

S. F. MACKIE.

Ore Stamp.

No. 64,339.

Patented April 30, 1867.

Fig. 3

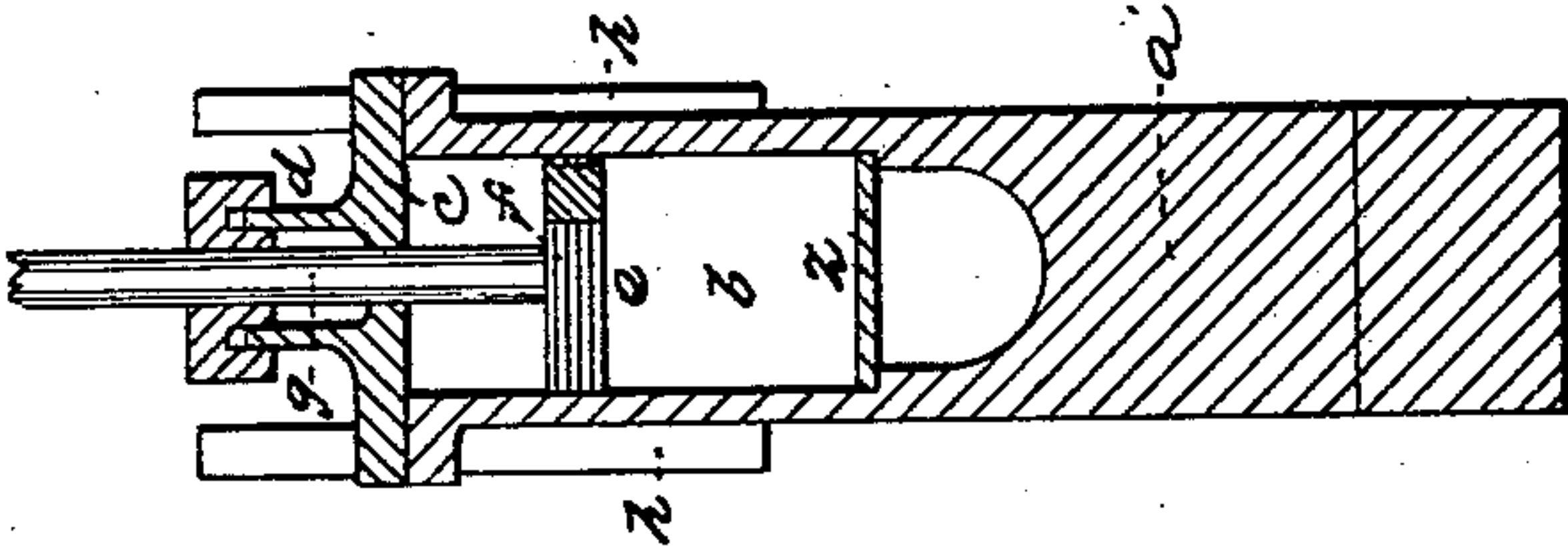


Fig. 4

