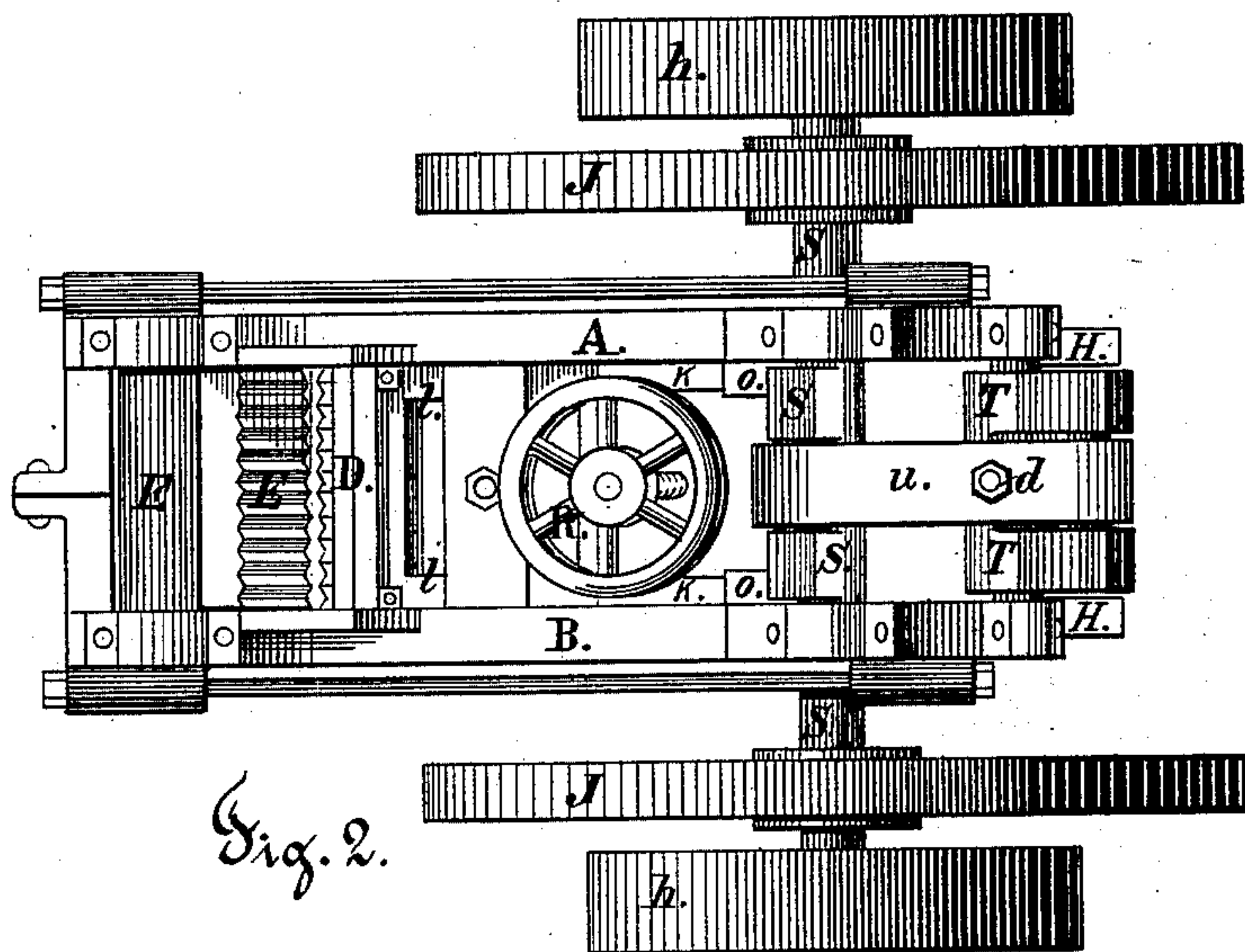
