

No. 786,265.

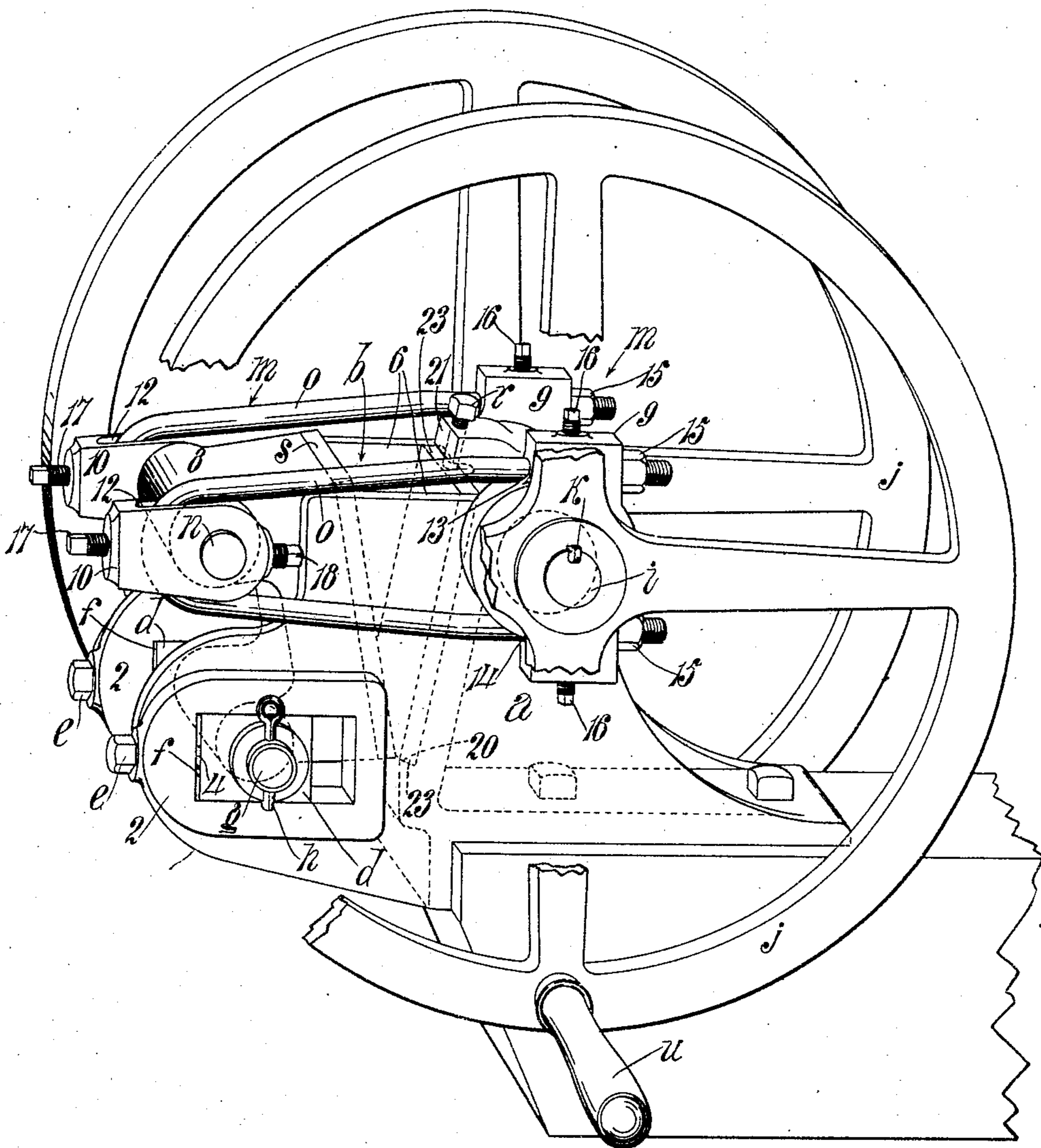
PATENTED APR. 4, 1905.

A. C. CALKINS.
ORE CRUSHER.

APPLICATION FILED APR. 11, 1900.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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Inventor

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3 SHEETS—SHEET 2.