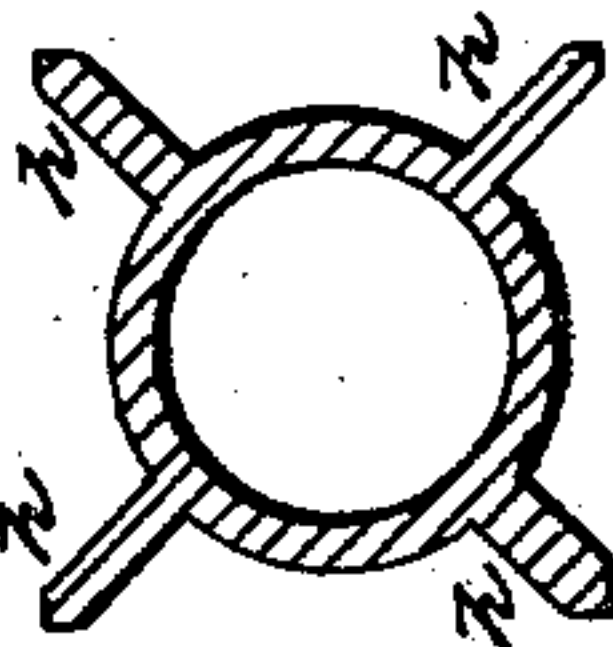


Fig. 2

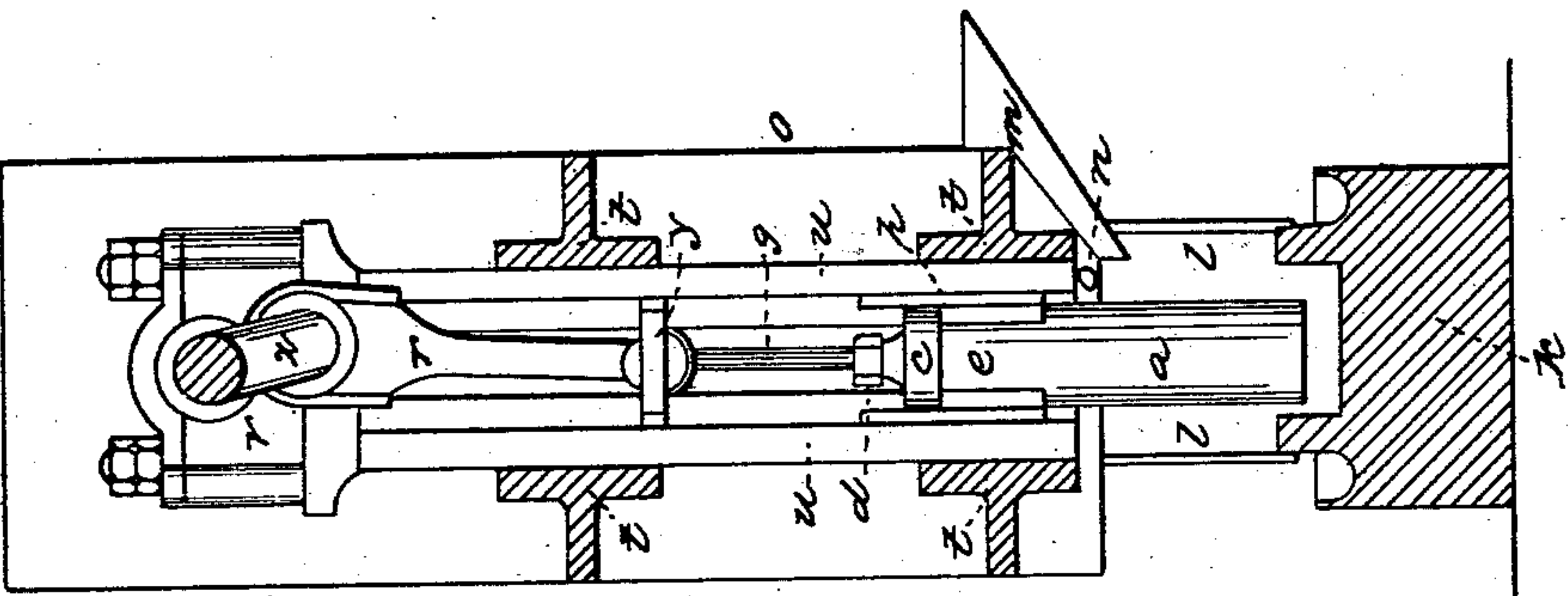
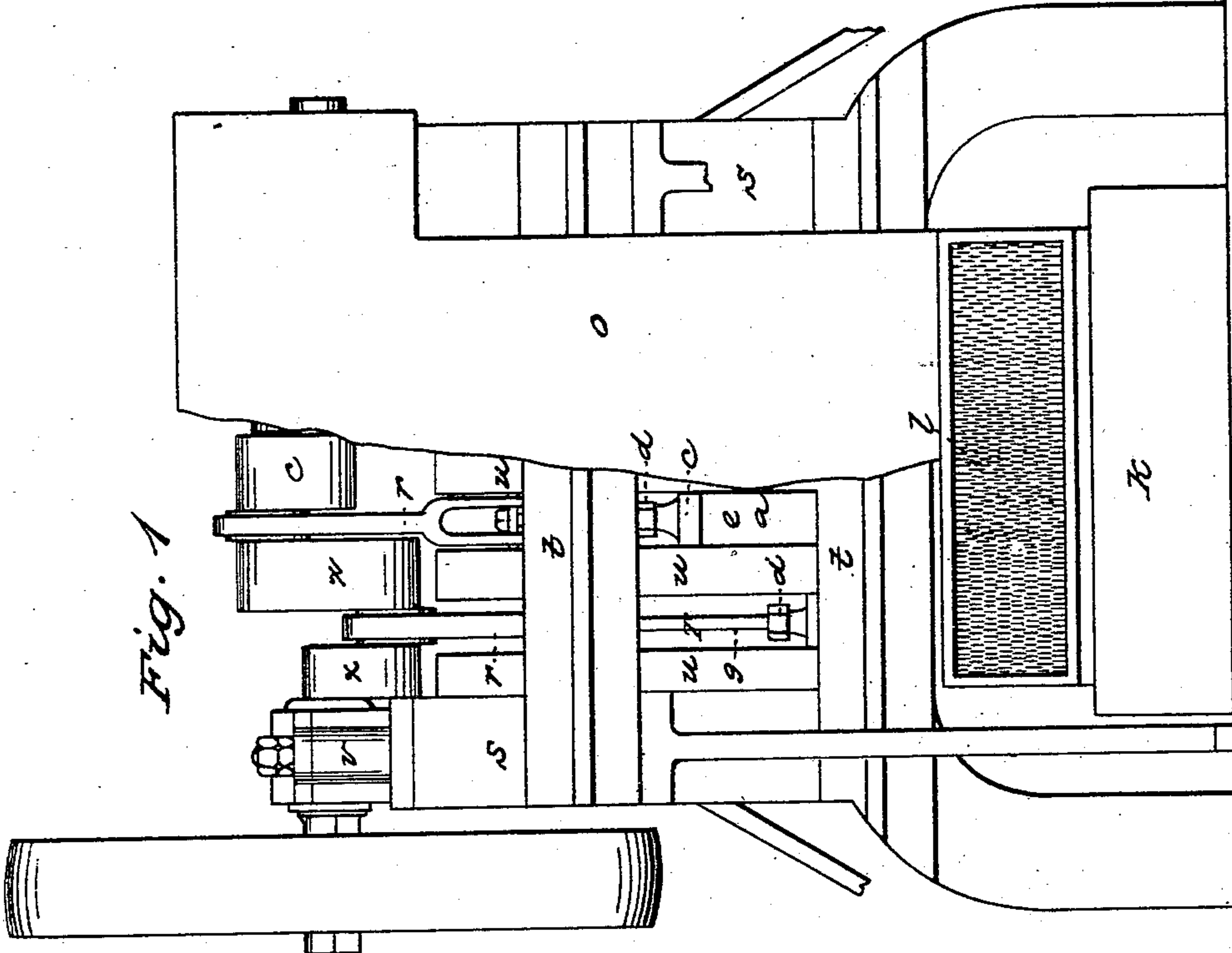


