

No. 610,122.

Patented Aug. 30, 1898.

F. H. COOK.
ROCK BREAKER AND ORE CRUSHER.

(Application filed Apr. 5, 1897.)

(No Model.)

2 Sheets—Sheet 1.

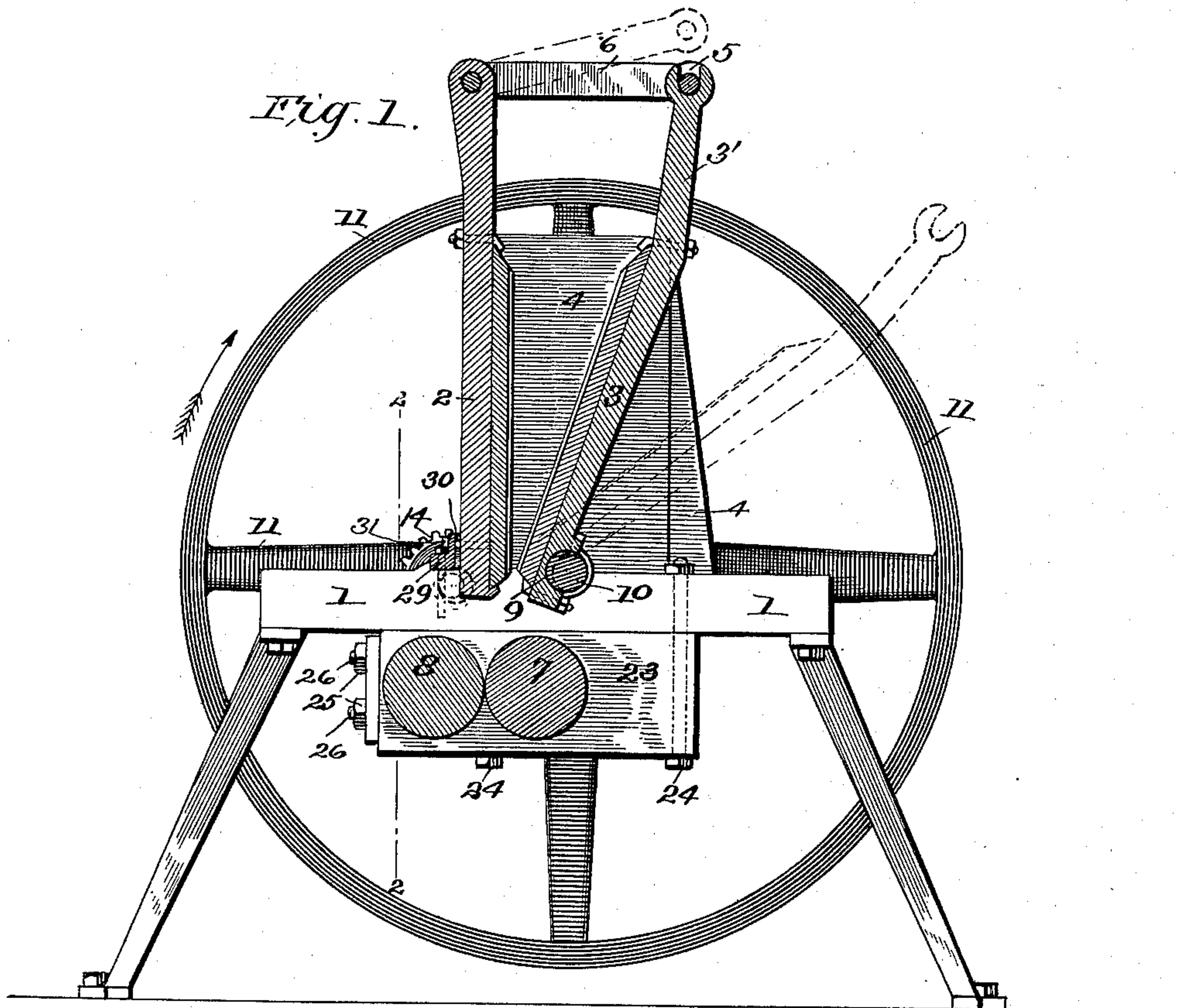
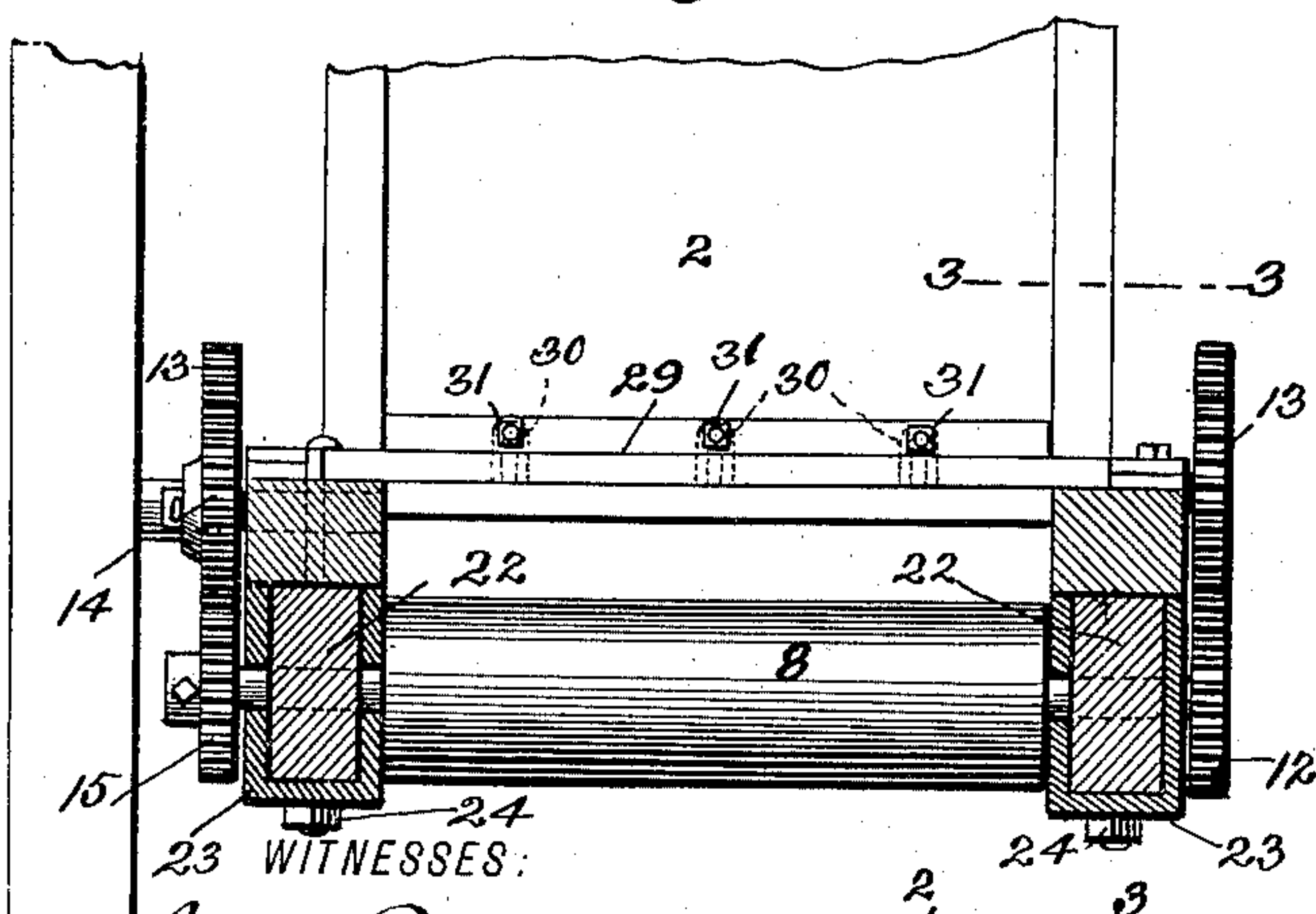