Fig. II

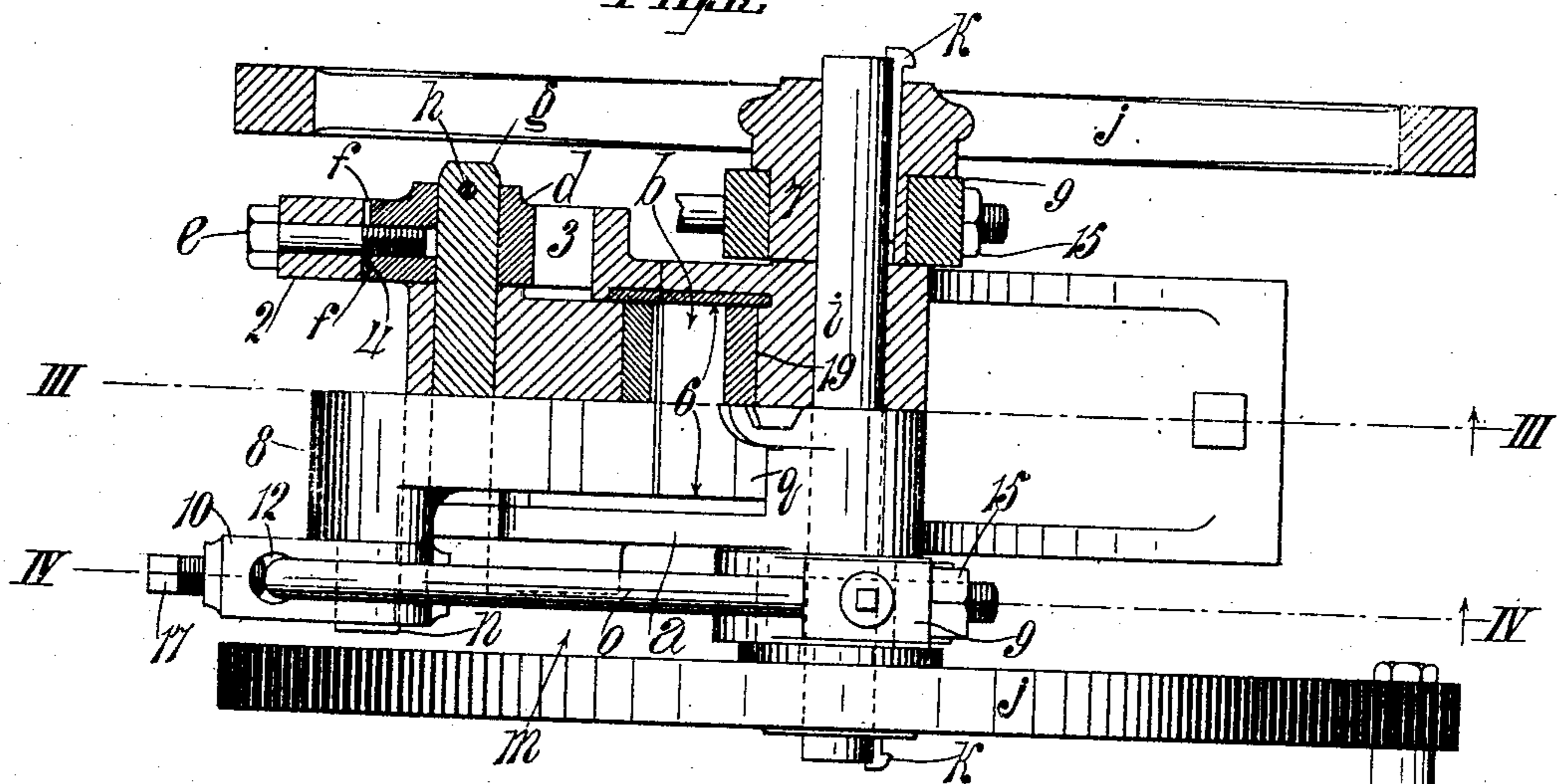
