

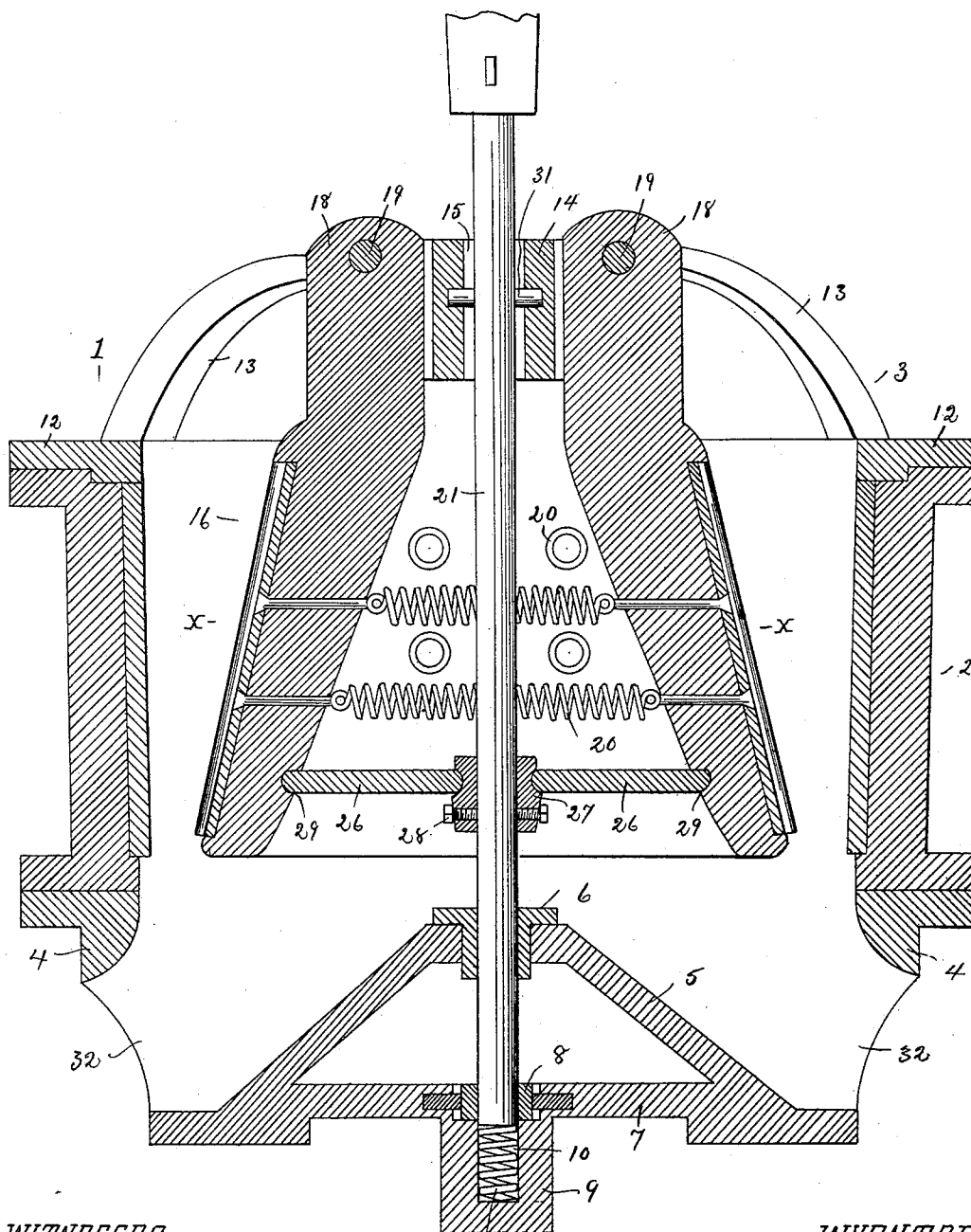
(No Model.)

2 Sheets—Sheet 1.

J. HENAHAN.
APPARATUS FOR CRUSHING STONE.

No. 462,765.

Patented Nov. 10, 1891.



WITNESSES

Carroll J. Webster
Mary A. Mathews.

Fig. 1.

INVENTOR.

John Henahan
By William Webster
att'y

(No Model.)

2 Sheets—Sheet 2.

J. HENAHAN.
APPARATUS FOR CRUSHING STONE.

No. 462,765.

Patented Nov. 10, 1891.

