

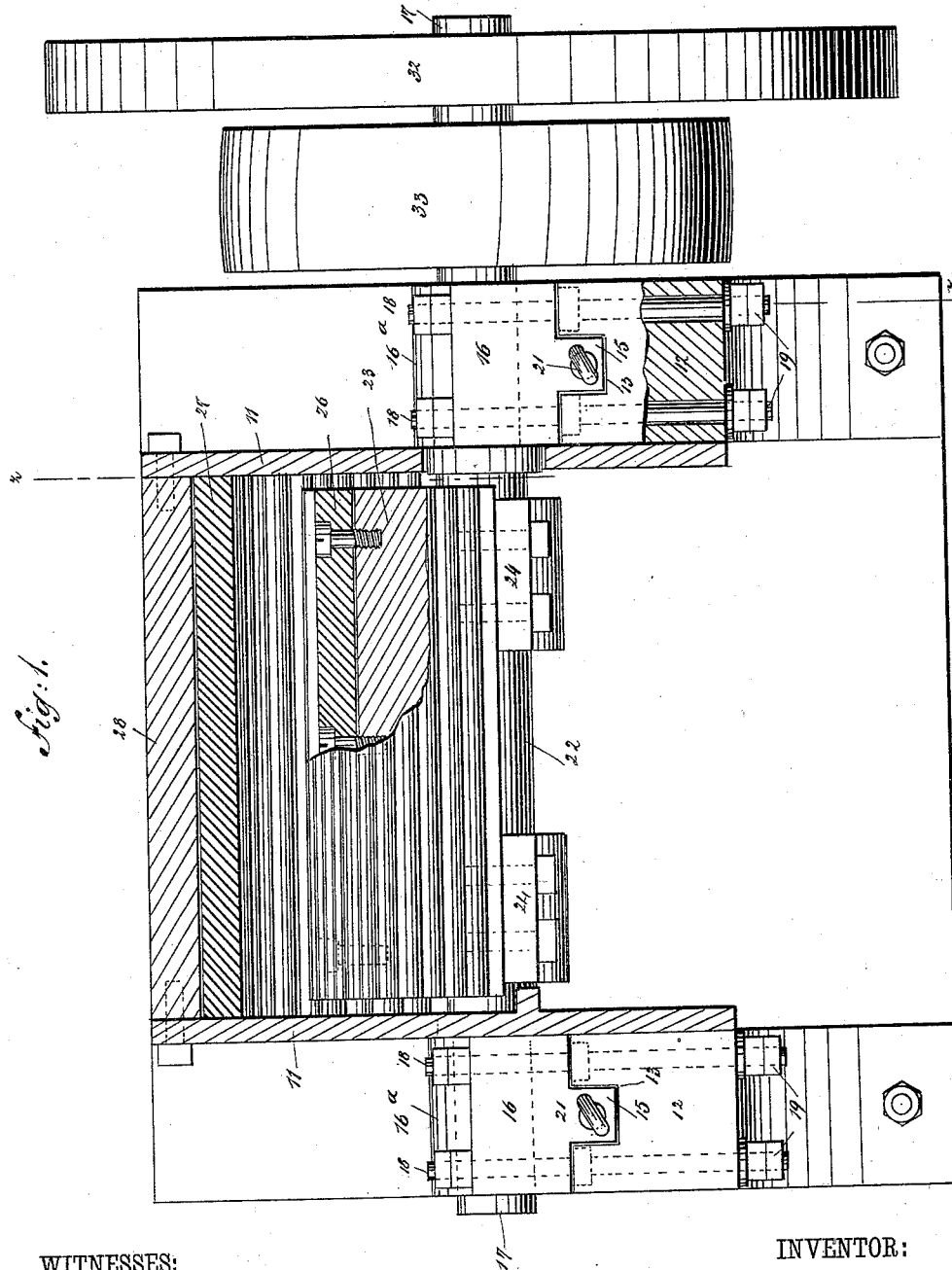
(No Model.)