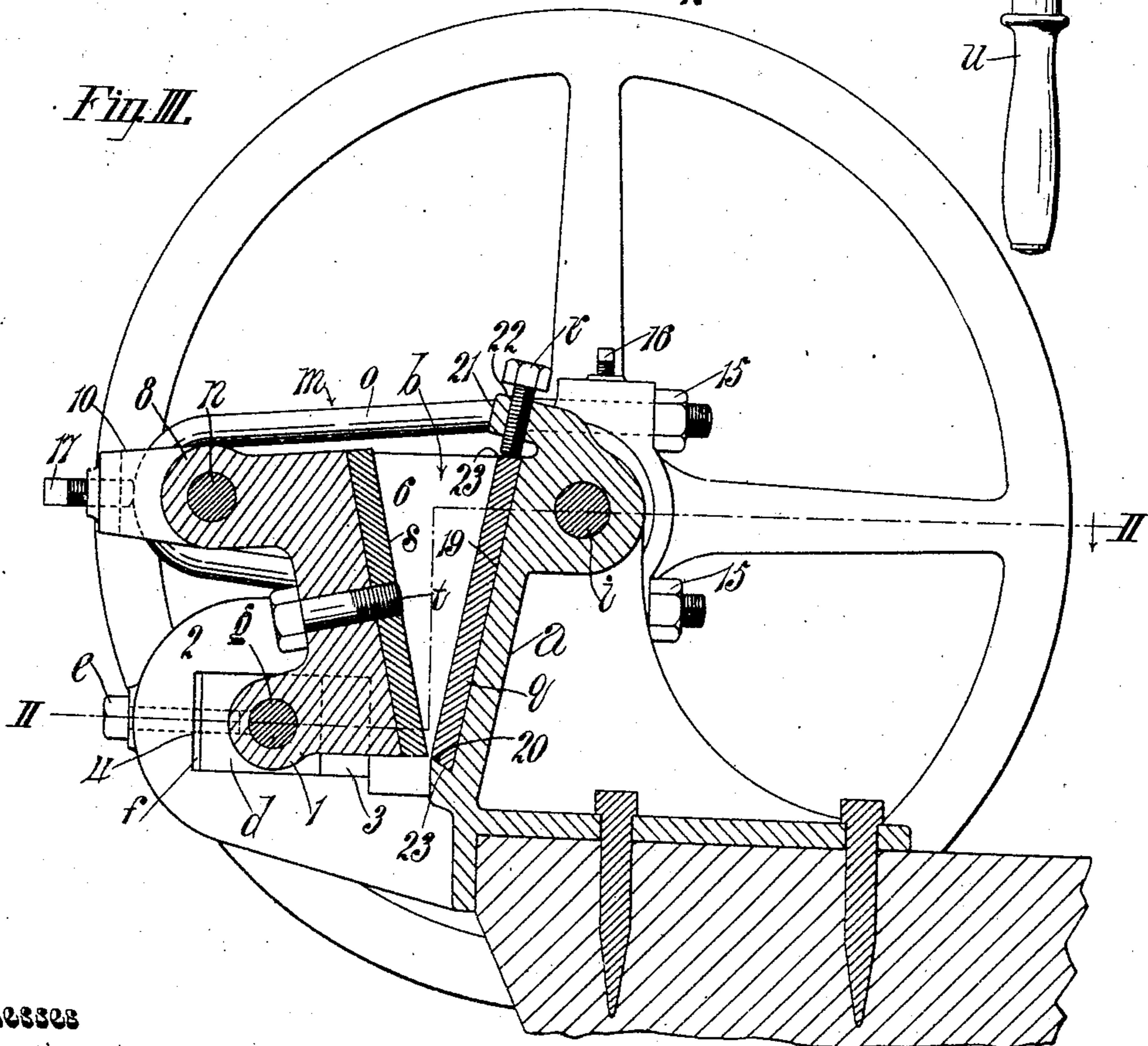