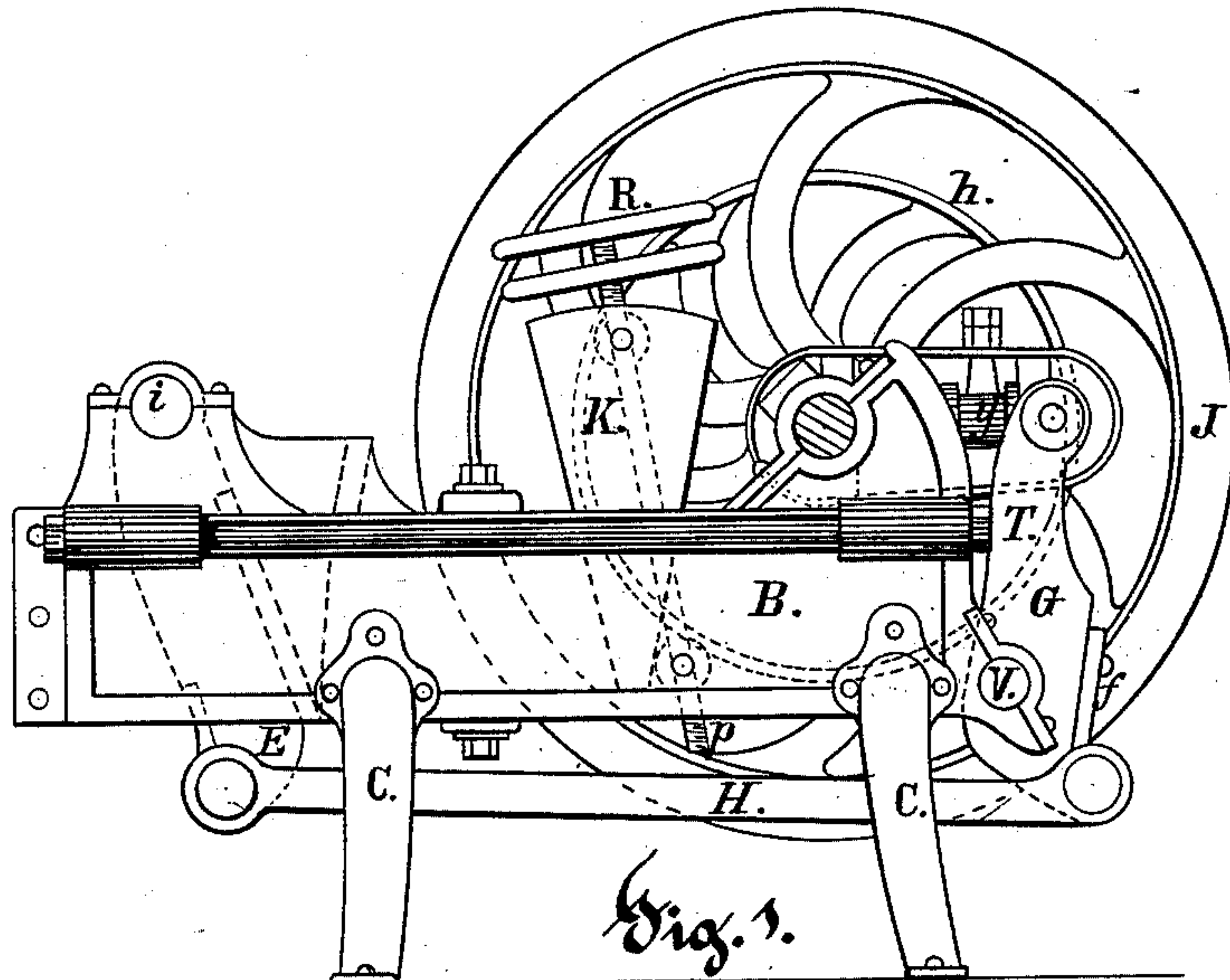


