

A. Hitchcock,

Ore Crusher.

No. 89765.

Patented May 4, 1869.

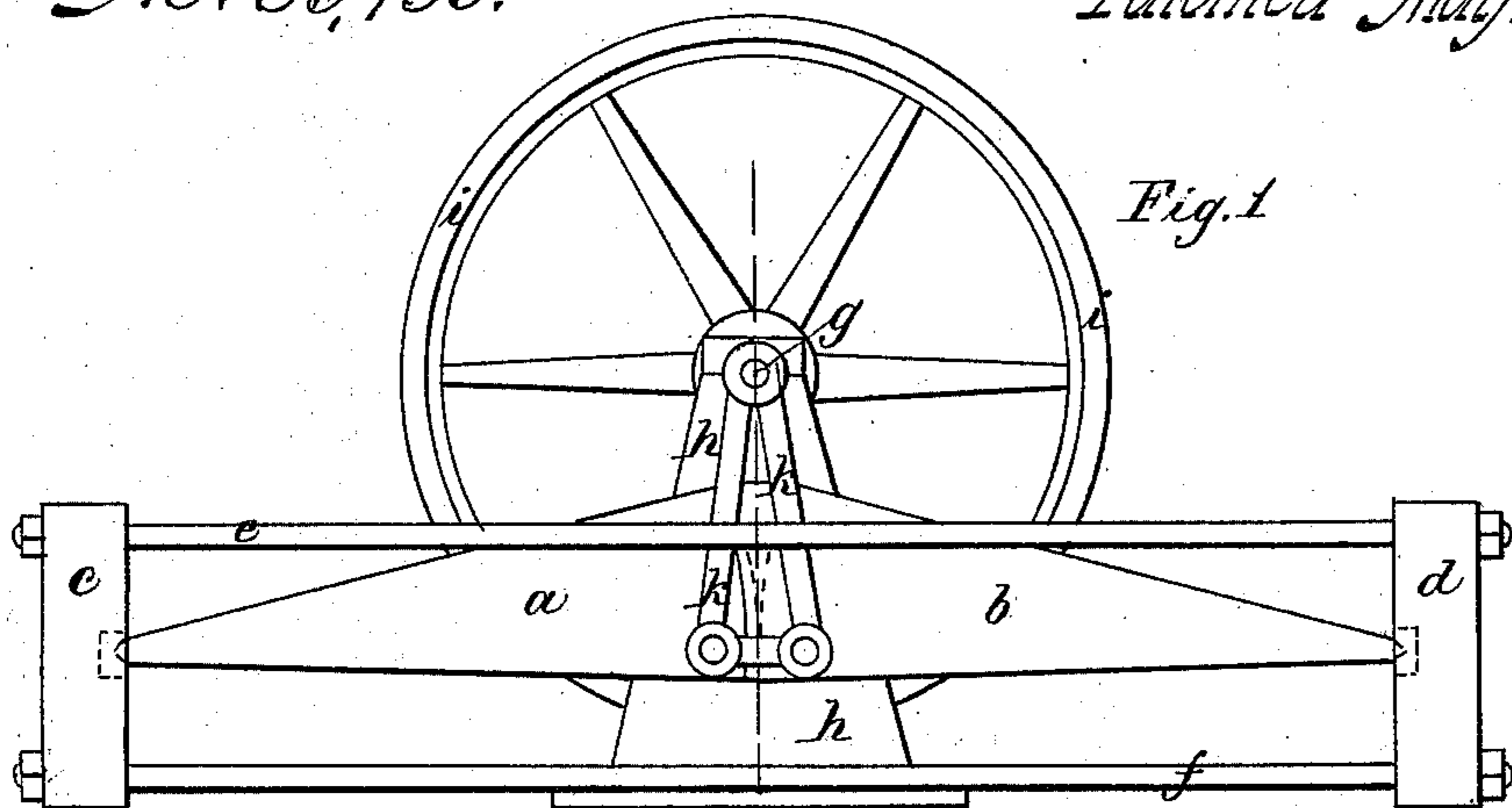