Fig. III.



Witnesses

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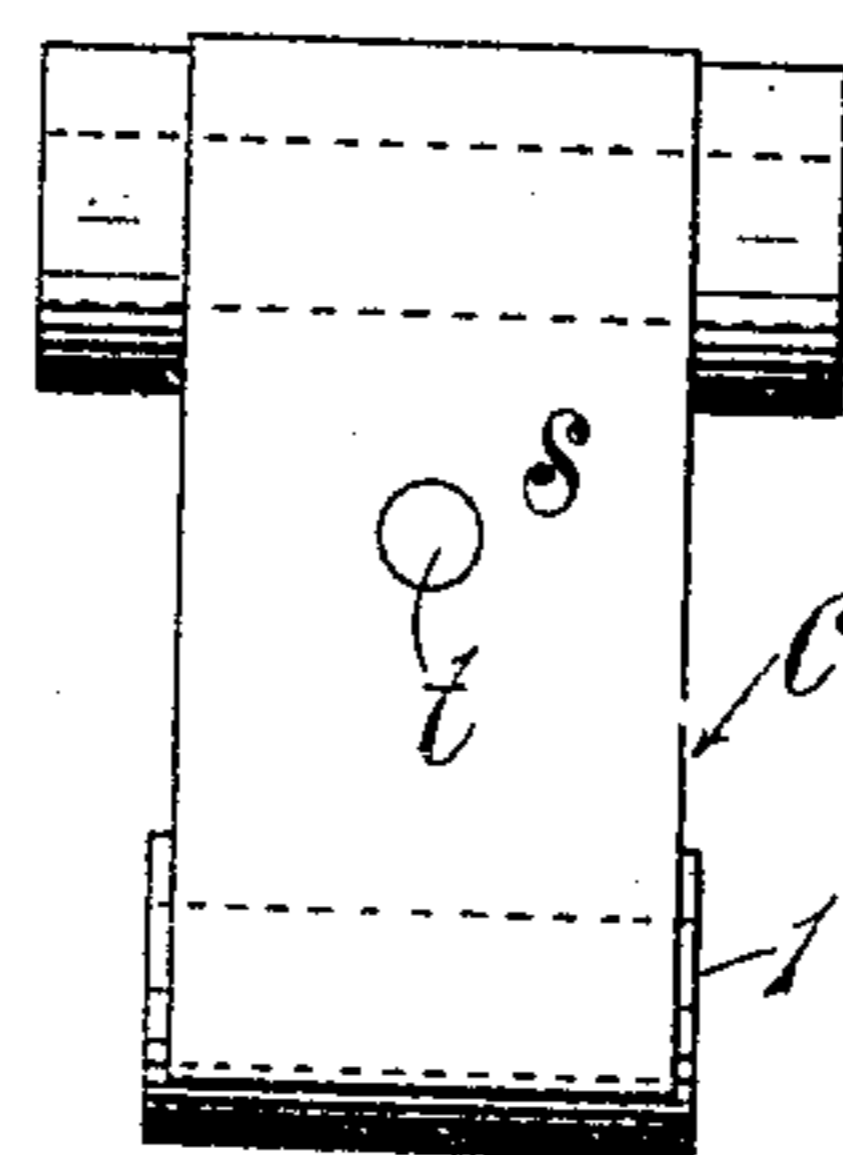