E. COLEMAN.
Rock-Crusher.

No. 223,581.

Patented Jan. 13, 1880.



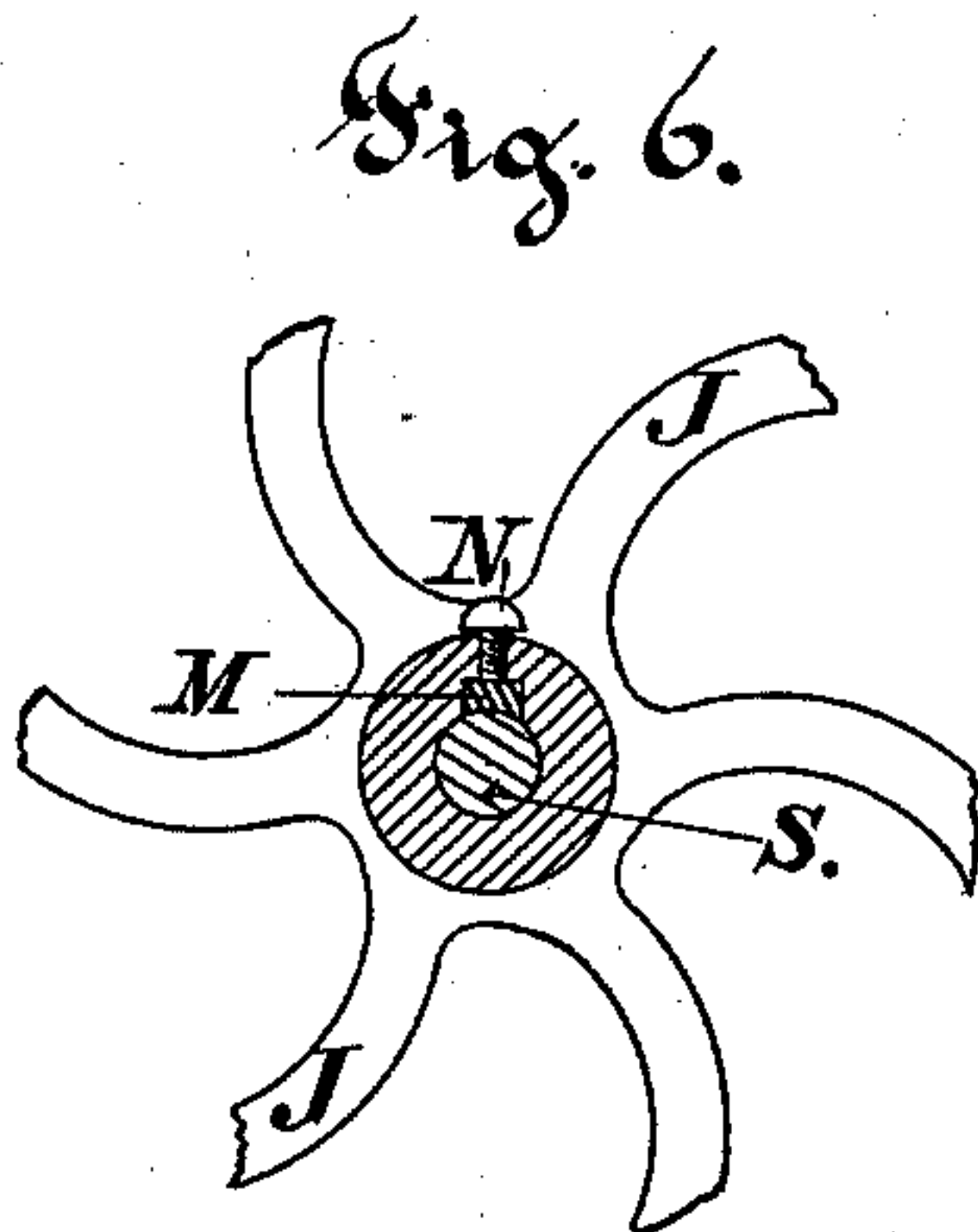
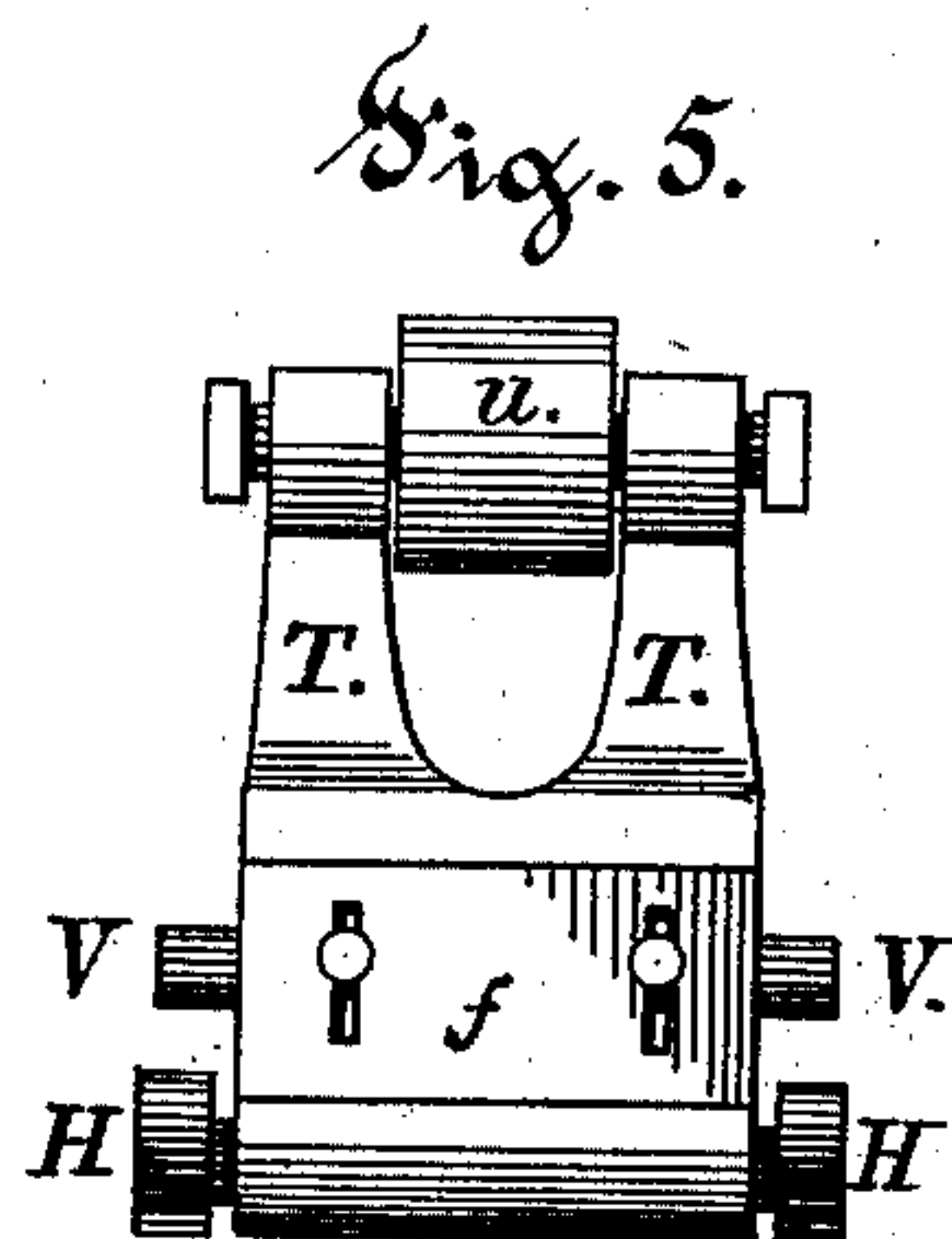
