

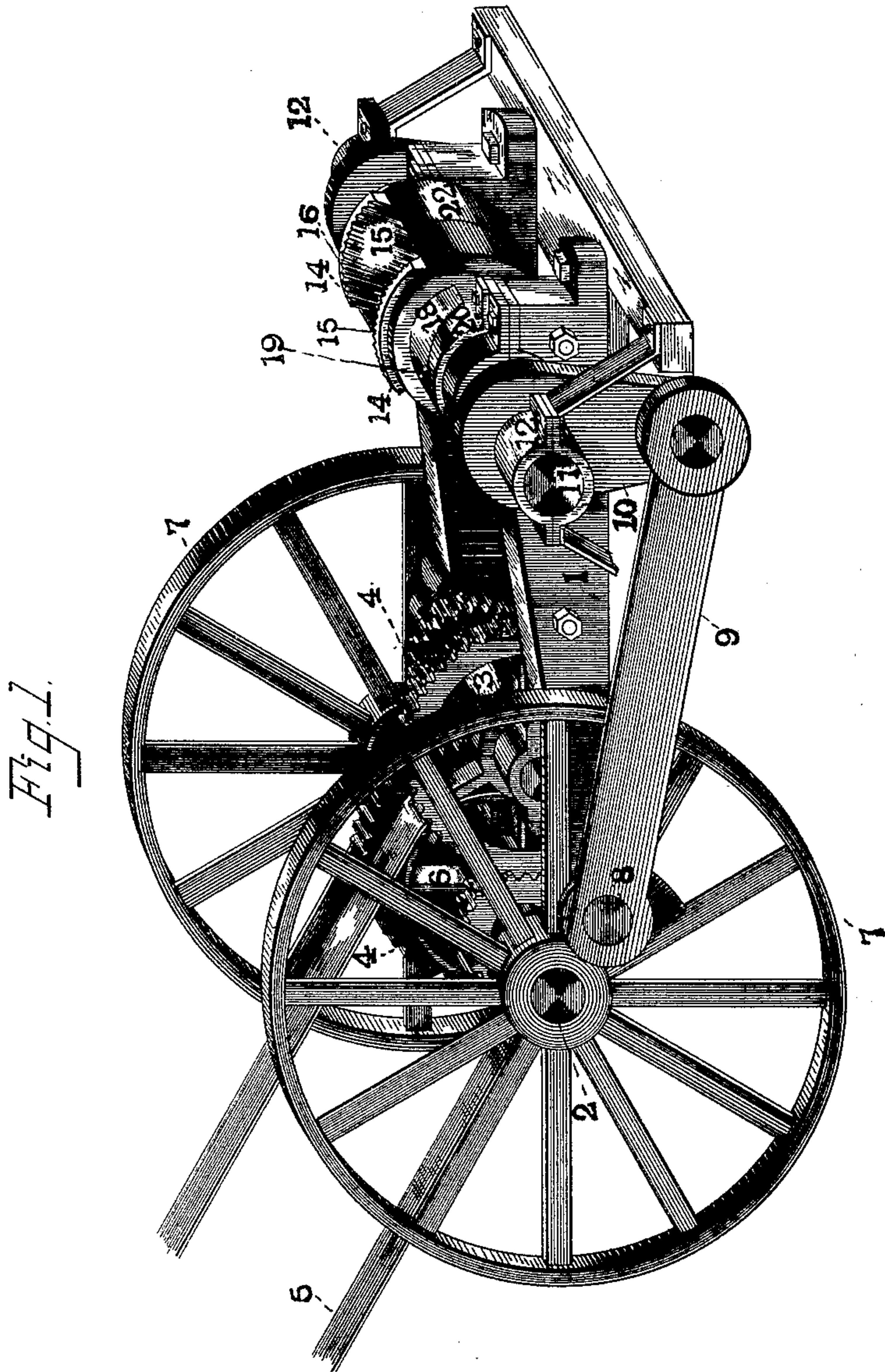
(No Model.)

3 Sheets—Sheet 1.

W. JOHNSTON.
CRUSHER.

No. 410,641.

Patented Sept. 10, 1889.



