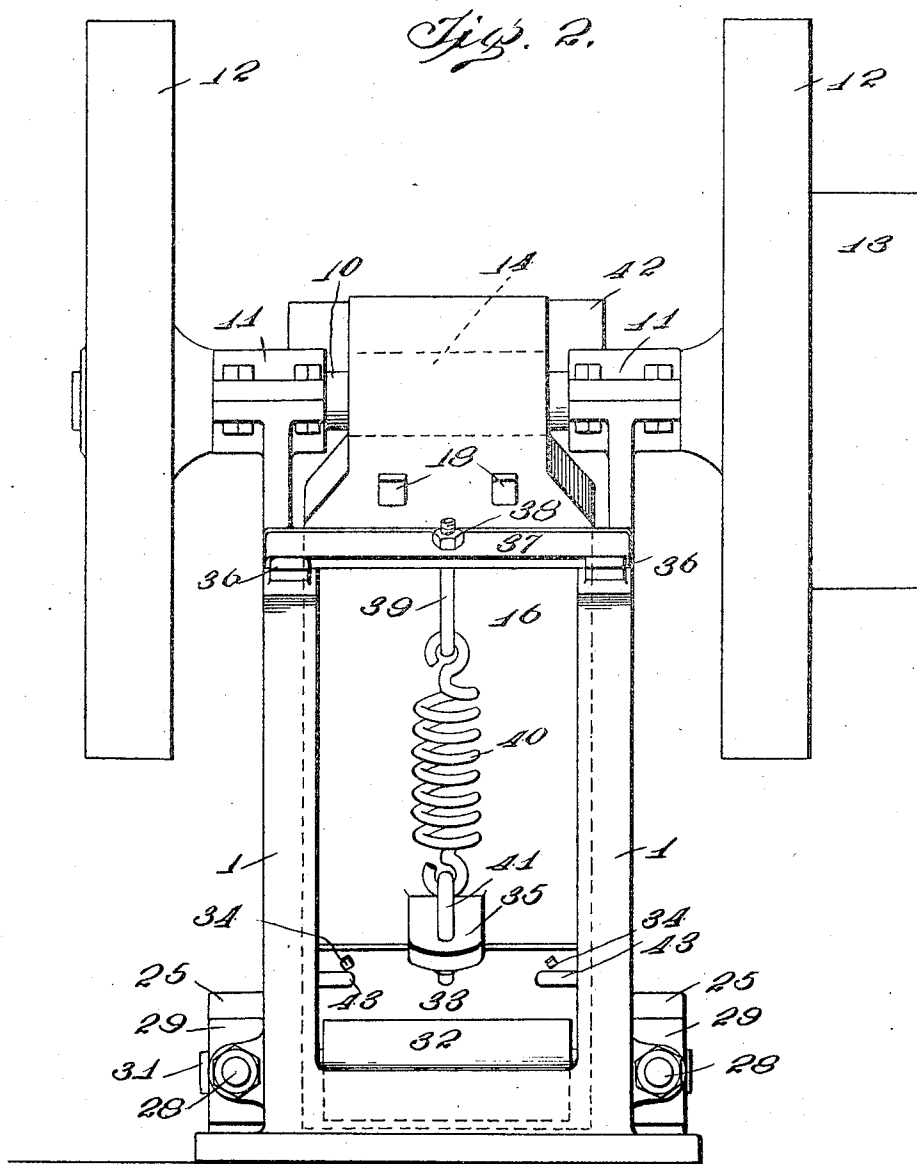
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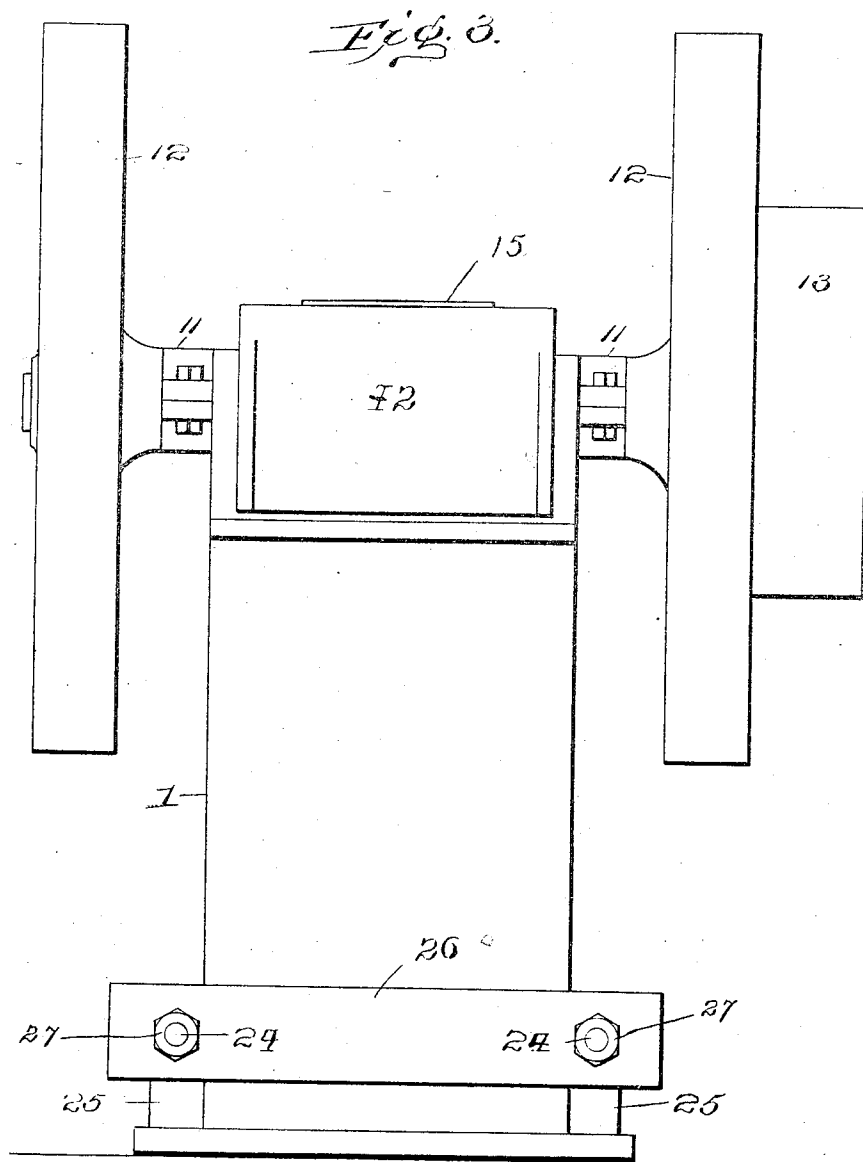
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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ORE OR ROCK CRUSHER.

