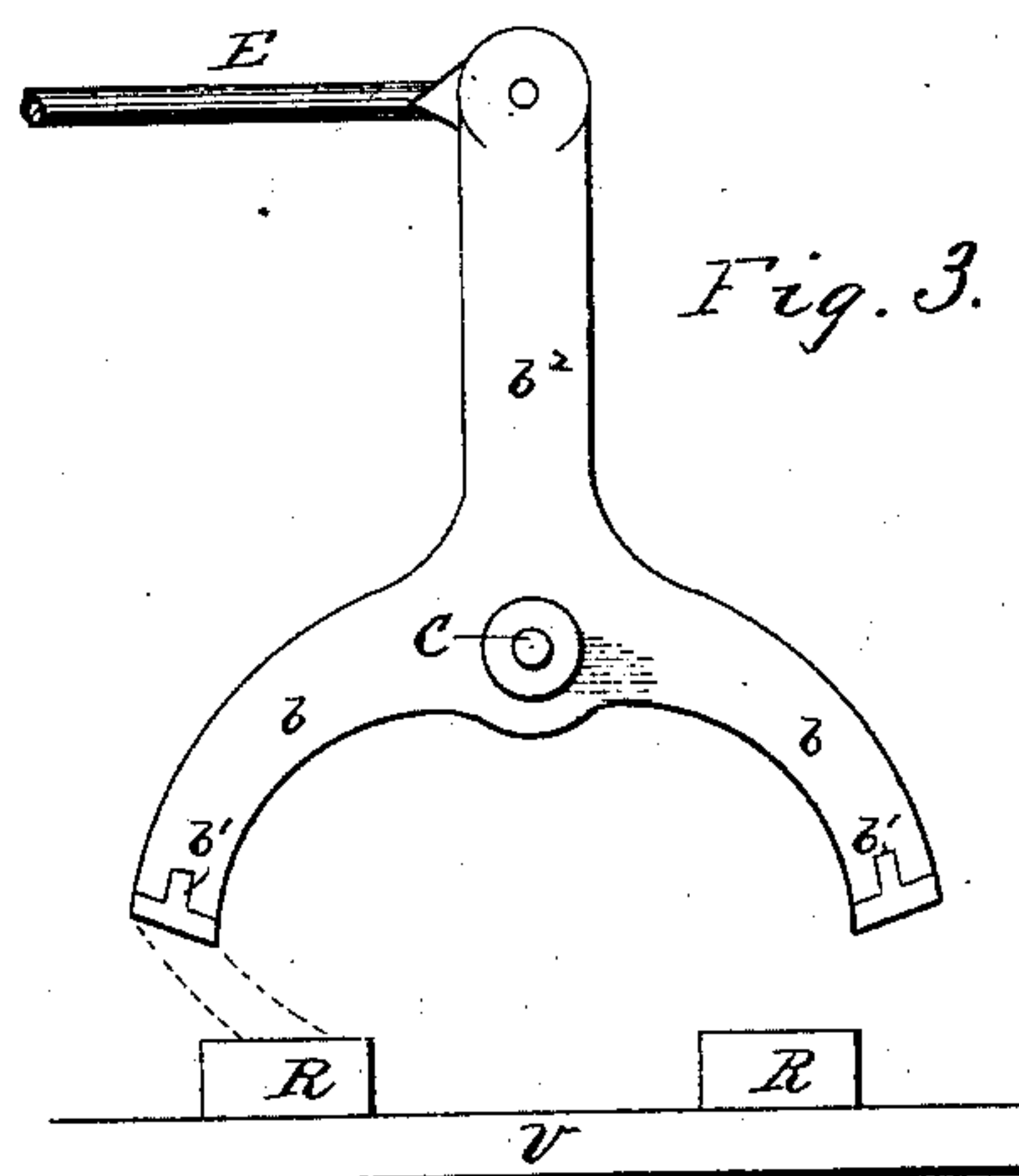
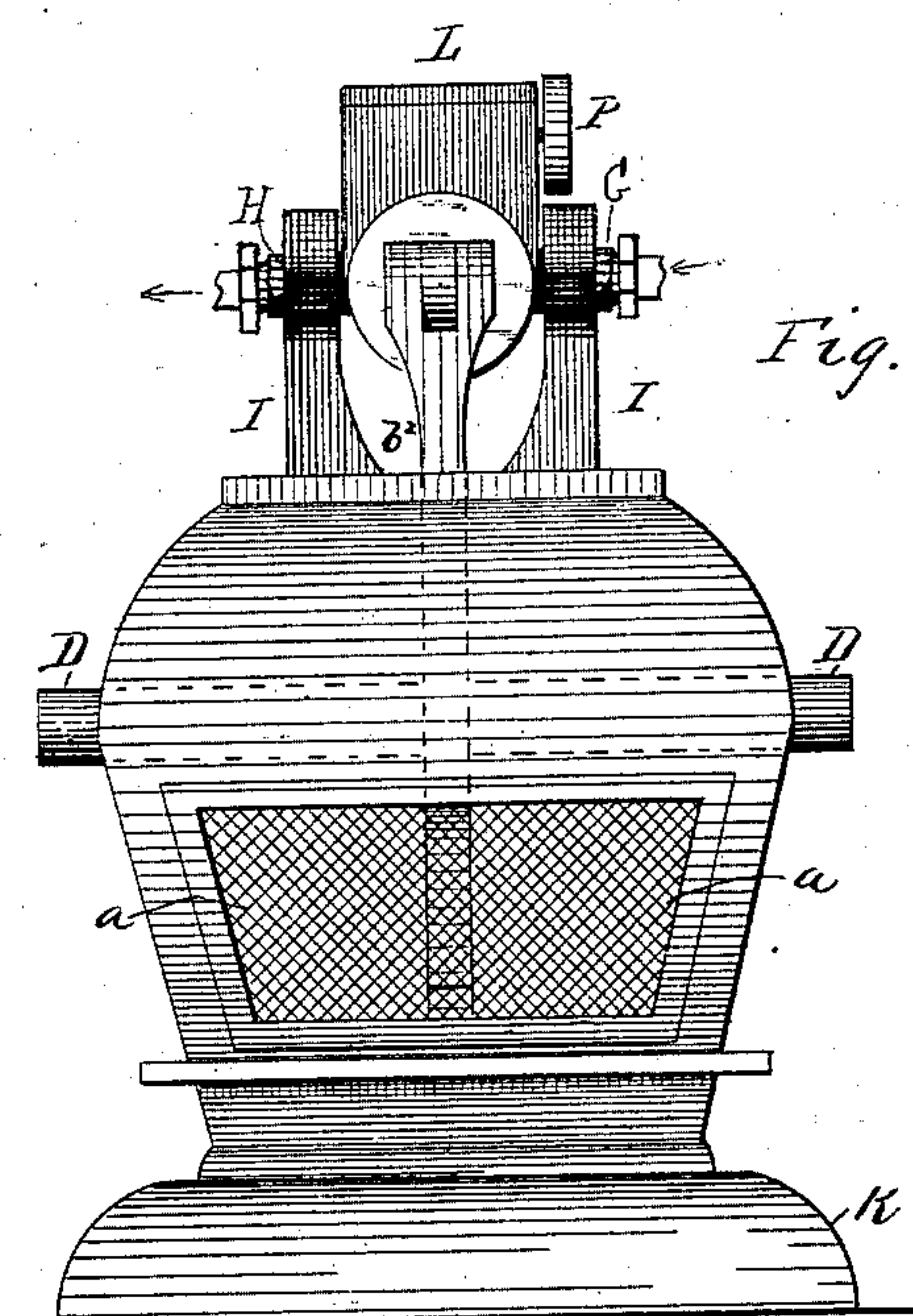
