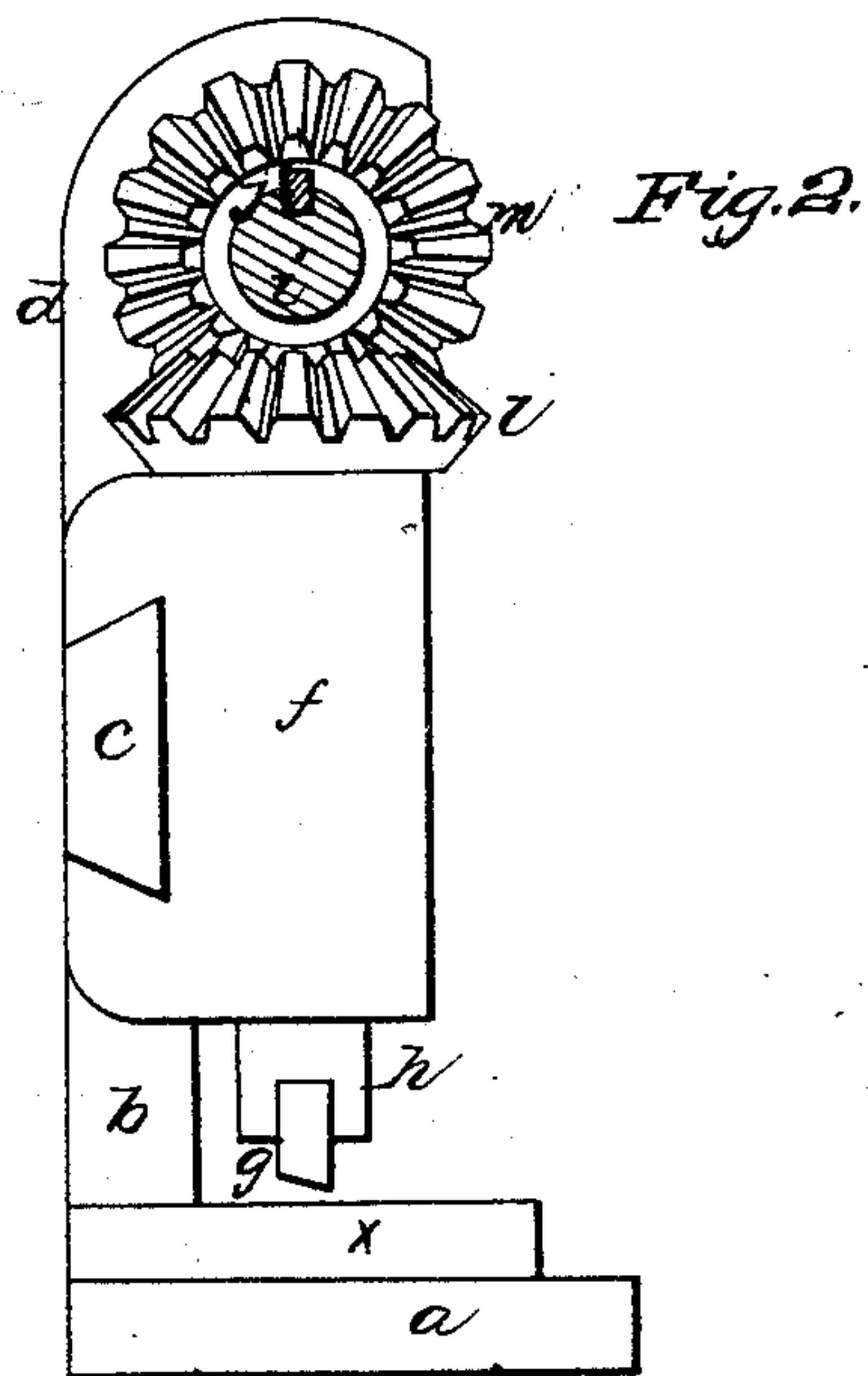
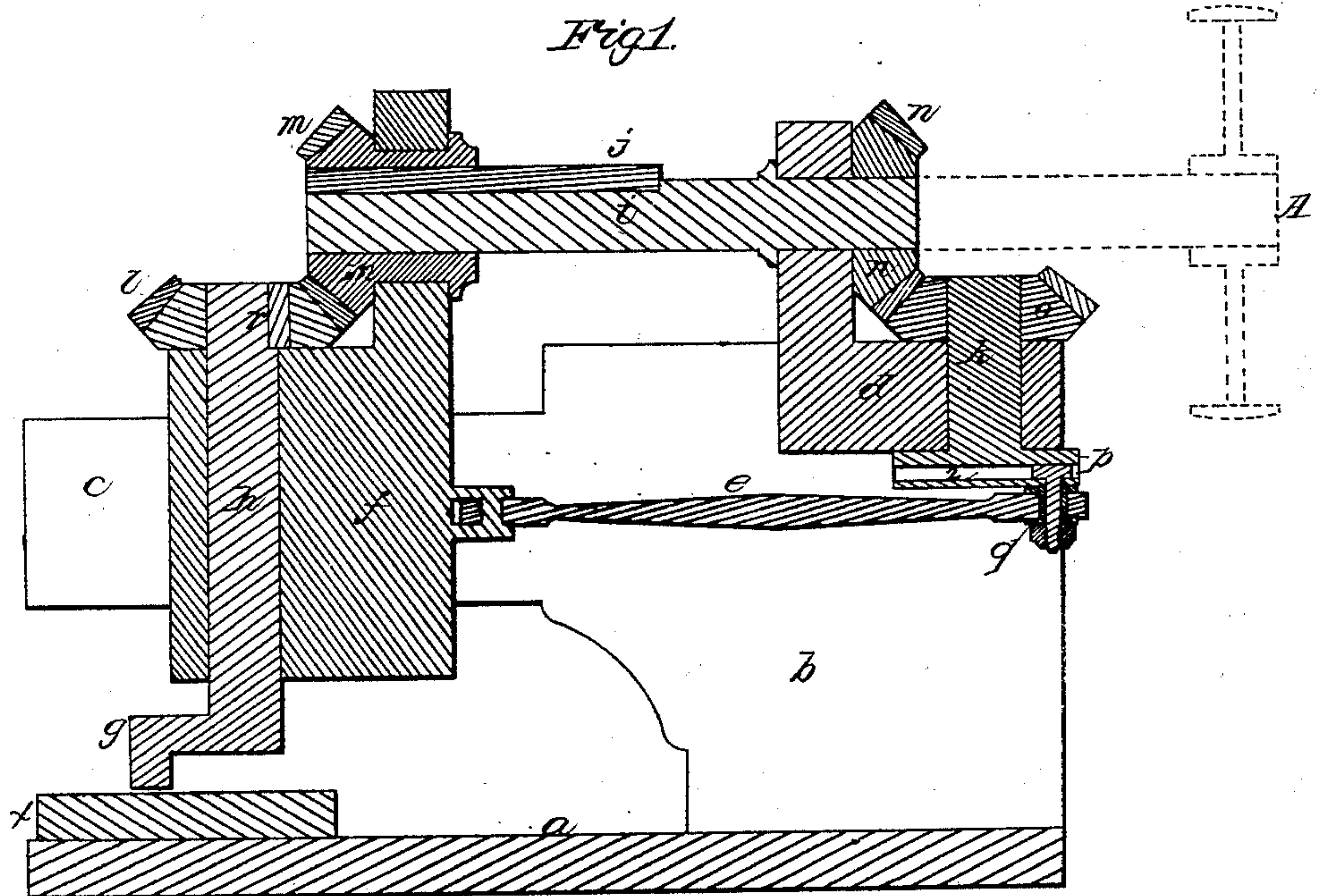