Fig. 1



Witnesses:

W. H. Colver

William S. Hoff

Inventor:

Simon Mackie W

United States Patent Office.

SIMON F. MACKIE, OF NEW YORK, N. Y.

Letters Patent No. 64,339, dated April 30, 1866.

IMPROVEMENT IN MILLS FOR CRUSHING ORE.

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, SIMON F. MACKIE, of New York, in the county of New York, State of New York, have invented new and useful improvements in the Mode of Constructing Stamp-Mills; and in order that no misunderstanding may arise as to what I consider a stamp-mill, I state that the ends or objects proposed to be attained in the construction of the machine which I thus designate are as follows:

First, that the linear dimensions of the lumps of ore fed to the machine shall be reduced in passing through said machine; second, that the lumps, pieces, or particles of ore, which are the product of said machine, shall possess, as nearly as possible, uniform linear dimensions; third, the process shall be continuous. In the most perfect form of this machine the ore is never handled except in bulk. In order to explain this idea more fully I would state that the raw material—the ore to be crushed—is deposited in suitable receptacles in large quantities, *e. g.*, is shot out of a cart into these receptacles, and after passing through the machine, the manufactured product—the crushed ore—passes by suitable contrivances either into receptacles, whence it may be carted, or into machines, where it is submitted to a subsequent process. Further, I desire to state that since the product of a stamp-mill may, according to the subsequent process which the peculiar nature of the ore demands, require to be reduced to different degrees of fineness, *e. g.*, the product may be required in the shape of fine sand, or it may be required as coarse gravel, it is impossible to predicate the linear dimensions of those portions of the machine which regulate the fineness of the product, prior to the predication of the subsequent processes to which the ore is to be subjected.

The improvements which I desire to patent are, first, improvements which allow the velocity of the driving-shaft to be increased, thereby obtaining an increased product; second, improvements which tend to render the machine more durable.

And I do hereby declare that the following is a true, full, and exact description of the construction and operation of my improved machine, regard being had to the annexed drawings, said drawings being a part of this specification, in which—

Figure 1 is an exterior elevation.