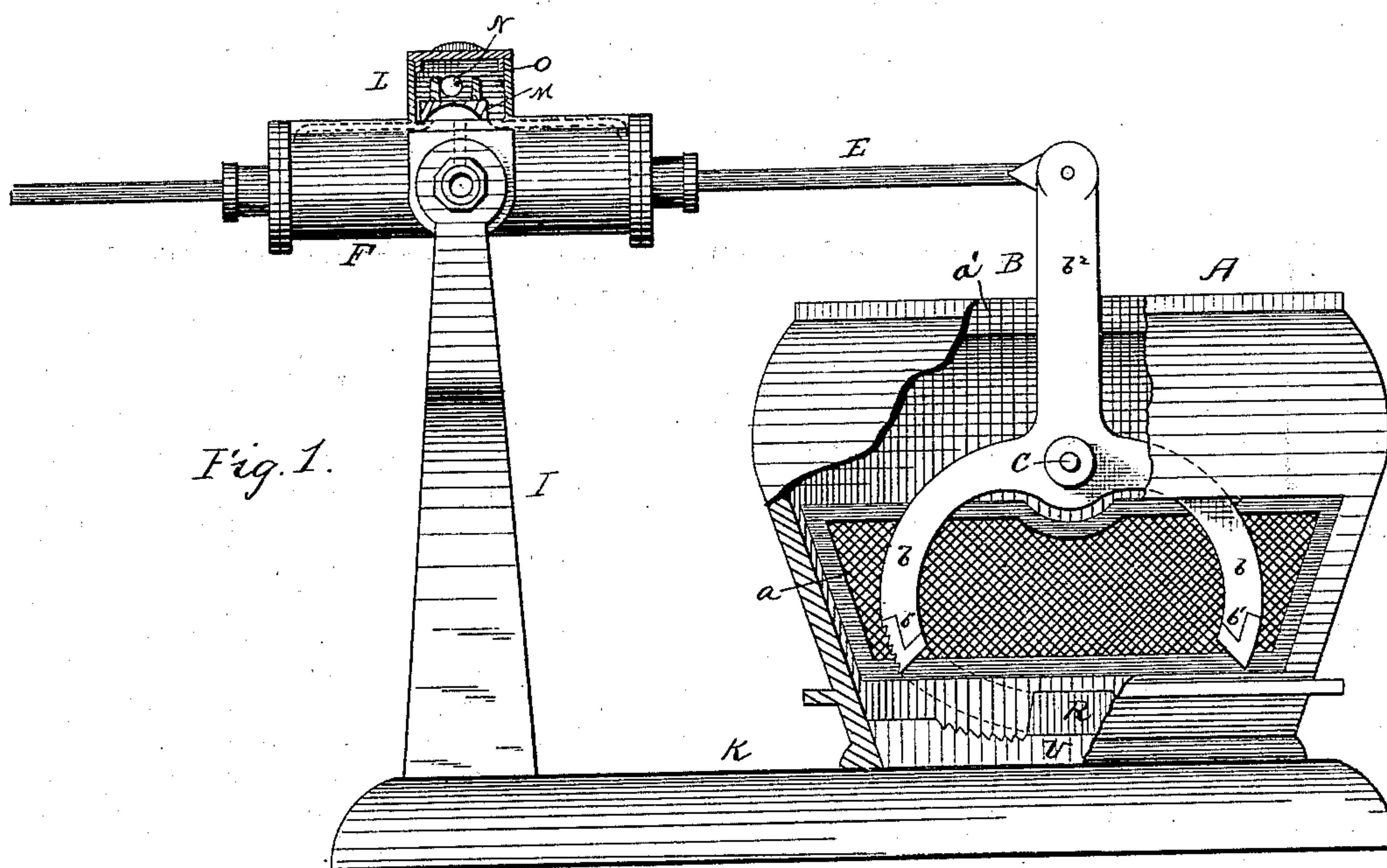