SPECIFICATION forming part of Letters Patent No. 794,876, dated July 18, 1905.

Application filed January 5, 1904. Serial No. 187,819.

To all whom it may concern:

Be it known that I, EDGAR S. MOULTON, a citizen of the United States, residing at Central City, in the county of Gilpin and State of Colorado, have invented certain new and useful Improvements in Ore or Rock Crushers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in ore or rock crushers.

The object of the invention is to construct a machine which will crush damp or wet ore with the same proficiency as when crushing dry ore or rock.

Another object of the invention is to construct a crusher having a fixed member and an oscillating cushioned member and means for the adjustment of said oscillating member.

Another object of the invention is to construct a device which is provided with a fixed jaw and an oscillating jaw coöperating therewith, said oscillating jaw assembled with means whereby the said jaw when in operation produces a rounding crushing action upon the material deposited between the fixed jaw and the oscillating jaw.

An additional object is the construction of a machine which will automatically be thrown out of operation when a foreign object, such as a piece of steel, is placed between the fixed and moving members of the machine.

With these and other objects in view the invention consists in the novel construction, combination, and arrangement of parts, as will be hereinafter fully described, illustrated in the accompanying drawings, and more particularly pointed out in the claims hereto appended.

In the drawings, Figure 1 is a side elevation of the machine shown partly in longitudinal section. Fig. 2 is a rear elevation of the machine. Fig. 3 is an elevated front view of a mechanism constructed in accordance with the present invention.

Referring to the drawings by reference-numerals, 1 indicates a casing or framework of the machine. Upon the forward end of the

casing 1 are formed integrally a plurality of extensions 2 and 3, between which is secured a buffer-block 4, which is preferably formed of wood or like material, through which is passed a plurality of horizontal rods 5, which are assembled with the machine for the purpose of retaining said block in position and also to assist in holding the crusher together. A plurality of crushing-plates are arranged in an assembled position with said buffeting-block and consists in upper, middle, and lower plates, which are employed in the construction of a fixed crusher-jaw. Said crushing-plates 6, 7, and 8 are retained in position by means of cheek-plates 9, secured in position upon the machine near each side thereof. A longitudinal rotary eccentric-shaft 10 is journaled upon the upper portion of the casing 1 and extends in a transverse position to said casing. Said shaft 10 is retained in a fixed position by means of removable caps 11, secured upon the side boxes of the machine. Upon each end of the eccentric-shaft 10 are keyed balance or fly wheels 12, one of which is provided with an annular flange 13, which is secured to said wheel 12 for the purpose of receiving a suitable belt, whereby motion may be imparted to the crusher. Keyed upon the eccentric-shaft 10 is an eccentric 14.

In the construction of the machine a jaw 15 is employed, said jaw comprising a lever member 16, which is mounted upon the eccentric 14, keyed to the eccentric-shaft 10. Upon the upper portion of the lever member 16 is a removable box 17, which is adapted to engage the eccentric 14, keyed to the shaft 10. To facilitate the operation of the machine, and particularly for the purpose of taking up the wear of the box 17, a wedge-key 18 is employed. It will be obvious as the block 17 is worn away the wedge-key 18 can be driven inward, and thereby cause the block 17 to be forced against the periphery of the eccentric 14. Removably mounted upon the surface of the lever member 16, which is adapted to face the fixed jaw, is a plurality of assembled crushing-plates 19, 20, and 21, which are retained in position by means of bolts or suitable rivets 22. The inner face of the lever 16, which car-

ries the crushing-plates 19, 20, and 21, is angular in shape and is provided with an integral projection 23, which assists in supporting the lower plate 21, which is secured to the oscillating jaw 15 in a plane different from that of the remaining crushing-plates employed in the construction of the oscillating jaw.

An adjusting mechanism is provided for the oscillating jaw and is an essential feature of the invention. The adjusting mechanism comprises in its construction a plurality of longitudinal adjustable bolts 24, which are secured upon each side of the casing 1 by means of a transverse removable plate or bar 26, preferably constructed of steel. Said bar 26 is of sufficient length to project beyond each side of the casing, and to the projecting ends thereof the bolts 24 are removably secured. Each of the bolts 24 is provided with integral annular extensions or loops 25. Owing to the construction of bolts 24 and transverse plate 26, the oscillatory jaw is provided with a cushioning mechanism, as it will be obvious that if sufficient pressure is brought to bear upon the oscillatory jaw a slight movement of the lower end thereof in a longitudinal plane will be produced, owing to the fact that the plate 26 is of sufficient resiliency to permit of the ends thereof to be slightly bent by means of the pressure exerted thereon through the medium of bolts 24. A plurality of adjusting-nuts 27 are mounted upon the bolt 24 and are adapted to engage the member 26 for retaining the bolts 24 in an adjusted position. An auxiliary or secondary adjusting-bolt 28 is secured upon the rear portion of the machine, and if it is desired a plurality of these bolts 28 may be secured in an assembled position for the purpose of assisting in adjusting the oscillating jaw or coacting with the lever-bolts 24 in the adjustment of said oscillating jaw 15. The inner end of the member 28 is adapted to engage a plate or member 29, which abuts one of the squared surfaces of the integral extension 25 of the bolts 24. It will be obvious that a plurality of members 29 may be secured in a parallel position, if preferred, in the construction of the crusher. Within each of the annular extensions or loops 25 of the bolt 24 is removably mounted a box 30. Within said box 30 is journaled a shaft 31, and upon said shaft 31 and between the boxes 30, carried within the extensions 25 of the bolts 24, is a friction-roller 32. It will be apparent upon considering the drawing Fig. 1 that a suitable aperture is formed within each side of the casing 1 for the purpose of permitting of the insertion of the roller 32 in an assembled position within the machine. Upon the surface of the lever member 16 opposite to that to which the crushing-plates 19, 20, and 21 are secured is a removable plate 33, which is held in a fixed position by means of bolts 34 or the like. Said plate 33 is adapted to bear against the regulating-