4 Sheets—Sheet 1.

W. H. HOWLAND.
STONE CRUSHER.

No. 417,918.

Patented Dec. 24, 1889.



WITNESSES:

Chas. W. V. A.
to Sedgwick

INVENTOR:

W. H. Howland
BY *Munn & Co.*
ATTORNEYS.

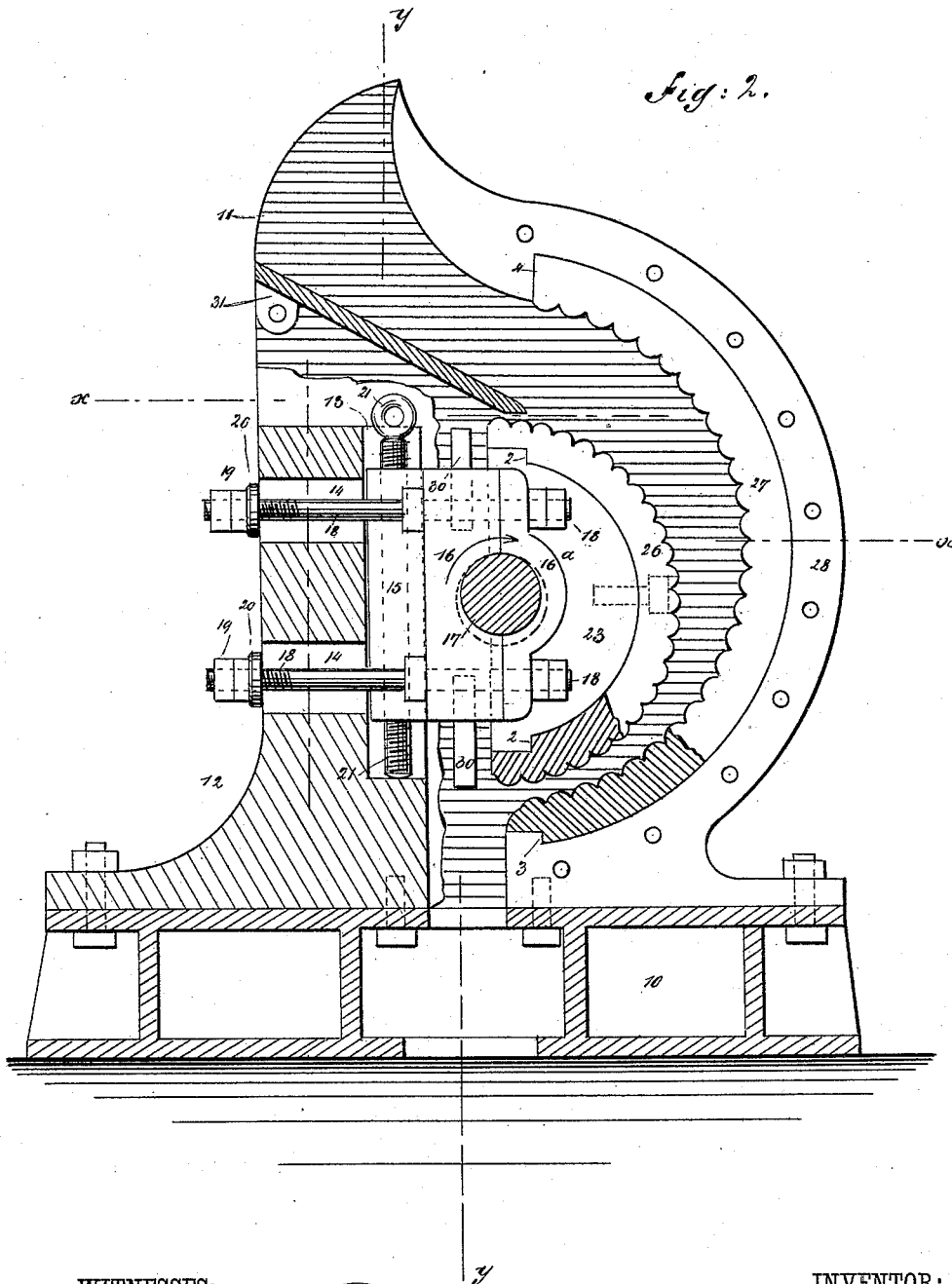
(No Model.)