WITNESSES:

Geo. H. Harvey
C. S. Johnston

INVENTOR

William Johnston
BY. A. C. Johnston
his

ATTORNEY

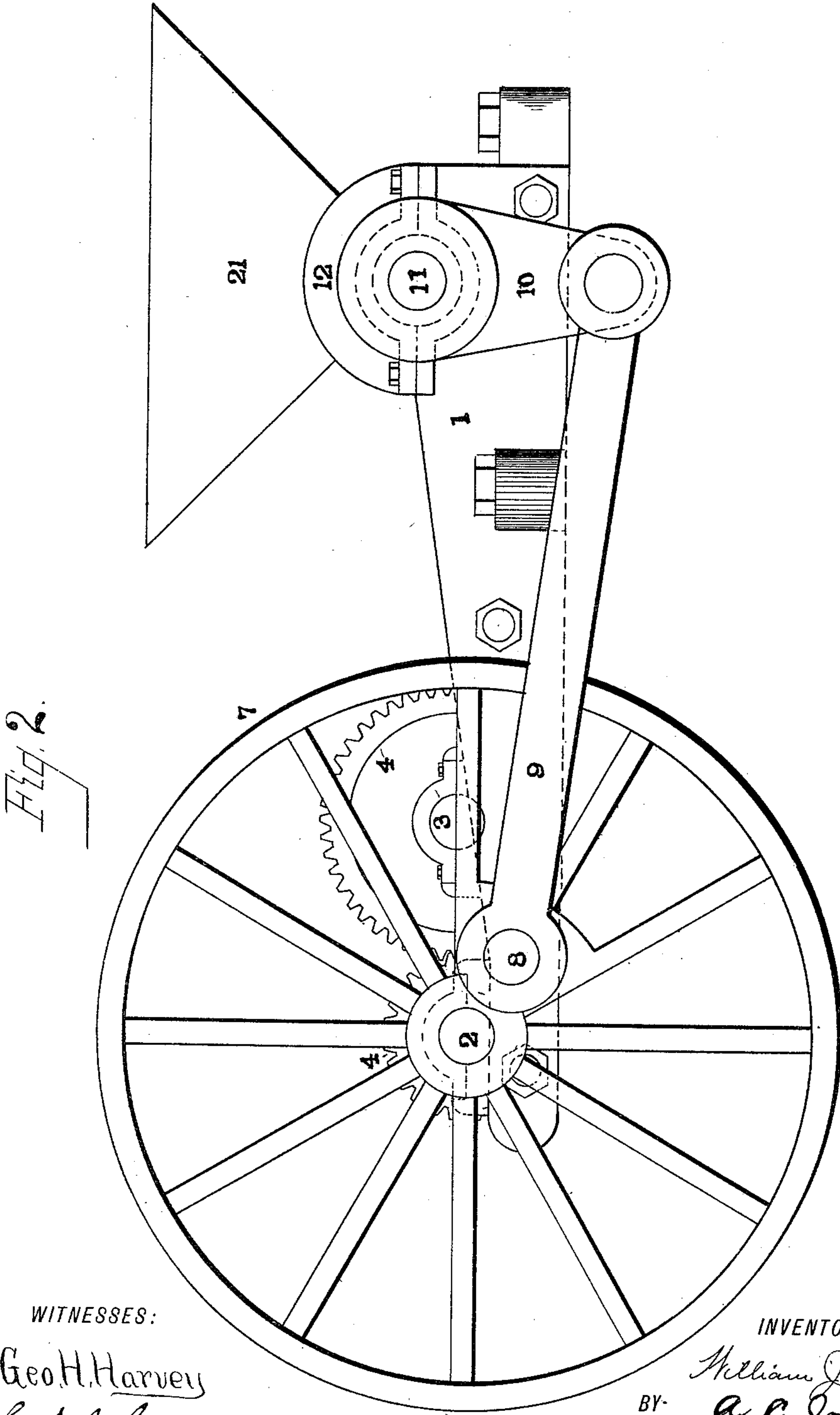
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