Fig. 1

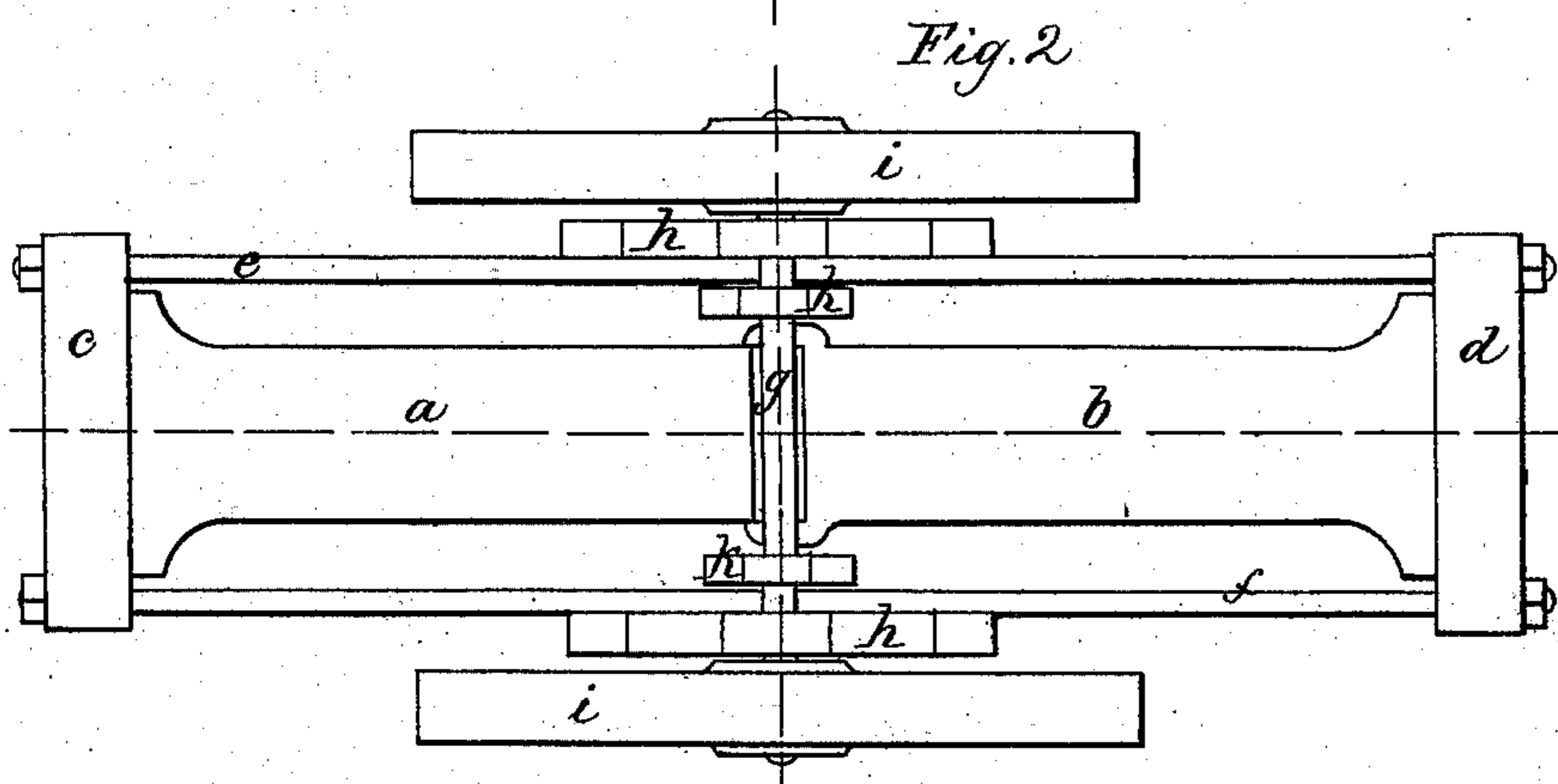


Fig. 2

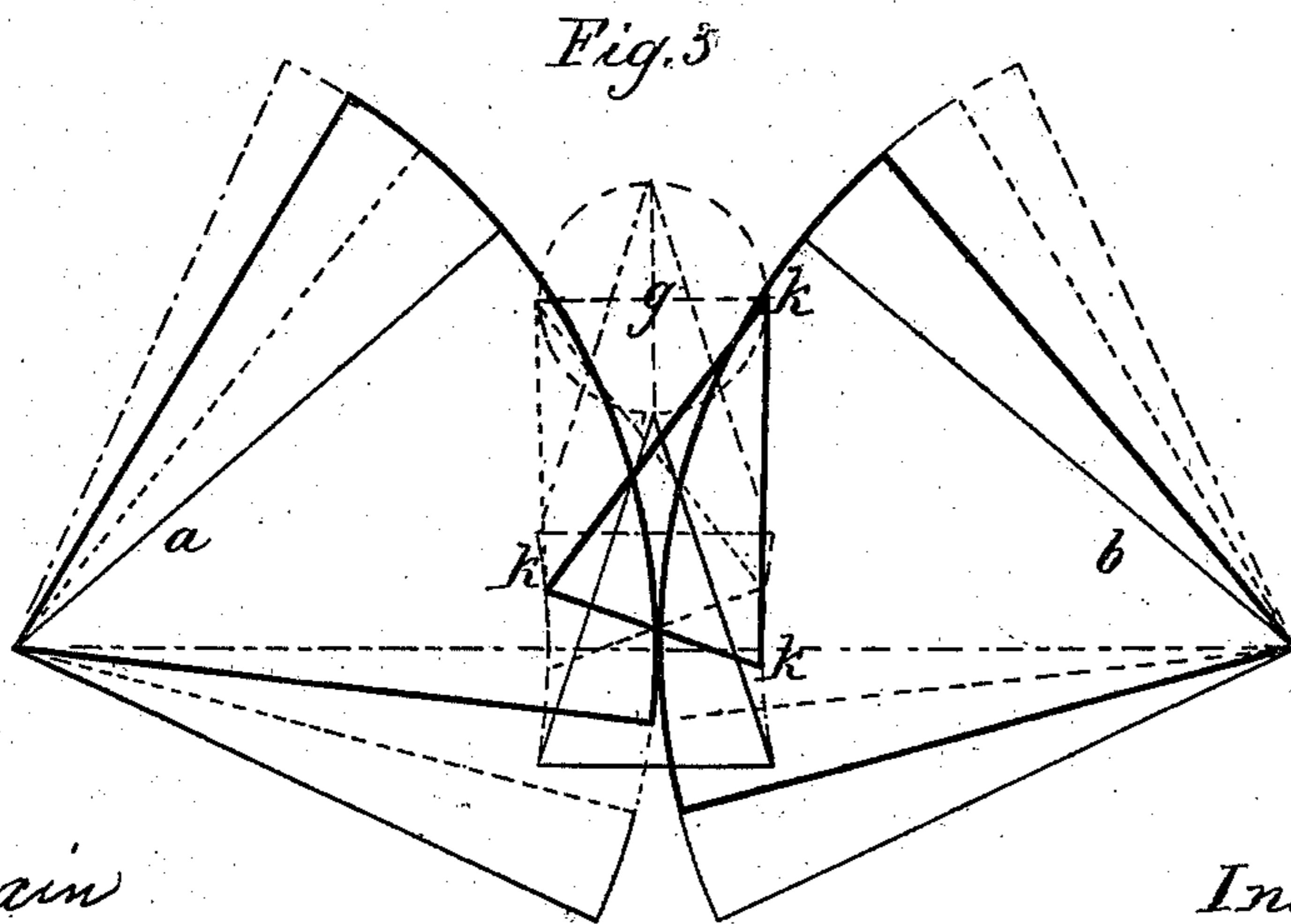


Fig. 3

Witnesses

D. Jones Crain
Wm. Remble Hall

Inventor

Alonzo Hitchcock

United States Patent Office.