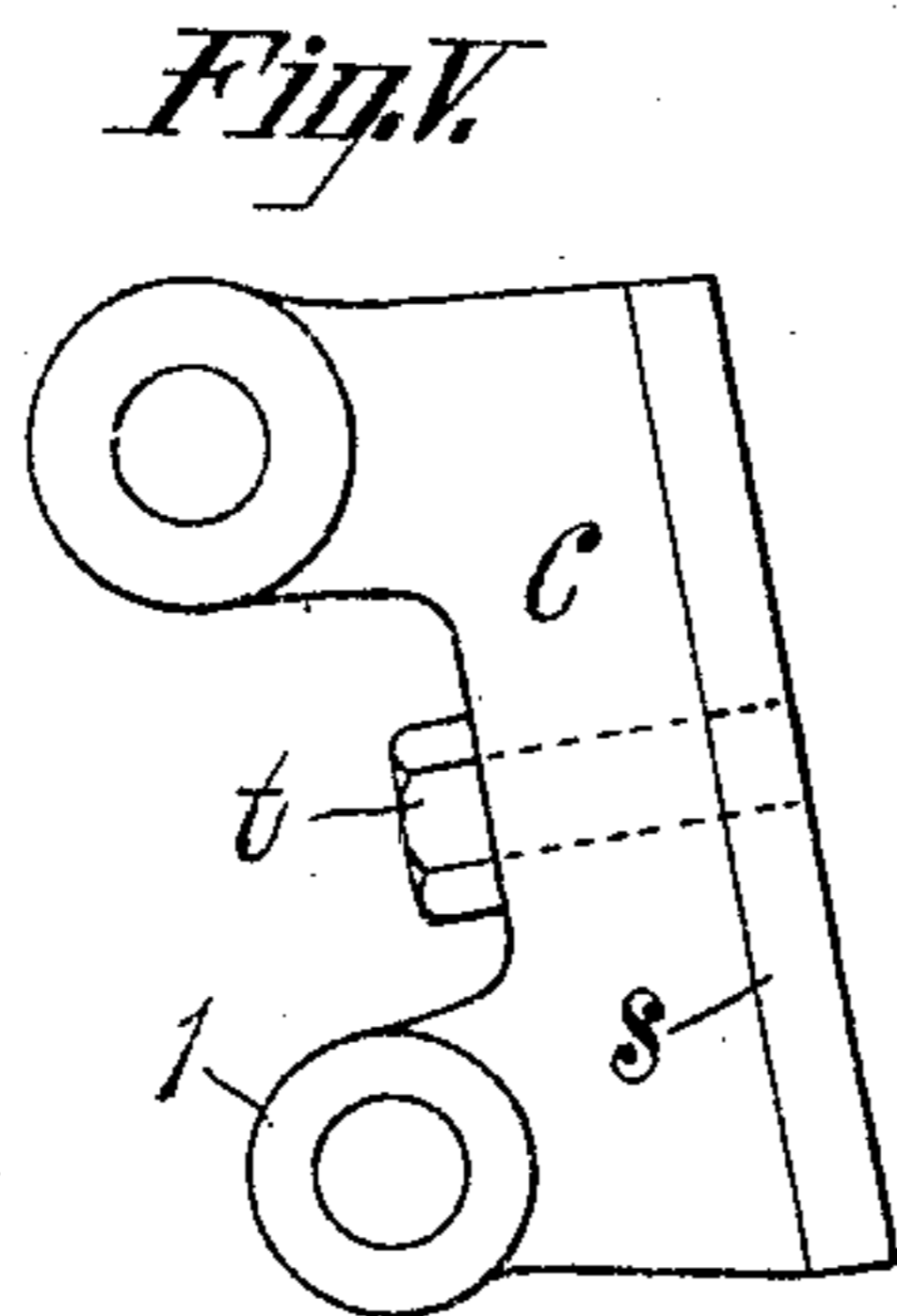
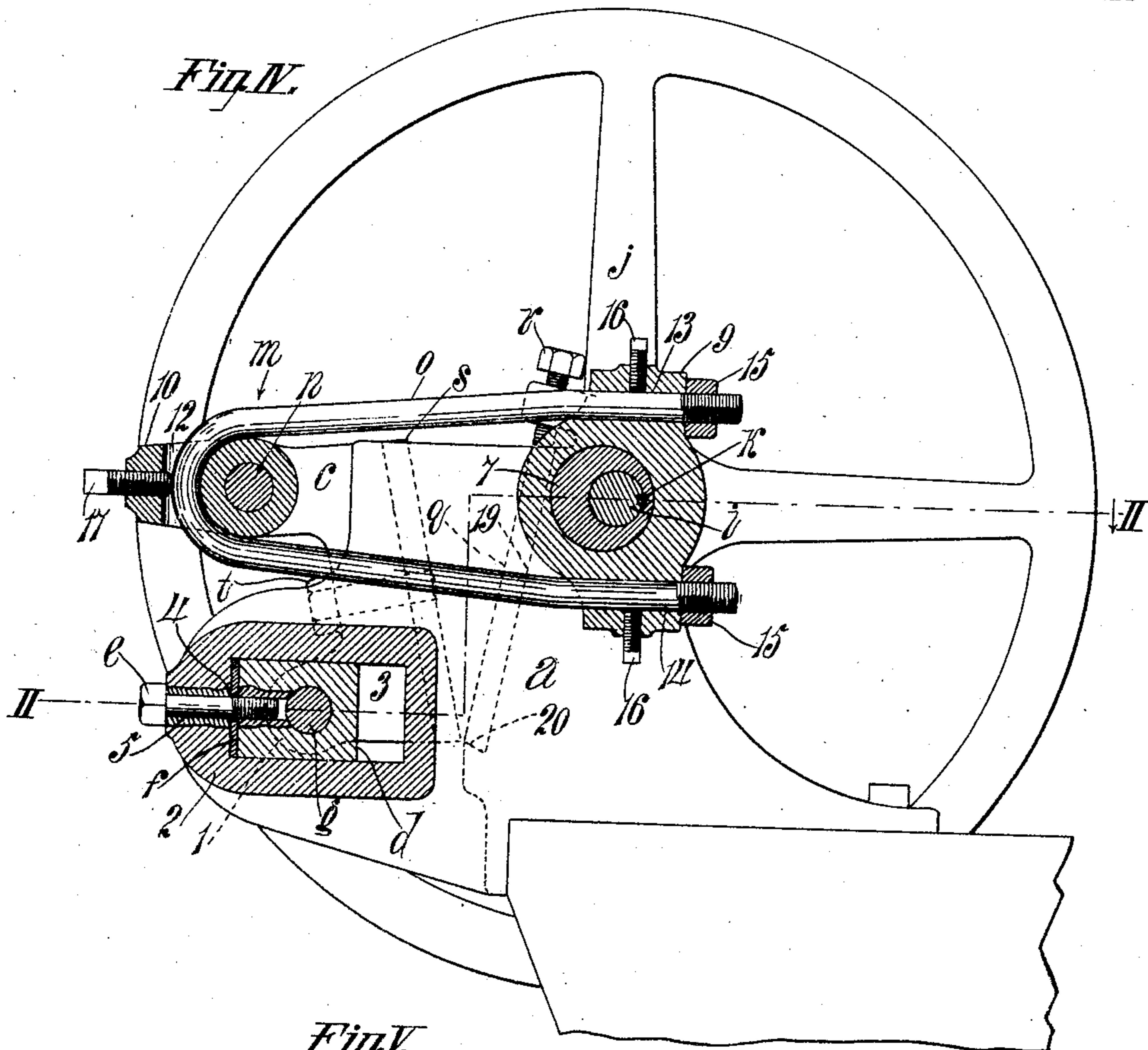
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ORE CRUSHER.