Fig. 2.



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Fig. 3.

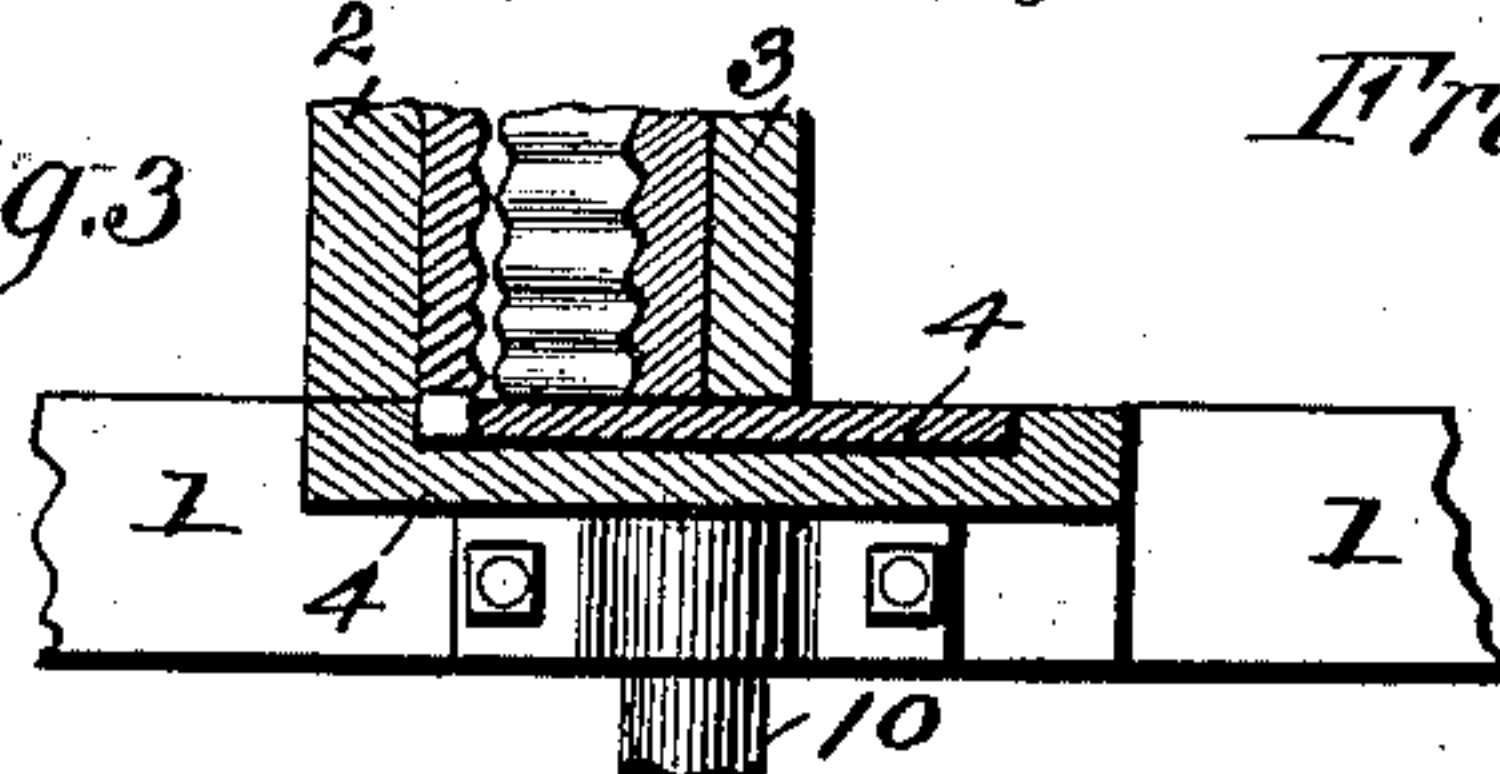