ALONZO HITCHCOCK, OF NEW YORK, N. Y.

Letters Patent No. 89,765, dated May 4, 1869.

IMPROVEMENT IN ROCK-BREAKER.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, ALONZO HITCHCOCK, of New York, in the county and State of New York, have invented a certain new and useful Improvement in Rock-Breakers, which I call a Compound-Motion Rock-Breaker; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, making part of this specification, and to the letters of reference marked thereon.

The object of my invention is to break and reduce lumps of quartz, or other material, for the purpose of preparing it for the action of a pulverizing-mill; and

It consists of a pair of cams, somewhat similar to segments of a cylinder, which are operated by means of a crank, in such a manner that their relative and conjoint action compresses the material placed between their jaws or working faces, and at the same time turns it while under compression in a crunching manner that is peculiarly efficacious in the process of reduction.

To enable others skilled in the arts to which my invention appertains to make and use the same, I will proceed to describe its construction and operation with reference to the drawing.

Figure 1 is a side elevation of the machine;

Figure 2 is a plan of the same; and

Figure 3 is a geometrical diagram, representing the compound motion of the cams in a manner in which, for the purpose of illustration, the proportions have been greatly exaggerated.

The same letters refer to like parts in the figures of the machine and the diagram.

The segmental cams *a* and *b* vibrate on centres at the heads *c* and *d*, which are retained in position by the screw-bolt rods *e f*.

One of the cams is furnished with flanges on the edges of the working face that lap over the other, and thus enclose the sides of the space between the acting surfaces or jaws of the cams, so that the material placed between them cannot escape at the sides, and must necessarily pass between the cams in accordance with their motion.

These segmental cams may be made hollow, or pannelled, to reduce their weight in any way that may be consistent with strength, and their bearing on the heads at the centres of their vibration should be made as wide as the machine will conveniently permit, to resist any tendency to twist or cant when the material upon which they operate should occasion a preponderance of the pressure upon one side.

The bearings on the heads may consist of separate pieces of steel or chilled iron, and the cams may be furnished with similar pieces at the ends, for the purpose of reducing the friction and the wear.

The working faces of the jaws may be made straight or curved, and be fitted with shoes that can be replaced when worn.

The crank-shaft *g* is supported on suitable standards, *h*, and is furnished with a pair of fly-wheels, *i*, and is connected at each side of the machine with the segmental cams by means of the yokes *k*.

The pin passing through one of the cams, and upon which the yokes work on each side, should be fitted in a slot in the cam, so that the cams may be adjusted by means of the screw-bolts connecting the heads, in compensation for the wear of the cams, without interfering with the action of the yokes.

As the throw of the cranks, and the consequent vibration of the cams are made very small in these machines, for the purpose of obtaining a slight but almost irresistible compressive action on the material between the cams, the compound character of the double motion may be best understood by reference to the geometrical diagram.

When the crank passes from the upper centre to a position one-quarter of a revolution to the right, the cam on the right moves quicker and further than the other, as is shown by the heavy lines of the figure, and on moving the crank to the lower centre, the cam on the left moves quicker, and both cams attain their lowermost points together, as represented in light lines.

The dotted lines and the broken lines represent respectively the positions and degrees of motion at the third quarter and at the completion of the revolution.

It will thus be seen that the relative motions of the cams not only compress an obstacle placed between them, the size of which may be limited by the opening of an ordinary hopper placed over the cams, but that the obstacle is turned, or twisted, and compressed, or crunched as it is forced through between the jaws of the same by the revolutions of the crank shaft.

I claim as my invention—

The combination of the segmental cams *a* and *b*, the crank-shaft *g*, and yoke *k k*, arranged together, to produce a differential movement of said cams, substantially as shown and described.

ALONZO HITCHCOCK.

Witnesses:

S. JONES CRAIN,
WM. KEMBLE HALL.