(No Model.)

W. S. SHARPNECK.
ORE CRUSHER.

No. 279,983.

Patented June 26, 1883.



WITNESSES:

H. B. Brown
C. A. Bond.

INVENTOR:

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UNITED STATES PATENT OFFICE.

WILLIAM S. SHARPNECK, OF DENVER, COLORADO, ASSIGNOR OF TWO-THIRDS TO H. N. NICHOLS, OF NORTH PLATTE, NEBRASKA.

ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 279,983, dated June 26, 1883.

Application filed January 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, WM. S. SHARPNECK, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Ore-Crushers, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to rock-crushing machines; and it consists in the peculiar combination, construction, and arrangement of parts, as hereinafter more particularly described, and then pointed out in the claims.

15 In the accompanying drawings, Figure 1 shows a side elevation of a machine constructed according to my improvement, with part represented as broken away; Fig. 2, an end view of the same, and Fig. 3 a modification in outline.

20 In the form of my machine here shown, A represents a casting forming the mortar of the machine, having openings *a a a* in the sides filled in with wire-gauze, and an opening, *a'*, in the top, through which the material may be fed.

B is a three-armed lever, preferably keyed fast on the shaft C, working in the bearings D, and having on its two lower arms, *b b*, the stamps *b' b'*, which, with the shaft C, receive a rocking or oscillating motion in the bearings D by means of the arm *b²*, which is connected by a pivotal joint to the piston-rod E of the oscillating cylinder F, supported on trunnions G H in the forked standard I, rising from the bed-plate K, which also supports the mortar A.