Fig. 4.

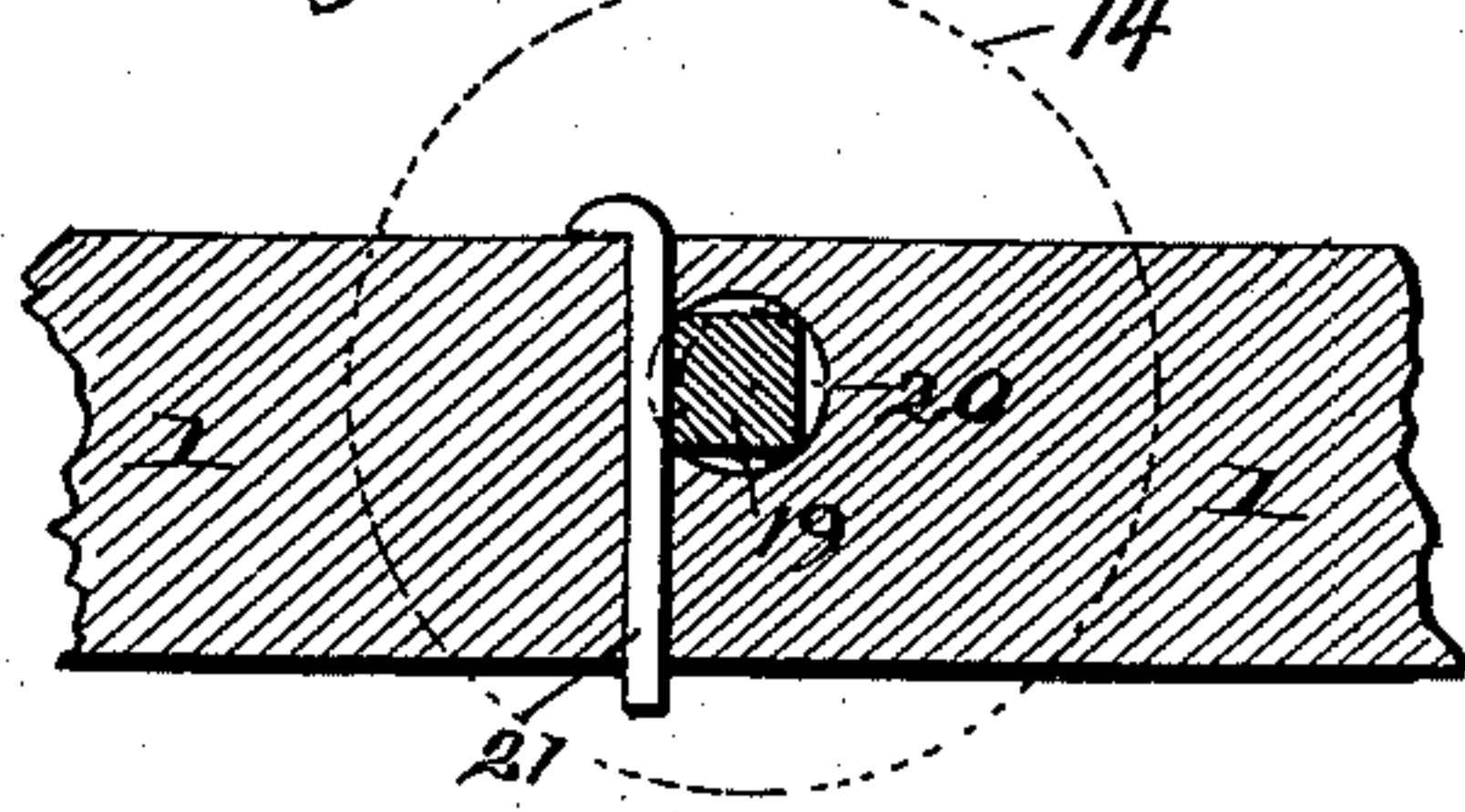
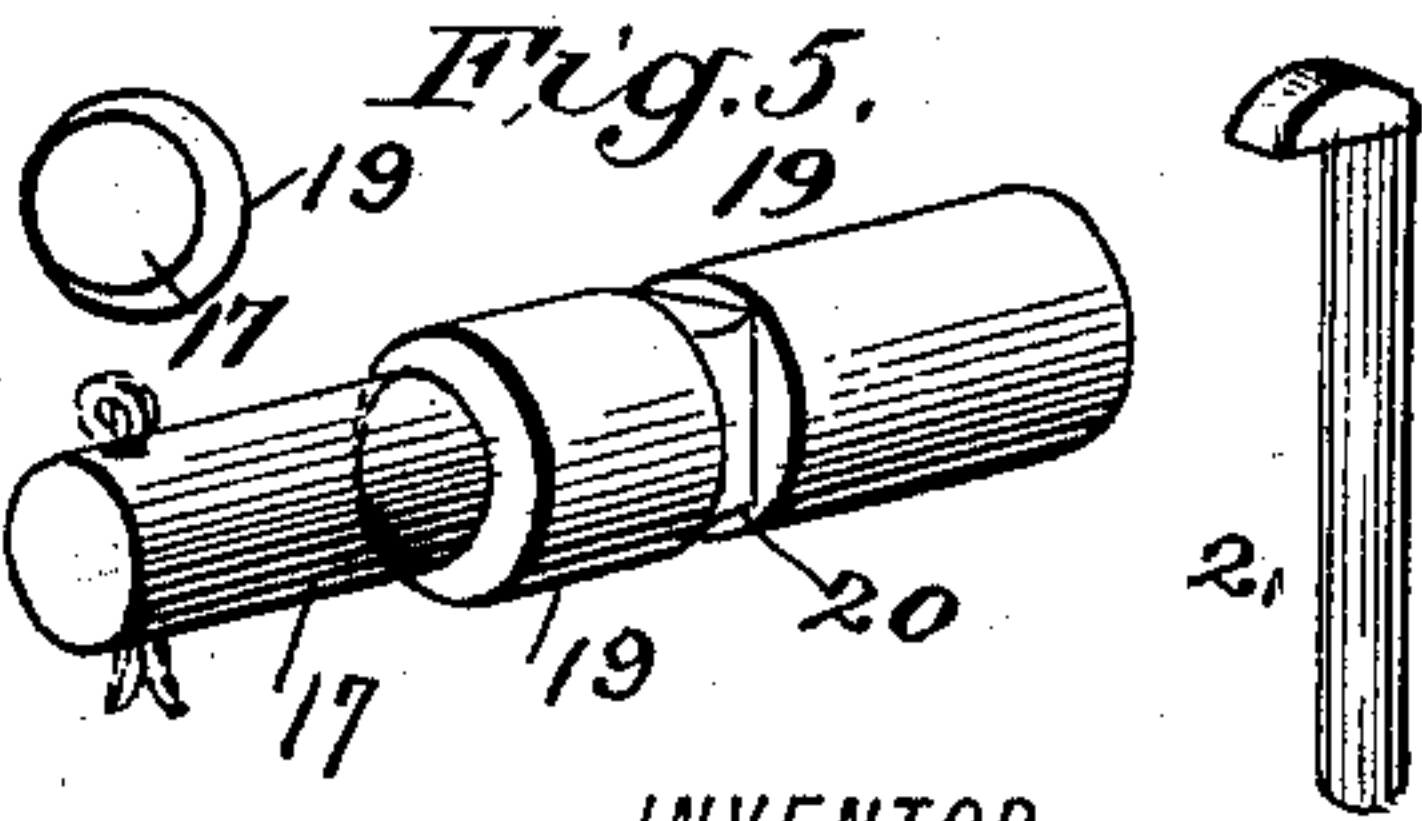