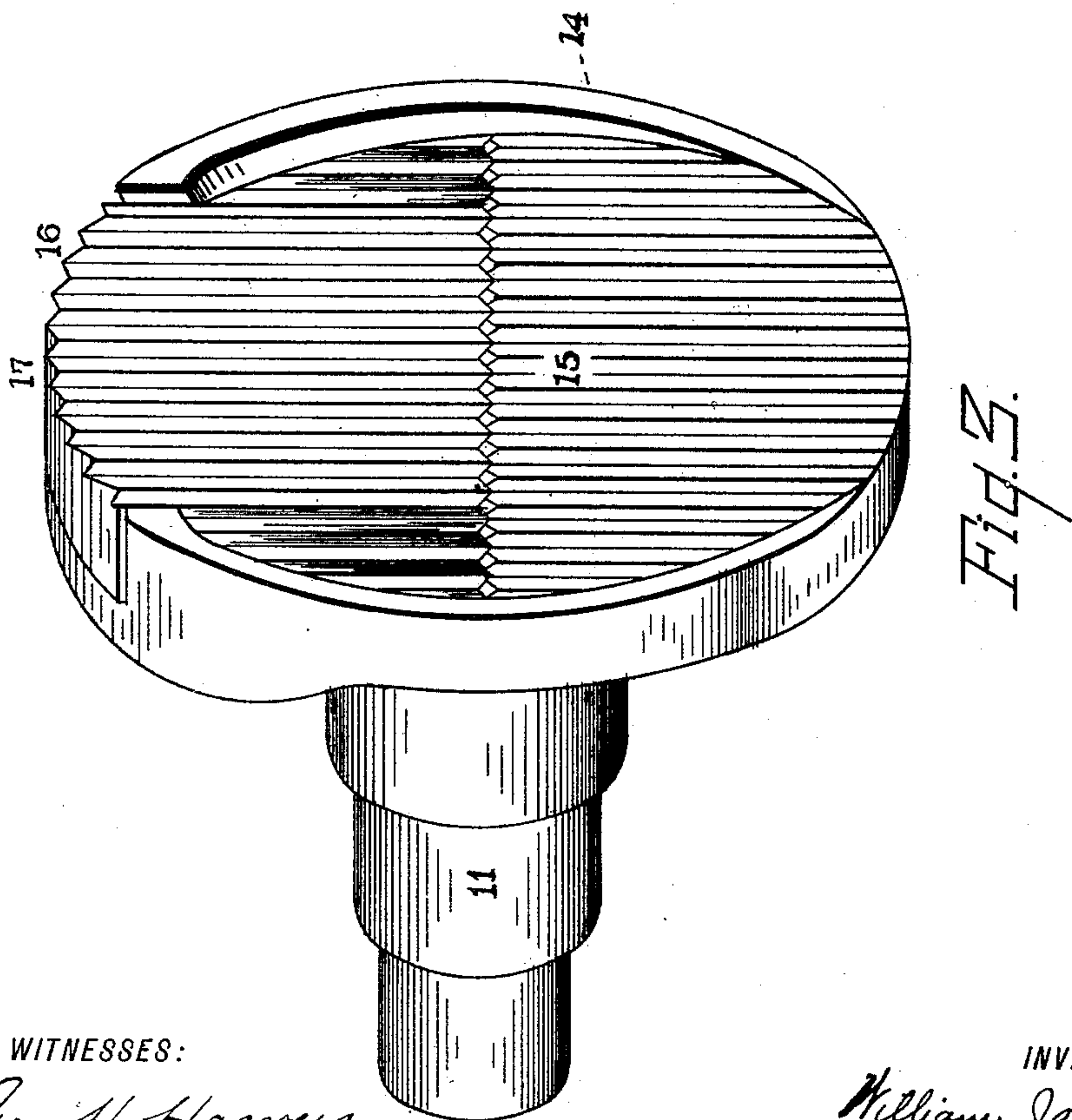
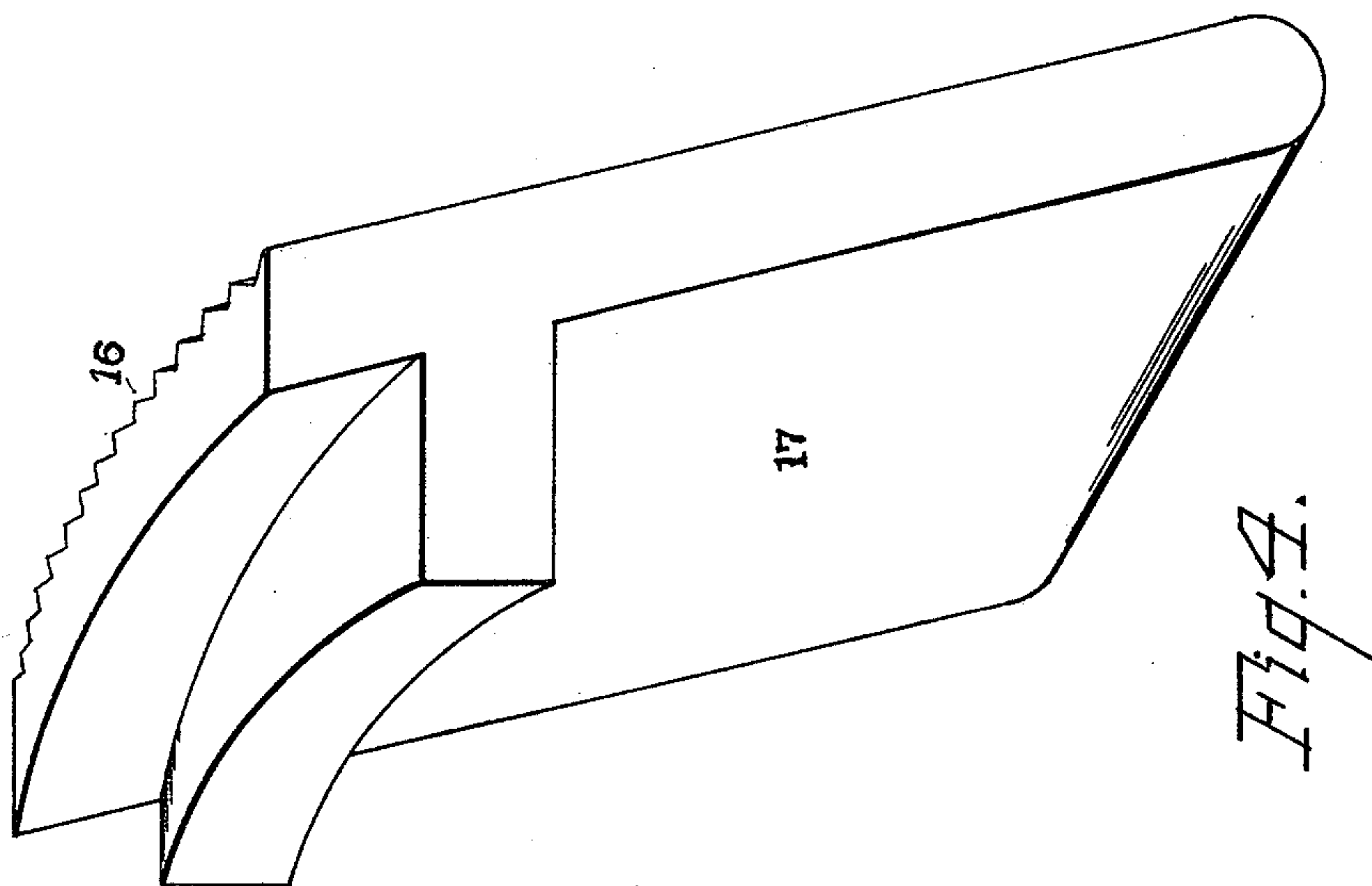
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UNITED STATES PATENT OFFICE.