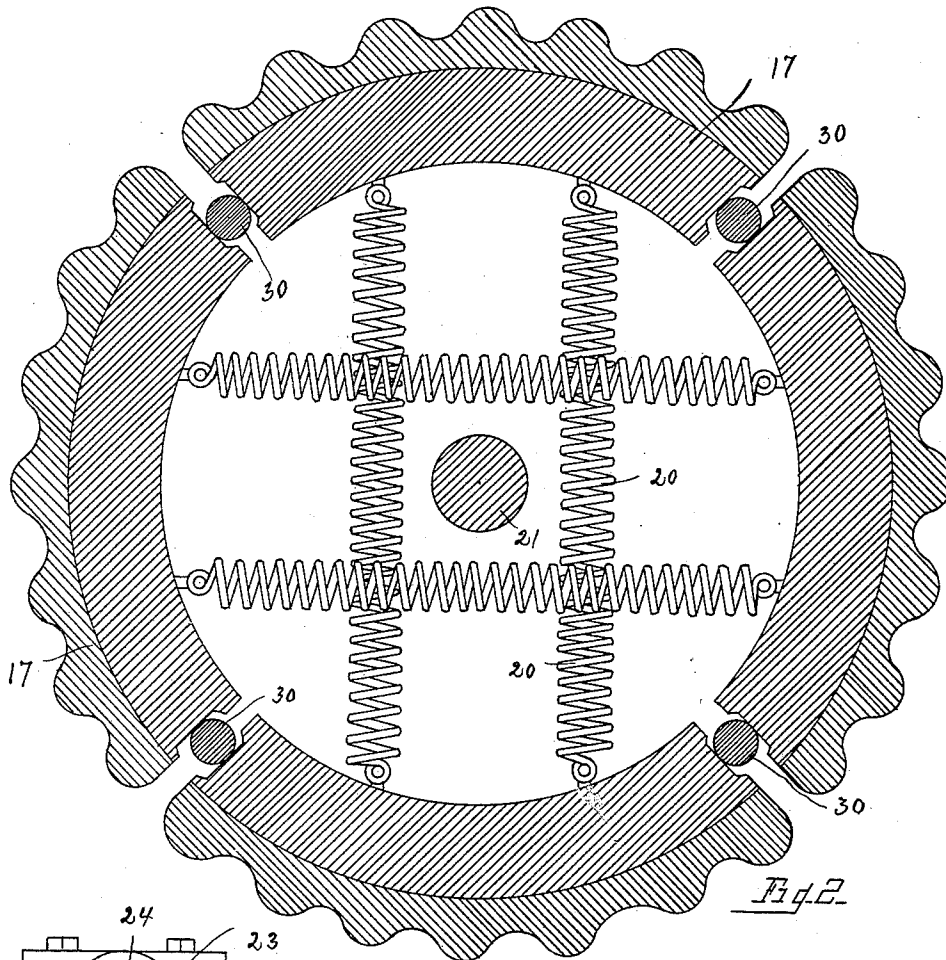


Fig. 2

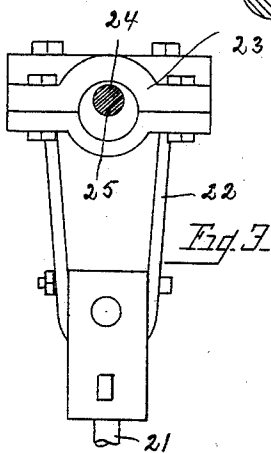


Fig. 3

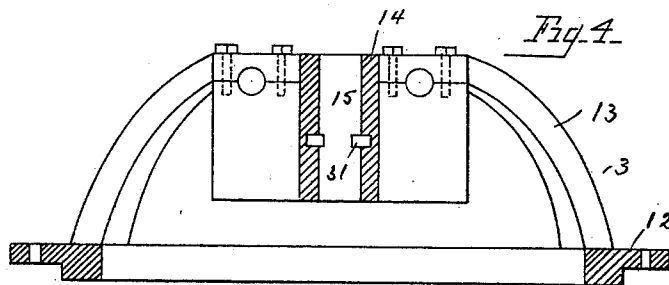


Fig. 4

WITNESSES

Charles J. Webster.
Mary A. Mathews.

INVENTOR

John Henahan
By William Webster
Atty

UNITED STATES PATENT OFFICE.

JOHN HENAHAN, OF TOLEDO, OHIO.

APPARATUS FOR CRUSHING STONE.

SPECIFICATION forming part of Letters Patent No. 462,765, dated November 10, 1891.

Application filed May 1, 1891. Serial No. 391,244. (No model.)

To all whom it may concern:

Be it known that JOHN HENAHAN, of Toledo, county of Lucas, and State of Ohio, have invented certain new and useful Improvements in Apparatus for Crushing Stone; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form part of this specification.

My invention relates to an apparatus for crushing stone, and has for its object to construct a crusher having a series of coincidentally-actuated segmental crushing-jaws and means for imparting thereto a vertical reciprocatory movement and also a certain lateral movement in a plane transverse to the axis of the crusher.