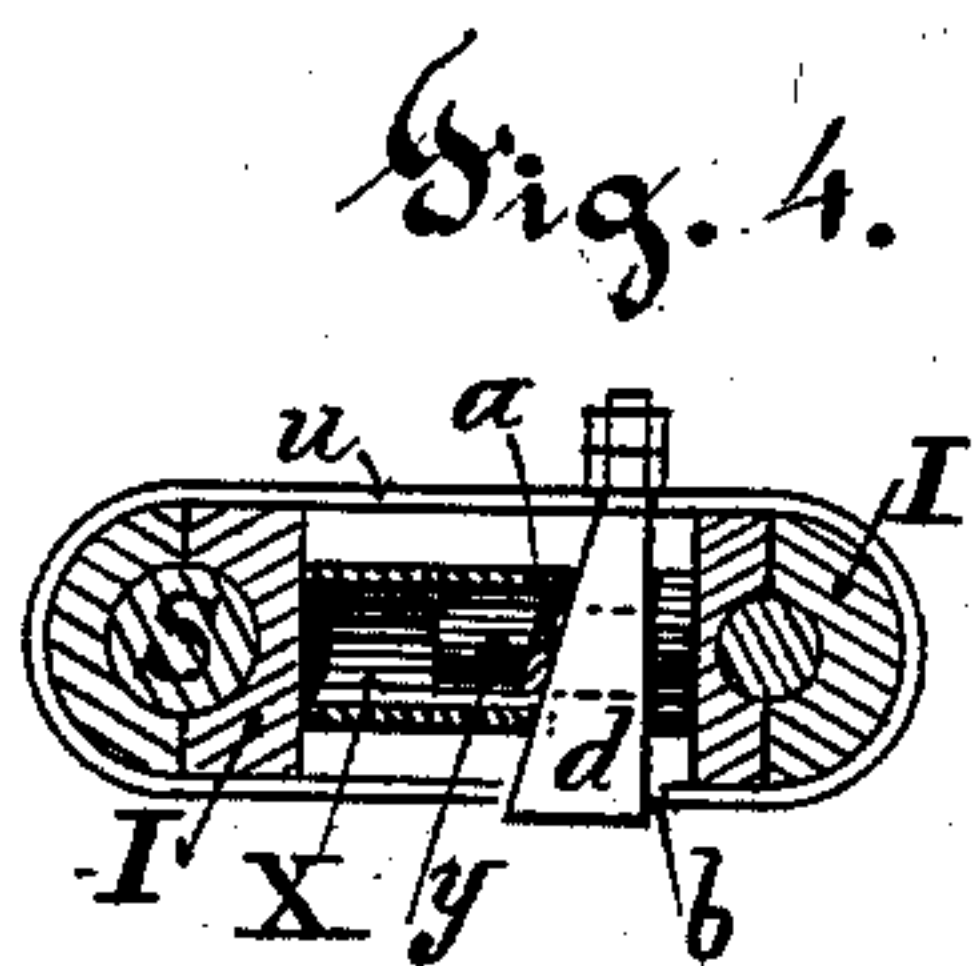
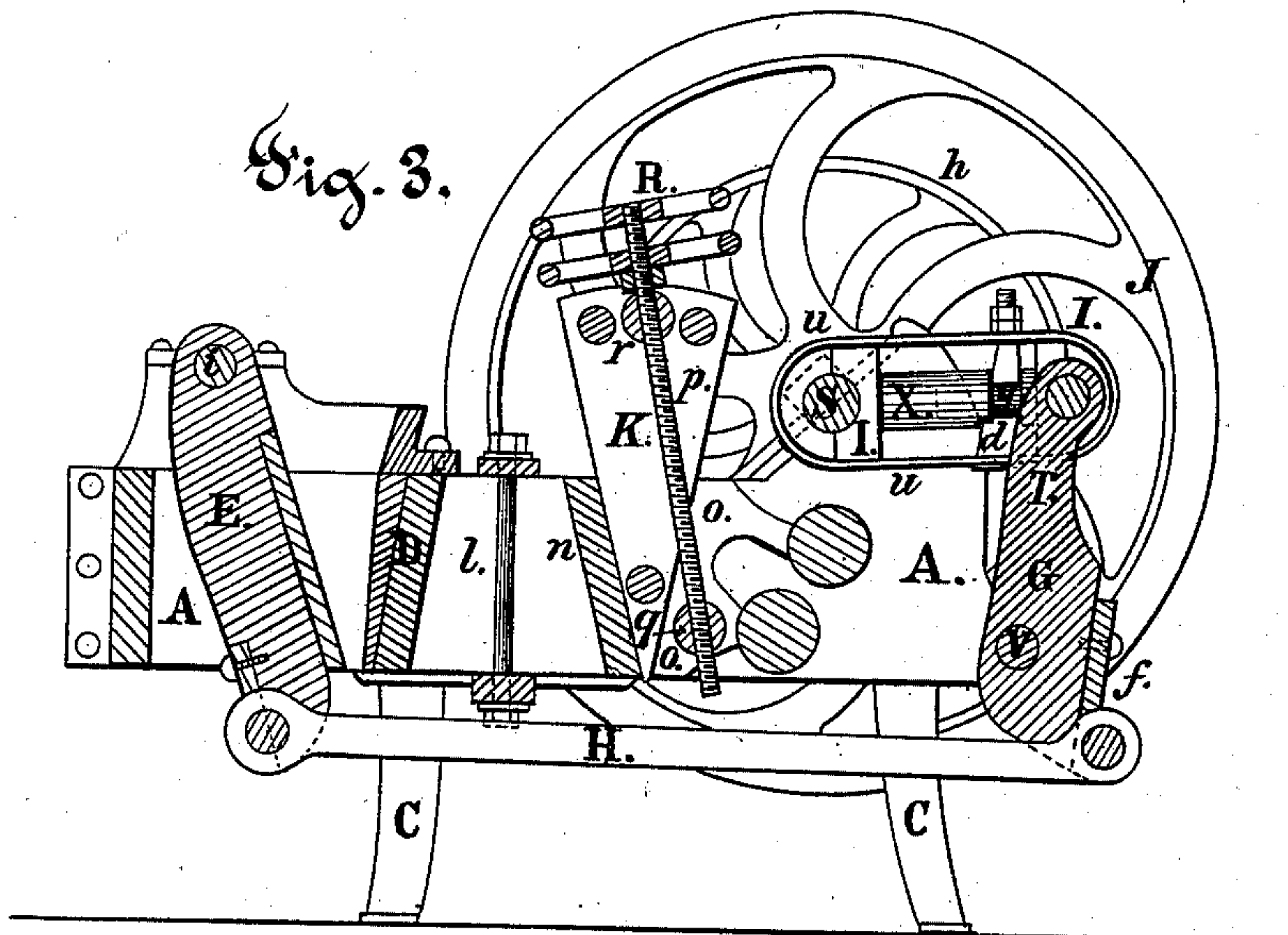
Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