Fig. 5.



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Fig. 6.

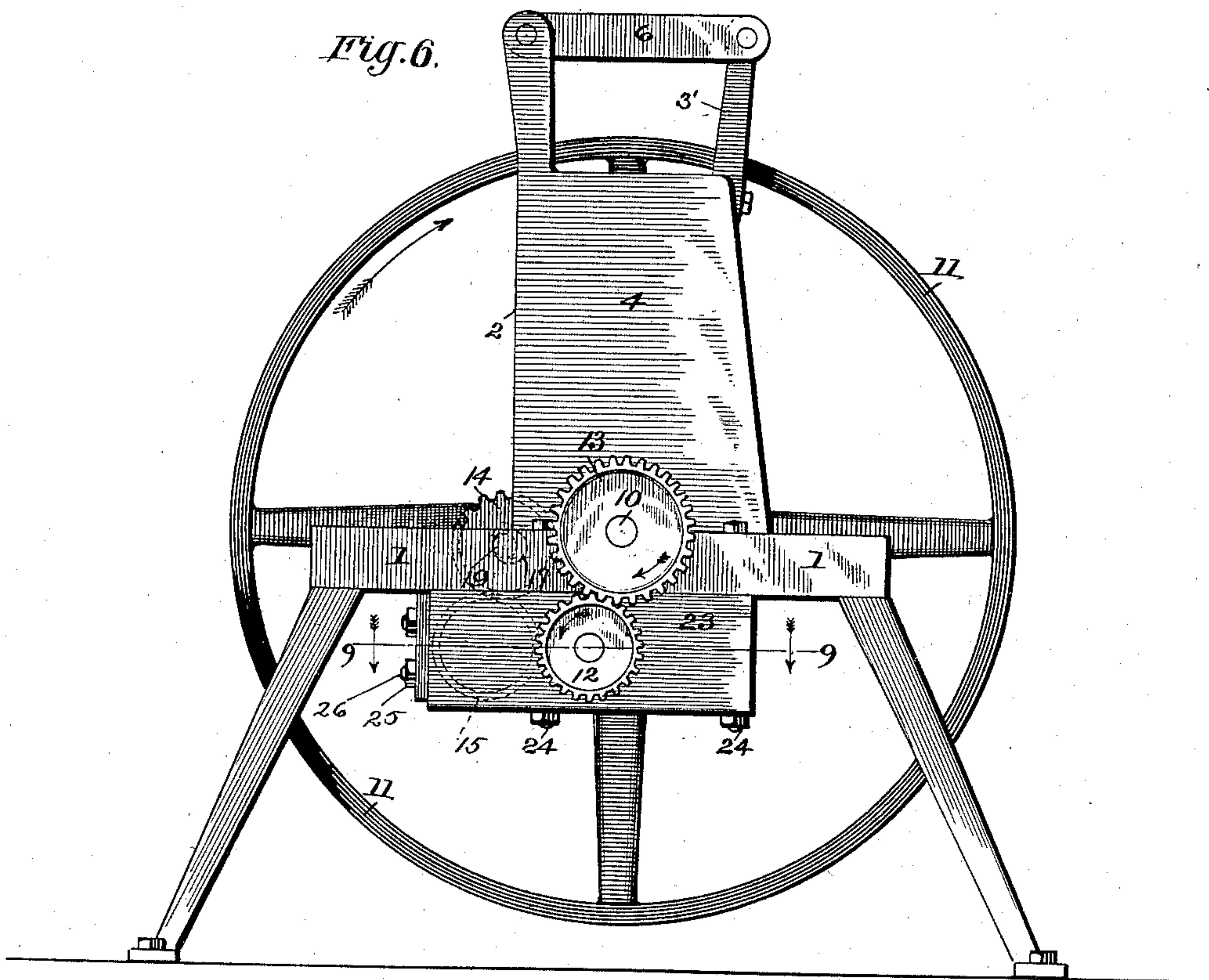


Fig. 7.

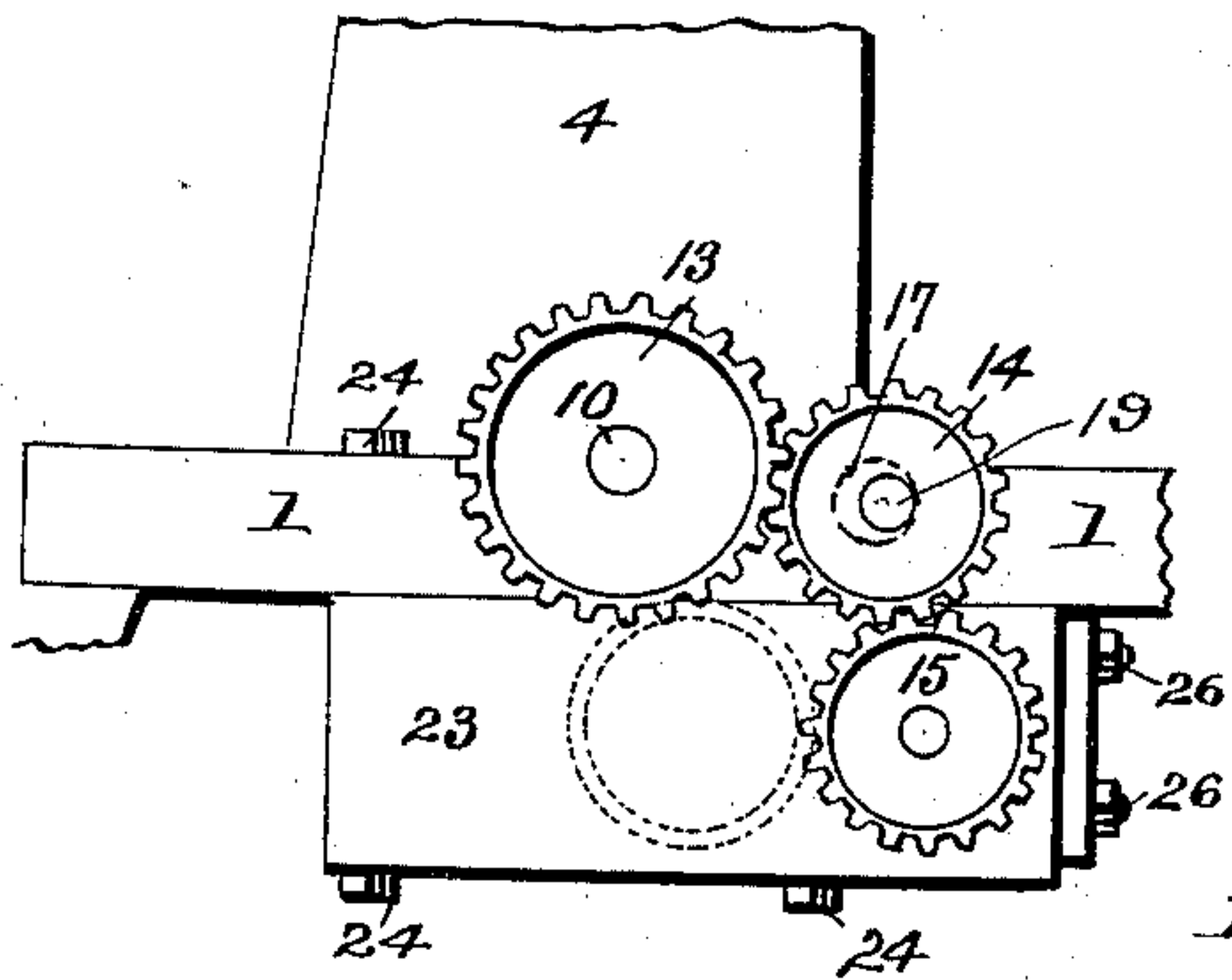


Fig. 8.