With these objects in view the invention consists, broadly, in a shell or casing and a segmental crusher movably secured therein, with the segments of the crusher held yieldingly assembled to allow of lateral movement thereto.

In the drawings, Figure 1 is a longitudinal vertical sectional view of a crushing apparatus constructed in accordance with my invention, part of shaft being omitted. Fig. 2 is a transverse section on lines *x x*, Fig. 1. Fig. 3 is an elevation of the upper portion of the shaft, showing the eccentric for reciprocating the same. Fig. 4 is a longitudinal vertical sectional view of the top of the shell.

1 designates the shell or casing, formed of a central section 2 and upper and lower sections 3 and 4, respectively, the sections being securely bolted together and of sufficient strength to withstand the great strain to which they are subjected. The lower section 4 is formed with a conical portion 5, having a central orifice into which a boxing 6 is secured, and also with a base-plate 7, having a light boxing 8, there being a depending step 9, having a circular chamber 10, into which is placed a coiled spring 11, for a purpose hereinafter stated. The upper section 3 comprises an annular base 12, curved arms 13, and a circular top plate 14, having a central

opening 15 extending vertically through the same.

16 designates a cone-shaped crusher formed of a plurality of segmental crushing-jaws 17, each jaw being formed with a hanger 18, pivotally connected with the top plate 14 and suspended therefrom by means of pins 19, so that each jaw may have a radial movement from the axial center of the crusher. The outer surface of the jaws is corrugated, as clearly shown in Fig. 2.

20 designates spiral springs, arranged transversely of the crusher and secured at opposite ends to diametrically-opposite jaws of the same, the tendency of the springs being to hold the sections of crusher closely assembled.

21 designates a shaft extending vertically through the shell and passing through opening 15 of the top plate, boxing 6 of plate 5, boxing 8 of plate 7, and resting at the lower end upon spring 11 in step 9. The upper portion of shaft 21 is formed with a yoke 22, to which is secured a boxing 23, in which is journaled a horizontal shaft 24, having an eccentric 25 secured thereto, by which means shaft 21 is given a vertical reciprocatory movement by the revolution of shaft 24, which may be driven by any preferred power.

26 designates toggle arms or levers, there being one arm to each jaw of the crusher, the inner ends of which arms are secured in a sleeve 27, secured upon the shaft by means of set-screws 28, the outer ends of the arms being seated in recesses 29, formed in the inner surface of each jaw of the crusher.

30 designates resilient buffers, preferably formed of rubber, and which are interposed between the jaws of the crusher to receive the jar and impact due to any unusual strain that may be exerted thereupon, there being resilient bearings 31 secured in the top plate, and which bear upon shaft 21 and allow the same a yielding motion.

32 designates an opening formed in the base portion 4, through which the crushed stone finds egress from the shell. In operation the stone to be crushed is introduced into the shell at the top and between the curved arms 13. A reciprocatory movement is given to shaft 21 by the revolution of shaft 24 and eccentric 25, this movement raising the inner end

of toggle-arms 26, and the springs 20, acting upon the jaws of the crusher, draw them inward toward the shaft, thus causing the crusher to assume its smallest diameter, when
5 by an inverse reciprocation of shaft 21 the toggle-arms assume a horizontal position, thereby projecting the jaws to their greatest diameter and causing a lateral movement of each jaw within the shell, with the effect of
10 gradually crushing and reducing the stone to the preferred size.

What I claim is—

1. In a machine for crushing stone, a casing, a circular cone-shaped crusher consisting
15 of a series of segmental crushing-jaws, and means for operating the same.

2. In a machine for crushing stone, a casing, a circular cone-shaped crusher consisting of a series of pivoted segmental crushing-
20 jaws, and means for operating the same.

3. In a machine for crushing stone, a casing, a circular cone-shaped crusher consisting of a series of pivoted segmental crushing-jaws having corrugated outer surfaces piv-
25 oted to arms secured to the casing, and means for separating the jaws.

4. In a machine for crushing stone, a cas-

ing, a vertically-reciprocating shaft held therein, a circular cone-shaped crusher consisting of a series of segmental crushing-jaws
30 pivoted within the casing, and toggle-levers actuated by the shaft for spreading the said jaws.

5. In a machine for crushing stone, a casing, a vertically-reciprocating shaft held
35 therein, a circular cone-shaped crusher consisting of a series of segmental crushing-jaws pivoted within the casing, toggle-levers actuated by the shaft for spreading said jaws, and
40 springs for returning the jaws to their normal position.

6. In a machine for crushing stone, a casing, a circular cone-shaped crusher pivoted to arms secured thereto, consisting of a series
45 of segmental crushing-jaws, and buffers arranged between the jaws.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN HENAHAN.

Witnesses:

WILLIAM WEBSTER,
CARROLL J. WEBSTER.