WILLIAM JOHNSTON, OF PITTSBURG, PENNSYLVANIA.

CRUSHER.

SPECIFICATION forming part of Letters Patent No. 410,641, dated September 10, 1889.

Application filed July 23, 1888. Serial No. 280,833. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM JOHNSTON, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Crushers; and I do hereby declare the following to be a full, clear, and exact description thereof.

In general terms my invention consists in a machine provided with suitable actuating parts operating a pair of strong jaws that open and close with a circular grinding movement in opposite directions, whereby ore, stone, bricks, or other material dropped between said jaws will be broken and crushed to a condition suitable for many purposes useful in the arts.

To enable others to fully understand the construction and operation of my improved breaking and crushing apparatus, I will proceed to describe it by reference to the accompanying drawings, wherein—

Figure 1 represents a perspective view of the entire machine deprived of its hopper or receiving-box. Fig. 2 is a side elevation of the same machine with its hopper arranged in proper position. Fig. 3 is an enlarged perspective view of one of the crushing-jaws detached from the machine. Fig. 4 is an enlarged view of one of the detachable parts of said jaws.

As my improved crusher comprises a series of toothed wheels for imparting a slow but powerful action to the crushing-jaws, a means for giving them a rotary converging movement in closing, and a movement in a reverse direction to open them, together with such appliances and appendages necessary to constitute a complete machine, it is essential that it be substantially built.