roller 32 and is so constructed, as heretofore described, that when the same has become worn it can be easily removed and a new plate positioned upon the oscillating jaw 15. To normally retain the lower end of the oscillating jaw in engagement with the roller 32, an integral projection 35 is formed upon one of its faces adjacent to the removable plate 33, which is adapted to engage the roller 32. Upon the upper portion of the casing 1 is formed an integral extension 36 for the purpose of preventing the removal of a plate 37 when said plate is mounted upon the casing of the machine. Passing through the casing 1 and retained in engagement with the plate 37 by means of an adjusting-nut 38 is a bolt 39, which is provided with an annular extension formed integral therewith at one of its ends and which is adapted to receive a cushion member 40, which in this instance is shown in the drawings as a helical spring. Said spring or cushion member 40 is secured to a member 41, constructed similarly to said member 39. The member 41 is removably mounted upon the integral extension 35 of the oscillating jaw 15. The cushioning member 40 will normally retain the lower end of the oscillating jaw 15 in contact with the regulating-roller 32 and will also permit of the oscillating jaw to move toward the fixed jaw and also permit of a slight downward movement and will retain the jaw at all times in contact with the adjusting mechanism. It will be apparent that by adjusting the bolts 24 and the auxiliary bolts 28 the spacing of the oscillating jaw with respect to the fixed jaw can be easily obtained.

The two jaws provide in combination with the cheek-plates a hopper or receptacle for the ores or rock which is to be crushed, and to facilitate the depositing of the materials between the fixed and movable jaws a suitable shield 42 is secured above the jaws and in such a position as to conduct the materials which are to be crushed to the compartment formed between the said jaws.

A shield 42 is mounted upon the casing 1 above the stationary and moving jaws, said shield 42 comprising in its construction a casing having a back and integral side portions, which are adapted to be mounted adjacent to the upper edges of the jaws and cheek-plates 9. Said shield is constructed for the purpose of preventing any foreign substances from being discharged over the upper edges of the jaws when said material is being supplied to said members.

In the operation of the machine the eccentric shaft 10 is rotated in such a manner as to cause the oscillating jaw 15 to move from right to left. This throws the said jaw toward the fixed jaw and downward in one stroke. The lower end being forced downward against the regulating-roller 32 is likewise forced toward the opposing face of the fixed jaw 4.

The movement of the oscillating jaw gives a rolling movement to the material being worked toward the outlet between the faces. As the shaft continues its revolution the moving jaw is withdrawn, raised, and again forced against the stationary face and downward. At each revolution it crowds out the material that has been crushed and allows fresh material to fall into the compartment formed between the fixed and moving jaws. Without this expelling movement wet and sticky material would pack at the narrow bottom of the opening and neither go through itself or permit anything else to pass from between the jaws. Another advantage of the construction as set forth in the foregoing description is that the operation of the lower portion of the moving jaw against the roller 32 increases the leverage of the eccentric at the point where it is most needed in the operation of the crusher.

While this crusher exerts as powerful a leverage as any now in the art, it is a peculiar fact that it cannot be injured by dropping a hammer-head or any foreign metallic substance between the jaws while the said machine is in motion. The injuring of the machine by the depositing of a piece of steel or the like within the hopper formed by the jaws is one of the disadvantages in the machines known in the patented art. When such foreign objects are deposited between the jaws, the natural results of such operation are the breakage of a portion of the crusher. In my machine I have found by actual experience that the machine merely stops after one or two labored revolutions. The wooden buffeting-block gives a resilient or cushioned effect to the crushing-jaws, and when the machine is in operation this buffeting-block produces a machine which is comparatively noiseless in operation.