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3 SHEETS—SHEET 3.



Witnesses
George H. Ingman.

J. Townsend.

Signed:
Albert Champlin Calkins
by Townsend Bros.
his Attys.

UNITED STATES PATENT OFFICE.

ALBERT CHAMPLIN CALKINS, OF LOS ANGELES, CALIFORNIA, ASSIGNOR
TO FREDERICK WILLIAM BRAUN, OF LOS ANGELES, CALIFORNIA.

ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 786,265, dated April 4, 1905.

Application filed April 11, 1900. Serial No. 12,480.

To all whom it may concern:

Be it known that I, ALBERT CHAMPLIN CALKINS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Ore-Crushers, of which the following is a specification.

The object of this invention is to provide an extremely cheap, strong, compact, and simple ore-crusher which is so constructed as to afford most ready access to the crushing-chamber for the purpose of perfectly cleaning the same.

This invention is applicable to crushers for crushing any hard frangible substances, but is especially designed for the use of assayers, in which use accessibility to the crushing-chamber is demanded to allow thorough cleaning, thus to prevent salting any charge by material which may have been left in the crushing-chamber by a previous charge.

In my invention the frame of the machine forms the rear and side walls of the crushing-chamber, and the vibratory jaw is pivoted by its heel to the frame and is fitted between the side walls of the crushing-chamber to form the front wall of such chamber. A shaft provided with eccentrics is mounted on the frame at the rear of the crushing-chamber, and connecting-rods connect the eccentrics with the upper end of the vibratory jaw. Preferably the vibratory jaw is detachably pivoted to the frame by a removable pin, and the connecting-rods are detachably pivotally connected with the upper end of the jaw by a removable pin. By this means the vibratory jaw may be detached at either the top or the bottom and swung into position to give access to the interior of the chamber and to the inner or crushing face of the vibratory jaw.

The accompanying drawings illustrate my invention.

Figure I is a perspective view of my newly-invented ore-crusher, portions being broken away to expose some of the parts that would otherwise be hidden. Fig. II is a plan view, partially in section on line indicated by II II, Figs. III and IV. Fig. III is a vertical longitudinal mid-section on line III III, Fig. II.