With this object in view I construct a strong cast-iron frame 1, and across one end thereof arrange the main shaft 2, and nearer the middle of the frame a secondary shaft 3, the two being connected together by suitable toothed wheels 4 in such a manner that motion may be communicated to them through the instrumentality of an endless belt 5, operating on a pulley 6, the construction, size, and relative arrangement of the several gear-wheels 4 being such as that the secondary shaft 3 will rotate rapidly and impart a slow movement or decreased rate of rotation to the

main shaft 2, and to steady the operations of this main shaft it is provided at each end with a large balance fly-wheel 7. Each of these large fly-wheels is provided with an outwardly-projecting wrist-pin 8, that rotates around the axis of its wheel with a crank-like movement. Each wrist-pin 8 carries one end of a horizontally-arranged connecting-rod 9, the other end being in like manner attached to the lower part of a stout lever 10, firmly secured to a transversely-divided rock-shaft 11, placed near and across the front end of the machine, where it is supported in suitable and substantial bearings 12. Upon each of the adjacent ends of this divided rock-shaft is securely affixed a strong circular iron disk or jaw 14, having in their opposite faces a series of wrinkles or angular corrugations 16, and the faces of these disks being set oblique to the axis of the rock-shaft are necessarily wider apart at the top than at the bottom.

Each disk 14 is provided with a wrinkled or corrugated detachable portion 17, that may be readily removed when worn out and its place supplied with a new part of similar form and structure.

The jaws 14 have on their rear sides curved inclined plates or portions 18, as shown in Fig. 1 of the drawings. The inclined faces 19 of these plates bear against similar inclined faces on the plates 20, secured to the frame of the machine, which plates, when the machine is in operation, cause the jaws to approach one another.

On a construction and arrangement of parts shown and described the cranks of the fly-wheels by means of their connecting-rods and intermediate levers will impart to the rock-shaft and corrugated jaws a partial rotation in reverse directions that will cause the collars just back of the jaws to move around the stationary inclines in such a manner as to force the jaws gradually toward each other with a rotary grinding movement and sufficient force to crush blocks of stone, lumps of ore, or other material placed between them, then rotate in a reverse direction and thereby open the jaws for the reception of a fresh supply of stone, &c.; and to facilitate the introduction of stone, &c., between the jaws a detachable hopper 21 is made use of. The crushed material on leaving the jaws is

guided in its passage therefrom by means of a curved guide or casing 22, that serves as a case to the lower portion of the jaws.

Having thus described my improvement, what I claim is—

1. In a crusher, the combination of the shafts rocking in opposite directions, the jaws secured thereon, said jaws having curved inclined plates on their rear sides, with the frame provided with the corresponding curved inclined plates, and means, substantially as described, for imparting motion to said shafts and jaws, whereby said jaws are caused to approach each other.

2. The combination of a pair of jaws provided with curved inclined plates, said jaws rocked in opposite directions and the frame provided with inclined curved plates, rocking shafts for carrying said jaws, and levers attached to the outer end of said rock-shafts, and mechanism for operating said levers to cause the jaws to approach one another, substantially as described.

3. In a crusher, the combination of the rocking jaws having serrations on their inner faces, the inclined plates or portions secured to the jaws and frame of the machine, respectively, the rock-shafts and levers, and means, substantially as described, for imparting motion to said levers and thereby operating the crushing-jaws.

4. In a crusher, the rocking jaws inclined toward each other provided with detachable corrugated crushing-faces, inclined plates for forcing said jaws toward each other, said plates secured to the jaws and frame of the machine, respectively, and a hopper for feed-

ing material between said jaws, the rock-shaft for supporting the levers at the outer ends of said rock-shafts, and links for imparting motion to the levers and thereby to the crushing-jaws, as described.

5. In a crusher, the combination of a pair of rocking corrugated jaws, moving inclined plates secured to said jaws, and inclined curved plates secured to the frame of the machine, said plates causing the jaws to approach each other when the supporting-shaft is rocked, rock-shafts for supporting said jaws, a hopper for supplying material between the jaws, and a guide or casing for conducting the crushed material from between said jaws, and means, substantially as described, for operating said jaws.

6. In a crusher of the character described, the frame 1, the shafts 2 and 3, secured therein, the pulleys and gearing mounted on said shafts, the balance-wheels 7 7, secured to the shaft 2, and the links 9, connected to said wheels, the levers 10, and rock-shafts 11, in combination with the rocking jaws 14, having removable corrugated crushing-faces 17, curved inclined plates secured on the rear sides of said jaws, and similar curved plates 20, secured to the frame of the machine, the whole constructed and arranged to be operated substantially as and for the purpose described.

In testimony whereof I have hereunto set my hand this 22d day of February, A. D. 1888.

WM. JOHNSTON.

Witnesses:

A. C. JOHNSTON,

C. S. JOHNSTON.