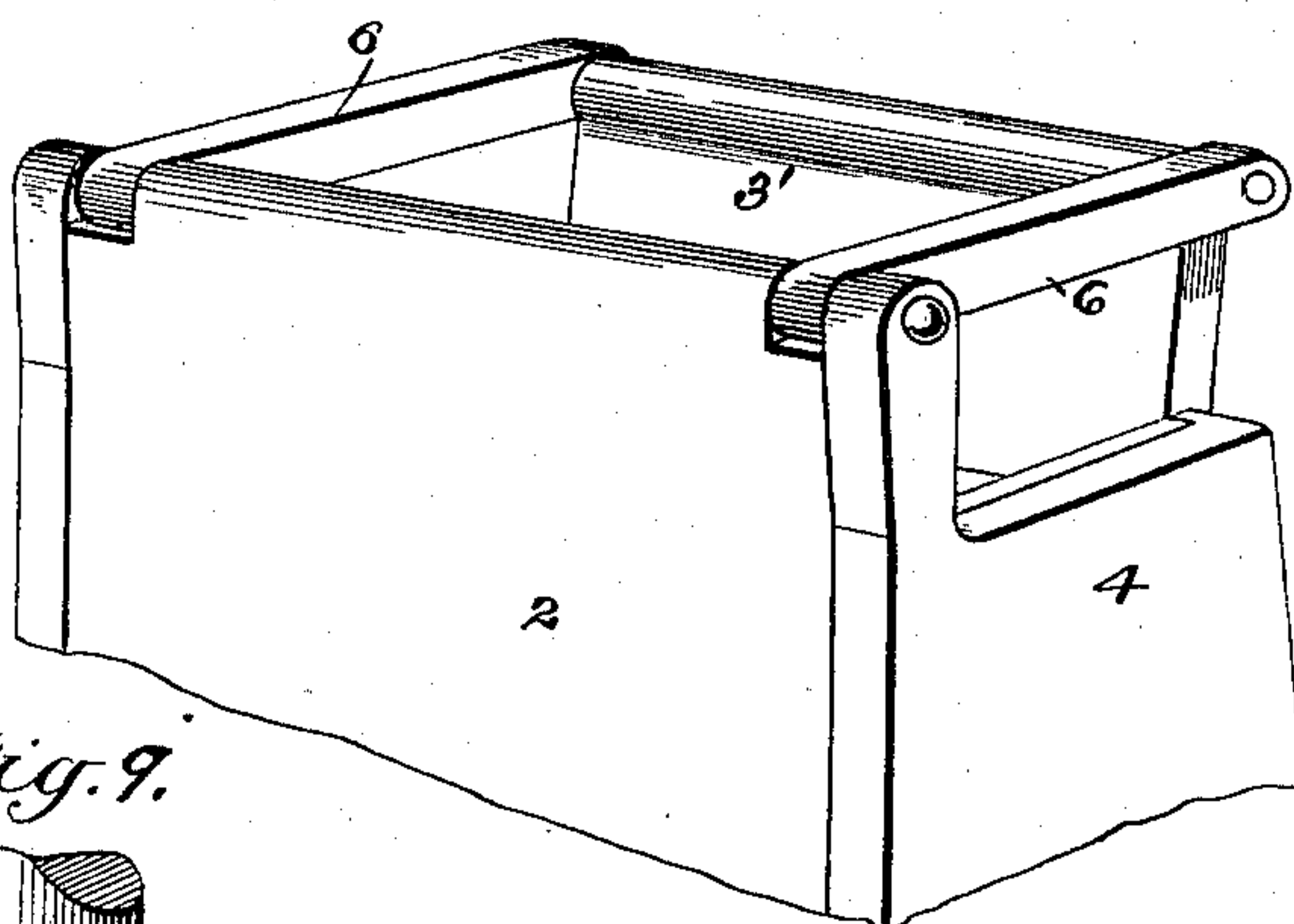
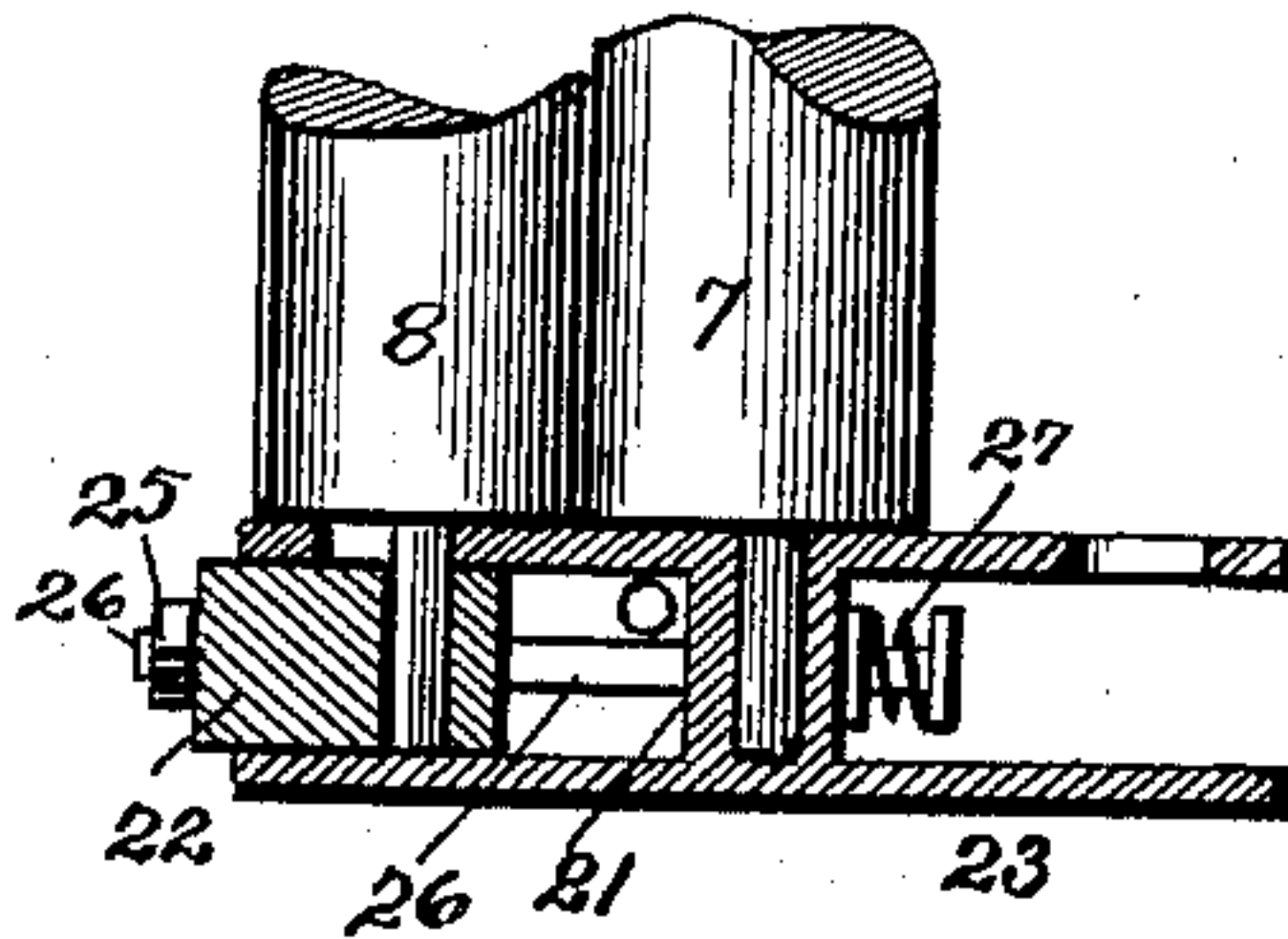