4 Sheets—Sheet 2

W. H. HOWLAND.
STONE CRUSHER.

No. 417,918.

Patented Dec. 24, 1889.



WITNESSES:

Chas. Nida
C. Sedgwick

INVENTOR:

W. H. Howland
BY *Munn & Co.*

ATTORNEYS.

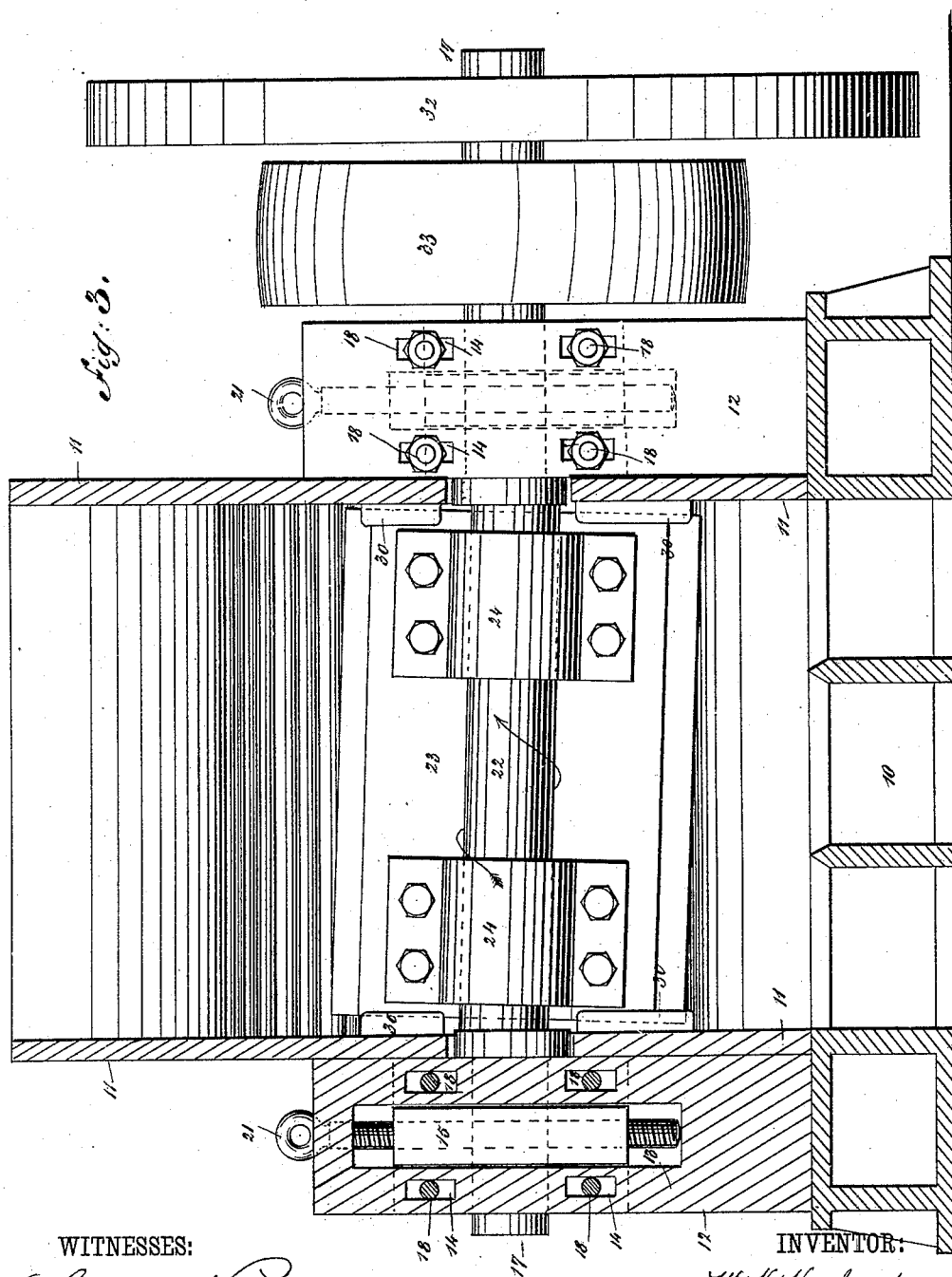
(No Model.)