Figure 2, a transverse section.

Figure 3, an enlarged longitudinal section of the stamp; and

Figure 4, a transverse section of the stamp-head.

Having secured, by any known and convenient means, a good and suitable foundation for the machine, I set up the standards *s*; these I connect by the cross-pieces *t*, to which I bolt the guides *u*. At the head of the standards, or in other suitable position, I fasten bearings *v* of the ordinary construction. In these bearings rests the cranked shaft *x*, which receives, when the machine is to be run, a continuous rotary motion from any convenient source of power *e. g.*, a steam engine. The cranks on this shaft are fitted with appropriate connecting-rods *r*, which couple the cranks with the rods *g*, hereafter to be described.

I will now proceed to describe the construction of the stamp itself. A longitudinal section of this stamp is shown in fig. 3, from which it will be seen that the upper portion of the stamp-head *a* is fashioned into a cylinder, *b*, to which is adapted a cover, *c*, with stuffing-box *d*. In this cylinder are bored two or three small holes, marked *e* in the drawing. To this cylinder *b* I fit a piston-rod, *g*, and piston *f*. Now, when the piston-rod of a stamp, fitted as above, receives a continuous reciprocating rectilinear motion, *e. g.*, by means of a crank and connecting-rod, this reciprocating rectilinear motion will be communicated to the stamp-head, but the relative velocities of the piston and stamp-head will be modified by the spring formed by the atmospheric air enclosed between the piston and cylinder ends. I render the piston air-tight by means of the following packing: The piston is of cast iron, in whose edge are turned two square grooves, and a corresponding steel ring is fitted into each groove, the rings being divided at one part with a plain but-joint and sprung into their places. Two small holes are bored from each face of the piston to the bottom of the nearest groove. The faces of the piston must be turned up exactly parallel with the cylinder ends. In order that the stamp-head shall not be subjected to injurious strains during casting and subsequent cooling, I cast the hollow in the stamp-head round at the bottom, as shown in fig. 3, and then, by fitting in the circular piece *z*, form a cylinder of any desired length. The projections *h*, which run in the guides *u*, further serve to strengthen the upper portion of the cylinder.

Now returning to the construction of the machine, I would call attention to the fact that the guides *u* constrain the stamp *a*, and, through the intervention of the cross-head *y*, the piston-rod *g*, to move up and down in the same right line. Underneath the stamps I place a suitable bed, *k*, which I prefer to place on a foundation distinct from that which supports the standards *s*. Around this bed, sometimes on one sometimes on two or more sides, I fasten the screens *l*, more distinctly indicated in fig. 2 by the blue line; these screens can be made of sheet iron punched with holes or slits. The ore is fed into the machine through the hopper *m*, and water may be introduced through the pipe *n*. To prevent the dust or sand from wearing the sliding-faces, &c., I enclose those parts of my machine by a board cover, *o*, more distinctly indicated in fig. 2 by the red line. This cover is pierced with holes for the stamps to pass through, to which holes stuffing-boxes may, if it is deemed desirable, be adapted. Of course this cover must have suitable doors or traps for obtaining ready access to the machine.

The operation of my machine is as follows: Having first seen that the bed *k* has a suitable bed of ore thereon, I set the shaft *e* in rotation, introducing simultaneously, by means of troughs, creepers, raff-wheels, jacob's ladders, or otherwise, a continuous supply of ore through the hopper *m*, at the same time introducing a suitable quantity of water. The impact of the stamps *a* on the ore, thus placed on the bed *k*, reduces it to the state of fineness desired. After having reached this point it passes through the screens, and then, by troughs or otherwise, to such a place as may be convenient for the subsequent operations. Mathematically speaking, the fineness of the product, *i. e.*, of the crushed ore, is a function of the velocity of the stamp, the quantity of water supplied, the height of the screens above the bed, the dimensions of the holes in the screens, and the dimensions of the screens themselves.

I claim as my invention—

1. The combination of the cylinder stamp-heads *a*, covers *c*, pistons *f*, piston-rods *g*, cross-head *y*, connecting-rods *z*, cranked shaft *x*, and guides *u*, with the bed *k*, and screen *l*, substantially as herein described and for the purposes herein set forth.
2. The plate *z*, in combination with the flanged stamp-head, as described.

SIMON F. MACKIE.

Witnesses:

H. W. COLVER,
WILLIAM T. GRAFF.