Fig. IV is a side elevation in section on irregular line IV IV, Fig. II. Fig. V is a side elevation of the vibratory jaw detached. Fig. VI is an elevation of the vibratory jaw detached and viewed on the side which forms the front wall of the crushing-chamber. Fig. VII is a view of one of the shims.

a indicates the ore-crusher frame, provided with a crushing-chamber *b*, open at the front, top, and bottom.

c indicates the vibratory jaw, detachably pivoted at its heel 1 to the frame through adjustable intermediate means, such as the blocks *d*, held in position by the screws *e* and shims *f*. The screws *e* screw through front extensions 2 of the frame and screw into the blocks *d*, respectively, to move said blocks forward and back. The blocks are mounted at opposite sides of the frame in slots 3, provided in the forward extensions 2 of the frame for this purpose. The shims are each provided with a slot 4, so that the shims will straddle the screws *e* and can be inserted while the blocks are held in position by the screws. The holes 5 in the extensions 2 of the frame for the screws *e* are unthreaded, so that the screws turn freely in said extensions and when turned will draw the blocks against the shims and away from the crushing-chamber.

g indicates a pin inserted through the blocks *d* and through the heel of the jaw.

h indicates cotter-pins inserted through the blocks *d* and pivot-pin *g* to fix the pivot-pin in the blocks. The pivot-pin *g* can be made and is preferably made of cold-rolled steel, and the heel of the vibratory jaw partially rotates freely thereon. The vibratory jaw fits between the side walls 6 of the crushing-chamber and forms the front wall of such chamber.

i indicates a shaft journaled to the top of the frame back of the crushing-chamber and provided with eccentrics at each side of the frame. In order to obtain extreme cheapness of construction and to facilitate assembling and taking apart, the eccentrics for this shaft are formed of the inner hubs 7 of the fly-wheels *j*, each of said fly-wheels being keyed to said shaft *i* by its key *k*. Connecting-rods are journaled on the eccentrics 7, respectively,

and extend forward and are pivotally connected to the top of the vibratory jaw. The vibratory jaw is provided with a rearward top extension 8 for this purpose.

5 *m* indicates the connecting-rods in a general way.

n indicates a detachable pin for detachably connecting the connecting-rods *m* with the top front extension of the vibratory jaw.

10 9 indicates the boxes by means of which the connecting-rods are respectively journaled on the eccentrics 7.

10 indicates the heads for the connecting-rods, respectively, by which said rods are connected with the pivot-pin *n*.

15 It is to be understood that each connecting-rod, with its box and head, is virtually one piece which might be cast integral; but for combined lightness and great strength, cheap-
20 ness and convenience of construction, and for purposes of adjustment the rods *m* are built up of a cast box 9, a cast head 10, pivoted to the top extension 8 of the vibratory jaw, and a rod *o*, made of cold-rolled steel, inserted
25 through a vertical hole 12 in its head 10 and bent around the bearing *p* in such head in which the detachable pin *n* is to be inserted, and the ends of the rods *o* are passed through
30 holes 13 14 in the box 9 at right angles to the shaft and above and below the eccentric and are fastened by any suitable means—such, for instance, as the nuts 15, screwed on the ends of the rod. Each of the connecting-rods, with its box and head, is of like construction. In
35 practice the holes 12 and 13 14 will be somewhat larger than the rod *o* to be passed there-through, so as to allow the parts to be assembled with ease, and set-screws 16 are screwed through the box to force the ends of the rod
40 toward each other and to clamp the ends of the rod firmly in the box, and a set-screw 17 is provided for clamping the loop of the rod in the head 10.

18 indicates screws screwed through the
45 heads 10 to clamp the detachable pivot-pin *n* to the heads, said pin being free to partially rotate in the front extension of the vibratory jaw.

The frame *a* is provided at the lower edge
50 of the rear wall 19 of the crushing-chamber with a forwardly-projecting lip 20, the upper face of which is at an acute angle with said rear wall, and at the top of said rear wall a forwardly-projecting lug 21 is provided, extending above said lip 20 and provided with
55 a screw-threaded hole 22.