Fig. 9.



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UNITED STATES PATENT OFFICE.

FRANCIS H. COOK, OF SPOKANE, WASHINGTON.

ROCK-BREAKER AND ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 610,122, dated August 30, 1898.

Application filed April 5, 1897. Serial No. 630,744. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. COOK, residing at Spokane, in the county of Spokane and State of Washington, have invented a new and Improved Rock-Breaker and Ore-Crusher, of which the following is a specification.

My invention is an improvement in that class of machines for crushing ores in which an oscillating jaw is arranged opposite a fixed jaw, the same forming thus two sides of a hopper.

The novel features are hereinafter specifically indicated.

In the accompanying drawings, two sheets, Figure 1 is a vertical section of the machine. Fig. 2 is a vertical section on line 2 2, Fig. 1. Fig. 3 is a cross-section on line 3 3, Fig. 2. Fig. 4 is a detail section hereinafter referred to, which illustrates the manner of locking the adjustable shaft of one of the gears. Fig. 5 is a detail perspective view of the aforesaid adjustable shaft and the pin for locking the same. Fig. 6, Sheet 2, is a side view of the machine. Fig. 7 is a view of a portion of the other side of the machine. Fig. 8 is a perspective view of the top portion of the machine. Fig. 9 is a horizontal section on line 9 9, Fig. 6.

The machine rests on legs bolted to a horizontal base-frame 1. The sides of this frame extend vertically and are provided with journal-boxes for the shaft which extends through the upper end of the fixed jaw. The fixed jaw 2, Fig. 1, stands vertical, and the movable jaw 3 is inclined, so that a hopper-space is provided between them and the parallel sides 4 of the machine for reception of rock or ore. The vertically-extended arm 3' of the movable jaw 3 has a notch or open slot 5 to adapt it for detachable engagement with a rod connecting the free ends of parallel arms 6, that are pivoted to the fixed jaw 2 and lie normally horizontal. By disengaging said pivoted arms 6 the movable jaw 3 may be thrown back, as shown by dotted lines, Fig. 1, to allow it to be cleaned by means of a stiff brush. The same position also enables the rotatable crushing-rolls 7 and 8 to be quickly cleaned by the same means. In larger sizes for heavy crushing I prefer to have parallel arms pivoted to upper ends of both fixed and movable jaws.

The faces of the jaws 2 and 3 are formed of removable iron plates suitably corrugated and secured by screw-bolts whose heads engage their beveled edges.