4 Sheets—Sheet 3.

W. H. HOWLAND.
STONE CRUSHER.

No. 417,918.

Patented Dec. 24, 1889.



WITNESSES:

Chas. Nida
C. Sedgwick

INVENTOR:

W. H. Howland
BY *Munn & Co.*

ATTORNEYS.

(No Model.)

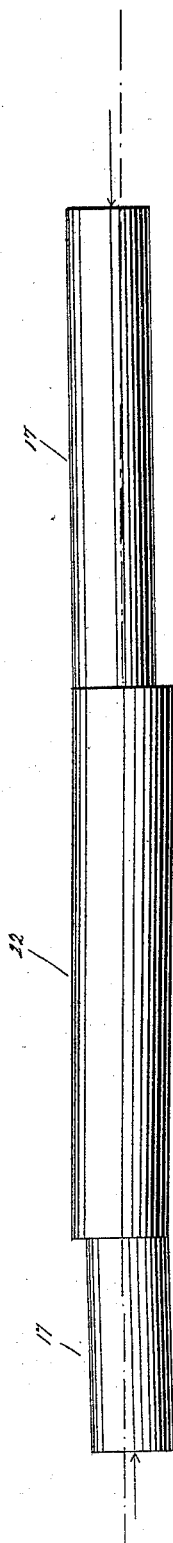
4 Sheets—Sheet 4.

W. H. HOWLAND.
STONE CRUSHER.

No. 417,918.

Patented Dec. 24, 1889.

Fig. 4.



WITNESSES:

Chas. V. V. V.
Sedgwick

INVENTOR:

W. H. Howland

BY

Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM H. HOWLAND, OF BERGENFIELD, NEW JERSEY.

STONE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 417,918, dated December 24, 1889.

Application filed March 5, 1888, Serial No. 266,162. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. HOWLAND, of Bergenfield, in the county of Bergen and State of New Jersey, have invented a new and Improved Stone-Crusher, of which the following is a full, clear, and exact description.

The invention is an improvement in that class of stone-crushers having a fixed and movable jaw, the latter being mounted eccentrically on a rotating shaft.

The improvements will be hereinafter pointed out.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a sectional plan view of my improved stone-crushing machine, the view being taken in partial section on line *xx* of Fig. 2, part of the movable jaw and its facing-plate and a part of one of the main standards being broken away. Fig. 2 is a sectional elevation taken on the broken line *zz* of Fig. 1, parts of the facing-plates of the two jaws being broken away; and Fig. 3 is a longitudinal sectional elevation of the machine, the view being taken on line *yy* of Fig. 2. Fig. 4 is a side view of the eccentric-shaft of the machine.

In the drawings, 10 is the base-frame of the machine, to which there are bolted two vertical side plates 11 and two main standards 12. These standards are formed with vertical slots 13 and horizontal slots 14, the slots 13 serving as ways for ribs 15, which are formed on the rear blocks 16, which blocks constitute sections of the journal-bearings of the driving-shaft 17, the outer sections 16^a of said bearings being bolted to the blocks by bolts 18, which extend to the rear through the slots 14, there to be engaged by nuts 19, which bear against washers 20. The ribs or flanges 15 are formed with vertical threaded apertures that are engaged by adjusting-screws 21, which bear against the lower defining-walls of the recesses 13, the arrangement being such that by turning the screws 21 the shaft 17 may be raised or lowered. The central section of the shaft 17 between the posts 12 is eccentric, as shown at 22. Upon this eccentric portion of the shaft there is mounted a