EZRA COLEMAN, OF SAN FRANCISCO, CALIFORNIA.

ROCK-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 223,581, dated January 13, 1880.

Application filed May 22, 1879.

To all whom it may concern :

Be it known that I, EZRA COLEMAN, of the city and county of San Francisco, in the State of California, have invented an Improved Rock-Crusher; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings.

This invention has relation to improvements in rock-crushers; and it consists, first, of a stationary jaw located between a swinging jaw and driving-shaft, in combination with a lever, pitman, and connecting-rods; secondly, a main lever having an adjustable short arm; thirdly, a stationary jaw provided with side pieces and inclined end piece, forming a frame, which moves on slides between the sides, in combination with inclined lugs or ribs, a wedge-frame having a screw-shaft, and a journaled shaft; fourthly, a pitman consisting of divided boxes, the outer halves of which are sustained by a metallic strap, while the inner halves are connected by adjustable extension-couplings; and, fifthly, the combination of the outer halves of said boxes held in place by a strap, the tubular extension on one inside half of a box, and the spindle or stem on the other inside half of the box with a slot and wedge, substantially as hereinafter more fully set forth.

Referring to the accompanying drawings, Figure 1 is an elevation, and Fig. 2 a plan, of my improved rock-crusher. Fig. 3 is a vertical section of the rock-crusher. Fig. 4 is a detached view of the pitman. Fig. 5 is a detached front view of the main lever. Fig. 6 is a detached view of the frictional device.

The body or frame of the crusher consists of two parallel sides, A B, which are properly connected together and supported upon legs C in the usual way.

The crushing-jaws D E are mounted between the sides A B at the front end of the frame, while the crank or power shaft, which operates the swinging jaw E, is mounted across the opposite or rear end of the frame, and its power and motion are transmitted to the swinging jaw through the main lever G, which stands vertically across the rear end of the frame, and two connecting-bars, H H, which pass longitudinally underneath the frame, so as to connect

the lower or short arm of the main lever with the lower end of the swinging jaw, as herein-after more particularly described.

The swinging jaw E is suspended from its upper end between the two sides A B at the front end of the frame by a bolt, *i*, while the permanent or stationary jaw D is mounted upon a slide between the two sides A B, so that it can be adjusted to or from the swinging jaw, to increase or diminish the space between the two jaws.

For adjusting the stationary jaw to or from the swinging jaw I use a wedge, K, which passes down between the sides A B in rear of the stationary jaw, as follows: The stationary jaw has a side piece, *l*, extending backward from each end to a short distance, and the rear ends of these side pieces are connected by an inclined end piece, *n*, thus forming a sliding frame, of which the stationary jaw forms the front end. An inclined lug or rib, *o*, is formed upon or secured to the inside of each of the sides A B, opposite each other and in rear of this jaw-frame. These lugs or ribs are inclined in a direction opposite to that inclination of the rear end of the jaw-frame, and the wedge K passes down between the lugs and the rear end of the jaw-frame. A screw, *p*, passes down vertically through a roller, *r*, which is attached to the wedge, and its lower end passes through a journaled shaft or roller, *q*, which extends across the frame below. A hand-wheel, R, on the upper end of this screw-shaft serves as a lever to rotate it, so that by turning the screw-shaft the wedge can be raised or lowered, and thus shift the stationary jaw to or from the swinging jaw, to regulate the size of the crushed product. This forms a simple and solid arrangement for adjusting the stationary jaw. The journaled shafts *q* *r*, through which the screw-shaft moves to raise and lower the wedge, allow the wedge to adjust itself in whatever position it is required.

S is the crank-shaft, to which the power is applied for operating the swinging jaw. This shaft is mounted in boxes across the rear end of the crusher-frame.

G is the main lever, that receives the power and motion from the crank-shaft and transmits it, through the connecting-rods H H, to