The movable jaw 3 has a compound motion which is caused by an eccentric 9, Fig. 1, on the main or driving shaft 10, that passes through it. The point of engagement of the jaw-arm 3' with the pivoted arms 6 is the fulcrum of the jaw 3, and the eccentric 9 moves the latter up and down and its lower end forward and back. Thus the lower end of the jaw 3 has practically a rotary movement, so that the rock or ore is subjected to a rolling and crushing pressure simultaneously. The eccentric 9 enables great force to be applied with comparatively little power, and it will be seen that the fly-wheel 11 on the shaft 10 when rotated toward the stationary jaw causes the jaw 3 to apply the crushing effect when descending, so that the full benefit of its weight is utilized. It may be added, however, that this operation is practically most applicable to comparatively large pieces of rock or ore and when no crushing-rolls are employed. When the ore is in small pieces and extra fine crushing with rolls is desired, the direction of rotation of the shaft 10 and fly-wheel 11 may be reversed, since a better result may be thus obtained.

The two crushing-rolls 7 and 8 are so arranged, Fig. 1, that the rock or ore crushed by the jaws 2 3 falls directly into the space between their upper sections. They rotate inward toward each other. The fixed roller 7 is connected with the main or driving shaft 10 by gears 12 and 13, and the adjustable roll 8 is connected with said shaft by gears 13, 14, and 15, Fig. 7—that is to say, a gear 14 is mounted on journal 17, Figs. 4 and 5, which is held in a socket in the side of the machine and meshes with a gear 15 on the adjustable roll 8 and another gear 13 on the shaft 10. To adapt the gear 14 to be shifted to accommodate different adjustments or positions of the roll 8, its journal 17 is arranged eccentrically and adapted for adjustment around a center, as shown in Fig. 5—that is to say, the journal 17, Fig. 5, is formed on the end of a short shaft 19, whose larger cylindrical end is inserted in a socket in the frame, but held somewhat loosely therein, so that it may

be rotated without difficulty when required to shift the eccentric journal 17. Such shaft 19 has one or more flat side portions 20, and a cotter-pin 21 is inserted down through the frame to engage such flat portion, and thus hold the shaft fixed in the required adjustment. It is apparent that by withdrawing the pin the position of the eccentric 17 may be changed by rotating the shaft, and then upon replacing the pin it will hold the shaft in the new position.

The two crushing-rolls 7 and 8 are journaled in boxes 21 22, Fig. 9, arranged in two metal box-like parallel frames 23, arranged beneath and parallel to the base-frame 1 and each attached to the latter by means of two screw-bolts 24, that pass up through the latter, as shown. Each frame 23 has a central integral web or partition, which serves as a journal-box for the shaft of the fixed roll 7, and the shaft of the adjustable roll 8 is journaled in blocks 22, that are adapted to slide in the frame 23 lengthwise thereof. The sides of the box-like frames 23 have lengthwise slots to permit such movement of the shaft of roll 8. The frames 23 can be exchanged one for the other in order that different wearing sides may be presented to the rollers. They may also be reversed end for end for the same purpose. These changes necessitate the formation of the alined slots on opposite sides of the fixed partition. The range of movement of each journal-block 22 is limited by two long screw-bolts 26, which pass through it lengthwise and also through the adjacent partition 21 of the frame 23 and have springs 27 and nuts 25 applied to their respective ends to enable the roll 8 to yield when an uncrushable article comes between it and the fixed roll 7. For the same purpose I adapt the fixed jaw 2 to yield by means of a breakable bar 29, Fig. 2, which is L-shaped in cross-section and bolted to the base of said fixed jaw and to the base proper, 1. The bar 29 will sustain normal or ordinary pressure; but if a hammer or like article comes between the jaws it will break, and thus avoid more serious consequences.

To provide for adjustment of the jaw 3, and thereby for enlarging or diminishing the space between the jaws, U-shaped washers 30, Fig. 2, may be interposed between said jaw and the nuts 31, the latter being in such case adjusted as required—that is to say, the opening between the jaws can thus be regulated to crush rock or ore to any desired size.

In an application, Serial No. 595,183, filed June 11, 1896, I have shown and described some features which are represented more or less nearly in the present application.

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

1. The combination, with the fixed crushing-jaw, the movable jaw having the vertically-extended arm 3', provided with an open slot, or notch, on its upper end, and eccentric shaft on which the movable jaw is mounted, and the swinging arms 6, pivoted to the extension of the fixed jaw and having a transverse connecting-rod which is adapted to enter the aforesaid slot, and to be freely disengaged therefrom, as shown and described, for the purpose specified.

2. The combination with box-like frames arranged horizontally and having integral partitions, a fixed roll whose shaft is journaled in such partitions, a movable roll and journal-blocks therefor which are adapted to slide in said frames, screw-bolts passing through such partitions, and blocks and springs for cushioning the same, as shown and described.

3. The combination with the fixed frame, and a shaft held in its top, of the fixed jaw, parallel arms pivoted on said shaft, and the pivoted jaw, having a detachable connection with said arms, substantially as shown and described.

4. The combination with the fixed jaw, of the breakable supporting L-bar arranged horizontally at the base of the same, and bolted thereto and to the base proper, as shown and described.

5. The reversible frame for roller-journals, the same having a fixed partition and slots alined lengthwise on opposite sides of the partition, as shown and described.

6. The combination with the movable jaw, adjustable crushing-rolls, and gears on the shafts of the same, of a shiftable gear 14, that meshes with the first-mentioned gears, the shaft 19 having an eccentric journal 17, and adapted to be rotated on its axis, and having polygonal portions, and the cotter-pin for securing said shaft in any desired rotary adjustment, as shown and described.

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Witnesses:

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E. W. TALBOTT.