60 *g* indicates a removable wearing face-plate with edges 23 23 beveled converging from front to rear and at an angle with the faces of the face-plate to fit the angle between said rear wall and upper face of said lip.

65 *r* indicates a set-screw screwed through said lug 21 to engage the upper edge of said face-plate and to clamp the face-plate against the beveled upper face of the lip.

s indicates a removable wearing face-plate for the rear face of the vibratory jaw. The wearing face-plate *s* is fastened in place by a bolt *t*, which extends through the vibratory jaw and is screwed into the face-plate *s*. 70

In practical operation the shaft *i*, with its eccentrics 7, will be turned by the crank *u*, and the vibratory jaw will be moved back and forth by the connecting-rods operated by the eccentrics to cause the vibratory jaw to
75 crush the ore in the ordinary manner. After the charge has been crushed and it is desired to clean the crushing-chamber either of the removable pivot-pins *g* or *n* will be removed, thus allowing the upper or lower end of the
80 vibratory jaw to be swung away from the crushing-chamber. Preferably the lower pin *g* will be withdrawn and the lower end of the vibratory jaw will be swung forward and
85 downward away from the crushing-chamber and may be swung upward and backward over the crushing-chamber, thus giving perfect access to all the surfaces upon which any of the crushed material might adhere. When
90 the surfaces have been thoroughly cleansed of all foreign material, the jaw will be again brought into position and fastened by the pivot-pin *g*.

The lower edge of the face-plate *s* of the vibratory jaw may be adjusted toward and
95 from the lower edge of the face-plate *g* of the rear wall by turning the screws *e* and by inserting or removing shims *f*, as may be required.

The inclination of the vibratory jaw may
100 be regulated to a greater or less degree by adjusting the distance between the connecting-rod heads and the eccentric rings or boxes.

What I claim, and desire to secure by Letters Patent of the United States, is— 105

1. An ore-crusher comprising a frame forming a crushing-chamber open at the front and bottom, and closed at the rear and sides, a vibratory jaw detachably and adjustably pivoted at its heel to the frame, and forming the
110 front of such chamber, an operating-shaft at the rear of the chamber, reciprocating operating means extending from said shaft alongside of the chamber, and a pivoted operating connection for the vibratory jaw with such
115 means, at the top of the chamber, the said jaw being movable on this pivot, when the lower pivot is detached, to swing out of the open front of the chamber and expose the interior thereof. 120

2. An ore-crusher comprising a frame provided with a crushing-chamber open at the front, top and bottom and closed at the rear and sides by substantially vertical rear and side walls formed integral with said frame;
125 said side walls having slots, bearing-blocks movable in said slots, means for adjusting said bearing-blocks, a pin detachably secured in said blocks, a vibratory jaw pivoted at its heel on said pin and extending between the 130

side walls of the crushing-chamber and forming the front wall of such chamber; a shaft journaled to the top of the frame back of the crushing-chamber and provided with eccen-
5 trics outside the frame on opposite sides thereof, respectively; and connecting-rods journaled on the eccentrics and extending forward and detachably pivoted to the top of the vibratory jaw.

10 3. An ore-crusher furnished with a frame, a stationary jaw, a movable jaw, a shaft mounted on the frame, fly-wheels provided with eccentrics integral therewith respectively, and fixed on said shaft, between the fly-wheels and
15 the said frame, looped connecting-rods connected with the movable jaw, boxes on the eccentrics of the fly-wheels, and means adjustably connecting the said looped connecting-rods with said boxes.

20 4. An ore-crusher comprising a frame provided with a crushing-chamber open at the front, top and bottom, and closed at the rear

and sides by substantially vertical rear and side walls formed integral with said frame; a vibratory jaw detachably pivoted at its heel 25 to the frame and extending between the side walls of the crushing-chamber and forming the front wall of such chamber; a shaft journaled to the top of the frame back of the crushing-chamber and provided with eccen- 30 trics outside the frame on opposite sides thereof, respectively; and connecting-rods journaled on the eccentrics and extending forward and pivotally connected to the top of the vibratory jaw.

35 In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, at Los Angeles, California, this 27th day of March, 1900.

ALBERT CHAMPLIN CALKINS.

Witnesses:

JAMES R. TOWNSEND,
FRANCIS M. TOWNSEND.