the swinging jaw. This lever is as wide as the space between the sides A B of the crusher-frame. It is mounted between the sides A B across the rear end of the frame, and a bolt, V, which serves as a fulcrum for the lever to move upon, passes transversely through the lower rear corner of the sides A B and through the lever, so that the long arm of the lever extends upward, while its short arm extends below the frame. The upper or long arm of this lever is connected with the crank of the crank-shaft S by a pitman, which is constructed as follows: A portion at the upper part of the lever is removed, so as to leave the side arms, T T, between which the box is placed, while the shaft passes through the upper ends of the arms. The boxes I I, which fit over both of the journals—that is, the journal of the crank-shaft and the journal at the upper end of the lever—are each made in two halves, the outside half of each box being preferably made convex or rounding on its exterior, and a metallic strap, *u*, passes around both, so as to hold them in place. The inside half of one of the boxes has a tubular extension, X, projecting from it, while the other has a spindle or stem, *y*, extending from it and entering the tubular extension at the opposite box, as represented at Fig. 5. The spindle or stem *y* has a longitudinal slot, *a*, made vertically through it, and the metallic strap *u* has a slot, *b*, made in its upper side, and another in its lower side, directly in line with the slot in the spindle. A narrow wedge-shaped plate, *d*, passes up through these slots, and has a screw and nut on its upper end. By turning this nut down the wedge is raised, so as to force the tube X and spindle in opposite directions and press the half-boxes against the journals. This forms a simple, strong, and convenient pitman, that can be easily adjusted to take up wear by simply turning a nut.

The lower end or short arm of the lever is connected with the lower end of the swinging jaw by the two strong connecting-rods H H, which pass along directly underneath the crusher-frame from one end to the other. In constructing these connecting-rods I take care that the center of the bolt-hole in the end attached to the lever through which the bolt passes at the end of the rod will be about in the same line with the upper side of the rod, thus giving me more room between the rod and under side of the frame to adjust the rod up or down, and at the same time avoiding a dead line or center.

In order to shorten or lengthen the short arm of the lever, I make a separate piece, *f*, to bolt the ends of the connecting-rods H to, and this piece I bolt or otherwise secure to the lower end of the lever-block. I slot the bolt-holes, so that this attached piece can be adjusted the length of the slot up or down. This lengthens or shortens the effect of the crank-stroke on the swinging jaw.

The crank or driving shaft S projects on each side of the crusher-frame, and has a driving-

pulley, *h*, secured on each projecting end. Inside of each driving-pulley, on each end of the shaft, I secure a heavy fly-wheel, J, by means of a friction device, so that when the crusher is in operation, should anything happen that suddenly stops its motion, the friction device will allow the fly-wheels to slip upon the shaft, and thus prevent a breakage and relieve the machine from the strain that would otherwise come upon it.

The advantage of this arrangement has been practically illustrated in a full-sized rock-crusher of this kind.

The friction device which I use is a block or shoe, M, which is arranged to move in a radial slot in the hub of the wheel. This block or shoe is pressed against the face of the shaft or journal by means of set-screws N with any desired force, according to the amount of resistance required to stop the crusher.

By placing the crushing-jaws at one end of the frame and the power mechanism at the other end, as above described, I not only get the mechanism at a distance from the hopper, where it will be out of the way of the dust, but I apply the power so that the strain is thrown entirely upon the connecting-rods H H, thus giving a drawing-together strain instead of a pushing-apart strain.

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

1. The stationary jaw D, located between the swinging jaw E and driving-shaft S, in combination with the rear lever, G, pitman, and connecting-rods H H, substantially as and for the purpose above described.

2. The main lever G, with its adjustable short arm *f*, substantially as and for the purpose described.

3. The stationary jaw D, provided with the side pieces, *l*, and inclined end piece, *n*, forming a frame which moves on slides between the sides A B, in combination with the inclined lugs or ribs *o*, and the wedge-frame K, with its screw-shaft *p* and the journaled shaft *q*, all combined to operate substantially as and for the purpose described.

4. The pitman consisting of the divided boxes I I, the outer halves of which are sustained by the metallic strap *u*, while the inner halves are connected by adjustable extension-couplings, substantially as above described.

5. In combination with the outer halves of the boxes, held in place by the strap *u*, the tubular extension X on one inside half of a box, and the spindle or stem *y* on the other inside half of the box, with its slot *b*, and the wedge *d*, as and for the purposes set forth.

In witness whereof I have hereunto set my hand and seal.

EZRA COLEMAN. [L. S.]

Witnesses:

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CHAS. E. KELLY.