35 At L is a steam-chest, into which steam passes through the trunnion G, which is connected with the steam-pipe by a suitable stuffing-box, from whence it passes into the cylinder, in the usual manner, through the medium of a common D-valve, M, and after giving motion to the piston in the cylinder F passes out through the exhaust-port to the trunnion H, which is connected with the exhaust-pipe by a stuffing-box. The valve is operated by means of an eccentric, N, on the shaft O, which has bearings in the sides of the steam-chest, and is provided with a belt-pulley, P, through which

50 motion may be communicated to the valve from any convenient moving power.

At the bottom of the mortar is a die, R, cast with a base, *v*, and separate from the mortar, and is placed loosely therein, so that it may be easily renewed when worn.

55 In operation the belt-pulley P, and consequently the valve M, is driven by the belt at the desired rate of speed, and then by means of a throttle-valve in the steam-pipe, connected with the trunnion G, a proper quantity of steam is admitted and the piston kept in motion, in the usual manner, by which means the three-armed lever B is given an oscillating motion, and the stamps *b' b'* are caused to rapidly approach and recede from the die R, thus giving a series of powerful blows upon the rock, which is fed in through the opening *a'*, with whatever water is necessary, and is rapidly crushed between the faces of the stamps and the sides of the die. As the stamps recede the crushed rock falls down, and at the next blow of the stamp a part of the crushed rock is acted upon again by the face of the stamp, and another part is acted upon by the side of the stamp, which thus gives a grinding or rubbing blow upon that portion of the rock between the side of the stamp *b'* and the base *v* of the die. To increase this effect I sometimes propose to cast a series of steps or ribs on the base of the die, or on the side of the stamp, or on both base of die and side of stamp, as shown on the left-hand side of Fig. 1.

80 It will be observed that the ore is placed in the mortar and held by the fixed base until pulverized to the desired fineness by the successive blows of the faces of the stamps against the sides of the die and the rubbing of the sides of the stamps over the base. By connecting the stamps with an oscillating engine the motion of one compensates for that of the other, and thus no connecting-rod is required between the piston and the three-armed lever.

85 By this construction is obtained a rapidly-working crusher that will take comparatively little power to run, as the two opposite stamps balance each other, and one that will not be likely to get out of order.

I do not limit myself to the precise form of

engine shown, as other forms of oscillating engines may be used with very good effect; nor do I intend to limit myself to the exact construction and arrangement of the three-armed lever, as it might be varied in many ways without departing from the spirit of my invention. For instance, instead of making the three-armed lever in one piece, the arm b^2 may be cast separately and attached on the outside of the mortar to the shaft C, which of course would have to be made long enough for this purpose. Instead of making both stamps work against opposite sides of the same die, I intend in some cases to arrange the stamps so that each one will strike upon the top of a separate die, as shown in the outline, Fig. 3. I do not regard, however, these plans as good as that shown in the main figure of the drawings. In some instances I propose to dispense with the vertical standard I by mounting an arm or arms on the top of the mortar and extending in the position now occupied by said standard I, to form a substitute for it.

Any novel feature not here claimed I reserve the right to make the subject-matter of a separate application.

What I claim as new is—

1. In a rock-crusher, the combination of a pair of stamps constructed to give crushing blows against the opposite sides of the die on a fixed bed supporting the material with said die, a fixed base, and means for operating the stamps, substantially as described.

2. In a rock-crusher, the combination of a pair of stamps constructed to give crushing blows alternately upon the opposite sides of the die, with said die, a fixed base supporting the material, and means for operating the stamps, substantially as described.

3. In a rock-crusher, the combination, with a fixed bed adapted to support the ore, and a die, of a stamp constructed to swing over and gradually approach said bed as the blow is given against the side of the die, substantially as described.

4. In a rock-crusher, the combination, with a fixed bed adapted to support the ore, and a central die, of a pair of stamps constructed to swing on a fixed bearing above the central die and to gradually approach the bed as the blows are given against the sides of the die, substantially as described.

5. The combination, in a rock-crusher, of two stamps rigidly connected to move together and oscillate on the same bearing, with a suitable die, and a stationary base supporting the material, substantially as described.

6. In a rock-crusher, the combination, with the piston-rod of an oscillating engine, of an oscillating stamp carrying lever connected directly to said piston-rod, whereby the movement of one compensates for that of the other, substantially as described.

7. In a rock-crusher, the combination, with the piston-rod of an oscillating engine, of a three-armed lever working on a central fulcrum, and having two of its arms carrying stamps and the third connected directly to said piston-rod, whereby the movement of one compensates for that of the other, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses, this 22d day January, 1883.

WILLIAM S. SHARPNECK.

Witnesses:

W. H. KINGSBERRY,
T. C. EARLY.