The machine can be run with a small loose belt, which permits of the machine being thrown out of operation when non-breakable material, such as a steel hammer-head, is inserted between the jaws, for the reason that a loose belt will throw itself free from the belt-pulley or annular flange 13, secured to one of the fly or drive wheels 12.

In this machine the movable crushing-jaw has a forward, downward, and upward movement, said movement being greatly facilitated by the assembling with said jaw of cushion means. Another essential element of the machine is the arrangement with the moving jaw of means for the adjustment of said jaw relative to the position of the fixed jaw. Owing to the angular crushing face of the movable jaw, the rolling movement of said jaw relative to the material that is to be crushed is obtained.

It will be apparent from the foregoing description that certain alterations, modifications, and changes may be made in the construction of a machine in accordance with my

invention, and I therefore reserve the right to make such changes, alterations, and modifications as shall fairly fall within the scope of my invention.

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

1. In a device of the character described, the combination with a casing, of a buffer-block secured thereto, crushing-plates secured to said buffer-block, an eccentric shaft journaled upon said casing, an oscillating jaw carried by said eccentric shaft, comprising a lever member, a plurality of crushing-plates secured thereto upon one side thereof, a removable plate secured to said lever member upon the opposite side to which said plates are secured, a flexible member secured to said casing and connected with said lever member, a revoluble member engaging said plate carried by said lever member, and means for moving said revoluble member and retaining the same in an adjusted position.

2. In a device of the character described, the combination of a casing, a fixed jaw secured thereto, a shield secured above said jaw, an oscillatory jaw secured within said casing, comprising a lever member, a removable box mounted thereon, means for adjusting said box, crushing-plates secured to said lever member in different planes, a friction-plate secured upon one side of said lever member, a flexible member secured to said lever member and mounted upon said casing, a plurality of adjustable bolts carried by said casing, means secured to said bolts and engaging said friction-plate, and means for imparting motion to said oscillating jaw.

3. A crushing mechanism, comprising a casing, a fixed jaw secured to said casing, an oscillatory jaw carried by said casing, said jaw provided with a plurality of crushing-plates, one of said plates being secured upon the lower portion of said jaw and at an angle to the remaining plates, a transverse, removable member positioned upon the front of said casing, an adjustable bolt removably positioned upon each end of said member, and a revoluble member secured to the opposite end of said bolts and normally engaging the back of the oscillatory jaw, and means for positively holding said oscillatory jaw in engagement with said revoluble member.

4. In a device of the character described, the combination with a casing, of a fixed jaw secured to the front portion of said casing, an oscillatory jaw mounted approximately in a central position within said casing, an adjusting mechanism for said oscillating jaw comprising looped means adjustably mounted upon the front portion of said casing and extending inwardly therefrom, transverse revoluble means assembled with said casing mounted within said looped means, auxiliary adjusting means assembled with the rear por-

tion of said casing and engaging said looped means, flexible means secured directly to said oscillatory jaw and the rear portion of said casing, and means for imparting motion to said oscillatory jaw.

5 5. In a device of the character described, the combination with a casing, of a stationary jaw secured in the forward end thereof, an oscillatory jaw mounted upon said casing intermediate of said stationary jaw and the rear portion thereof, rotary means engaging one side of said oscillatory jaw and interposed between said jaw and rear portion of said casing, adjustable connecting means carried upon 10 the front and rear portion of said casing and engaging said rotary means, separate, flexible means assembled with said oscillatory jaw and rear portion of said casing, and means for moving said oscillating jaw.

20 6. A crushing mechanism, comprising a stationary jaw, an oscillating jaw assembled therewith, a removable member secured upon said oscillating jaw and near one end thereof, rotary means normally engaging said removable member, adjusting means assembled with said rotary means and extending in opposite directions therefrom, and means for moving said oscillating jaw.