block 23, which is formed with a recess in its rear face, said recess being entered by the eccentric portion of the shaft, the block being held to the shaft by heavy metal straps 24, that pass about the shaft and are bolted to the rear face of the block. The said eccentric portion 22 is arranged at a small angle to the journals 17. In other words, the axis of the part 22 is out of alignment with said journals, which have a common axis; hence when the shaft revolves a kind of wobbling motion is imparted to the block or jaw 23. The forward face of the block 23 is circular, and upon this circular face there is mounted a heavy steel facing-plate 26, which is held to the block by tap-bolts, the heads of which rest in countersunk recesses formed in the plate 26, and in practice it will probably be found to be desirable that the block should be formed with projections 2, which enter correspondingly-shaped recesses formed in the inner circumferential face of the plate, as shown.

The block 23 and its plate 26 constitute the movable jaw of the crusher, and this jaw operates in connection with a fixed jaw made up of a concave and corrugated faced plate 27, which fits between shoulders 3 and 4, formed in the side plates 11, and is strengthened by a back 28, that is bolted to said side plates.

To the rear of the block 23 there are arranged projections 30, which extend inward from the side plates, and these projections serve as stops to limit the movement of the block—that is to say, the block 23 comes in contact with the said stops when carried inward or back by the rotation of the shaft.

Between the side plates 11, and above the standards 12, I arrange a deflecting-plate 31, upon which the material to be operated upon is dumped, to slide thence down between the jaws of the crusher.

Upon the shaft 17 there is mounted a fly-wheel 32 and a driving-pulley 33.

Such being the general construction of my improved form of stone-crusher, the operation is as follows: Stone is fed in between the jaws and the shaft 17 is revolved in the direction of the arrow shown in connection therewith in Fig. 3, and as the shaft so revolves one end of the face of the plate 26 will be carried toward the plate 27, while the other end will be

carried from said plate, this movement continuing for half a revolution of the shaft, after which the end which was approaching the plate 27 will recede therefrom and the opposite end will approach the plate 27, the stone between the two jaws being thus subjected to a constantly-varying pressure, and the pressure upon the shaft being distributed gradually from end to end.

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

15 1. In a stone-crusher, the combination, with a fixed jaw, of a movable jaw and a driving-shaft formed with a section, the axis of which is at an angle to that of the shaft, the movable jaw being mounted upon said section, substantially as shown and described.

20 2. In a stone-crusher, the combination, with a fixed jaw, of a movable jaw and a driving-shaft formed with an eccentric section, the axis of which is at an angle to that of the shaft-journals, the movable jaw being mounted upon said eccentric section, substantially as described.

25 3. In a stone-crusher, the combination, with a fixed jaw, of an adjustably-mounted driving-shaft formed with an eccentric section, the axis of which is at an angle to that of the journals of the shaft, and a movable jaw mounted upon said eccentric section, substantially as described.

4. In a stone-crusher, the combination, with a fixed jaw, of a driving-shaft formed with an eccentric section, the axis of which is at an angle to that of the journals of the shaft, bearings in which said shaft is mounted, adjusting-screws arranged in connection with the said bearings, and a movable jaw mounted upon the eccentric section of the driving-shaft, substantially as described.

5. In a stone-crusher, the combination, with the corrugated fixed concave jaw, the corrugated movable convex jaw, the shaft having a middle eccentric section which is arranged at an angle to the other parts thereof, and movable bearings in which the said shaft is mounted, of the screws 21 and bolts 18, arranged vertically and horizontally in connection with the said bearings, as shown and described, to operate as specified.

6. In a stone-crusher, the combination of a concaved fixed jaw, a vertical standard 12, the convex-faced movable jaw having a vertical rear side, the shaft having an eccentric middle section arranged at an angle to the shaft upon which said movable jaw is mounted, and the stops 30, arranged between the movable jaw and standard, as shown and described.

WILLIAM H. HOWLAND.

Witnesses:

EDWARD KENT, jr.,
C. SEDGWICK.