7. A device of the character described, comprising a casing, a stationary jaw secured to the forward end thereof, an eccentric shaft journaled upon said casing, an oscillatory jaw journaled upon said eccentric shaft, an adjustable journal-box carried by said oscillating jaw, said jaw provided with an integral extension intermediate of its length, flexible means connected to said extension and the rear portion of said casing, a separate adjusting mechanism assembled with said oscillatory jaw, comprising a plurality of adjustable looped members secured in parallel position on the forward portion of said casing, a transverse revoluble member mounted within said looped members, a plurality of parallel, adjusting-bolts mounted upon the rear portion of said casing engaging said looped members, and means for imparting motion to said oscillatory jaw.

8. In a device of the character described, the combination of a casing, a plurality of parallel extensions projecting rearwardly from the front portion of said casing, a buffer-block secured between said extensions, crushing-plates secured in an assembled position with said buffer-block, an oscillatory jaw mounted within said casing, said oscillatory jaw comprising a rear and front body portion, a web integrally secured to said rear and front body portion, crushing-plates secured to said front body portion, an integral extension projecting from said rear body portion, a removable transverse plate mounted upon the rear portion of said casing, a flexible member secured to said transverse plate and said integral extension secured to the rear body portion of

said oscillatory jaw, an adjusting mechanism mounted upon said casing, comprising a transverse roller engaging the rear portion of said oscillatory jaw below said extension, adjusting means engaging said roller and extending in opposite directions therefrom, and means for actuating said oscillatory jaw.

9. In a device of the character described, the combination with a framework, of a fixed jaw secured to the forward end of said framework, an oscillatory jaw journaled upon said framework intermediate its forward and rear end, an adjustable, flexible member secured to the upper portion of said framework and to said oscillatory jaw near the lower end thereof, an adjusting mechanism carried by said framework and normally engaging said oscillatory jaw near the lower portion thereof, comprising a plurality of parallel looped members detachably secured upon the front portion of said framework and extending inwardly, boxes secured in said looped members, a roller journaled in said boxes, a plurality of adjustable members secured upon the rear portion of said framework, removable means assembled with said looped members and normally engaged by said adjustable members, and means for moving said oscillatory jaw.

10. In a device of the character described, the combination with a casing, of a fixed jaw secured thereto, an oscillating jaw assembled within said casing, a flexible member secured to said oscillating jaw near the lower end thereof and connected to the upper portion of said casing, a rotary member engaging the lower portion of said oscillating jaw, means carried upon the forward and rear portion of said casing for causing movement of said rotary member.

11. A device of the character described, comprising a casing, a jaw secured upon the forward portion of said casing, an oscillatory jaw assembled with said casing in approximately a central position, an adjustable mechanism mounted upon said casing and engaging said movable jaw, comprising a removable plate mounted upon the forward portion of said casing, a looped bolt removably mounted near each end of said plate, a journal-box mounted within the looped portion of each bolt, a revoluble member journaled in said boxes normally engaging said movable jaw, a flexible member adjustably secured directly to said movable jaw and casing, and auxiliary, adjusting means mounted upon the rear portion of said casing and engaging said adjustable mechanism.

12. In a device of the character described, the combination with a casing, of a fixed jaw secured thereto comprising a buffer-block, a crushing-plate mounted upon said block, an oscillatory jaw mounted upon said casing, a crushing-plate carried by said oscillatory jaw, an adjusting mechanism for said oscillatory jaw, comprising a removable, transverse member, looped bolts secured near each end of said

member and upon the sides of said casing,
journal-boxes secured within the looped por-
tion of said bolts, a rotary member journaled
in said boxes, an auxiliary bolt engaging each
5 of said looped portions of said looped bolts,
and means normally retaining said oscillatory
jaw in engagement with said rotary member.

In testimony whereof I hereunto affix my
signature in presence of two witnesses.

EDGAR S. MOULTON.

Witnesses:

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FRED G. FELLOWS.