*J. McBride.*

*Drilling Oval Openings in Boiler Heads.*

*N<sup>o</sup> 57,534.*

*Patented Aug. 28, 1866.*



*Witnesses:*

*James P. Johnston*  
*James O. Sanning*

*Inventor:*

*James McBride*



# UNITED STATES PATENT OFFICE.

JAMES MCBRIDE, OF ALLEGHENY CITY, PENNSYLVANIA.

## IMPROVEMENT IN MACHINERY FOR CUTTING OVAL HOLES IN BOILER-HEADS.

Specification forming part of Letters Patent No. 57,534, dated August 28, 1866; antedated August 17, 1866.

*To all whom it may concern:*

Be it known that I, JAMES MCBRIDE, of the city and county of Allegheny, in the State of Pennsylvania, have invented a new and useful Improvement in Machines for Cutting Oval or Elliptic Openings in Boiler-Heads, &c.; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in the use of a cutter secured to a revolving shaft to which is imparted a reciprocating motion, said cutter and its shaft being operated by the mechanism hereinafter described.

In the accompanying drawings, Figure 1 represents a side elevation and a sectional view combined of my improved machine for cutting oval or elliptic openings. Fig. 2 represents an end elevation of the same.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

In the drawings, *a* represents the base of the machine. *b* represents the support of the operating-gear. *c* represents a slide or guide for the movable head-piece, marked *f*, which is connected to the disk *P* by means of a pitman, *e*, which is secured to a wrist, *9*, which may be adjusted in the slot marked 2 of the disk *P*, so as to give the desired movement of the head-piece *f*. *d* represents a bearing for the shafts *h* and *i*, and may be made in one piece with the support marked *b*, or made separate from and secured to it.

*g* represents the cutter, which is secured to the shaft *h*, which is so arranged in the head-piece marked *f* and wheel *l* that it can be raised or lowered by any suitable and known mechanism, for the purpose of bringing the cutter *g* to and from the work.

The wheel *l* gears into the wheel *m*, which has its bearing in the head-piece *f*, and is arranged so as to move back and forward on the shaft *i*, to which the pulley for driving it is attached, as indicated by the dotted lines marked *A*. On the shaft *i* is secured a wheel

marked *n*, which gears into a wheel marked *o* on shaft *k*.

I wish it clearly understood that I do not confine myself to any precise form, size, arrangement, or manner of constructing the various parts herein described and represented. These I leave to the taste, skill, and good judgment of the mechanic, provided, however, that said parts must work in the manner and for the purpose herein described and set forth.

The operation of my improved machine for cutting oval or elliptic openings is as follows: I arrange the boiler-head or the plate for it on the platform *x*, and adjust the cutter *g* so as to describe a circle the diameter of which shall be equal to the short diameter of the elliptic opening desired. I then adjust the wrist *9* in the slot 2 of the disk *P*, so that the pitman *e* will move the head-piece *f* the desired distance for making the difference between the long and short diameter of the elliptic opening—that is to say, if the short diameter of the elliptic opening is ten inches, and the long diameter is fifteen inches, the pitman *e* is so arranged with relation to the head-piece *f* and the disk *P* that it will cause the head-piece to move two and one-half inches forward and two and one-half inches backward.

Having all things properly arranged, I apply power to the pulley *A*, which will revolve shaft *i*, which will revolve the wheel *m*, which will revolve the wheel *o*, which will revolve shaft *k* and disk *P*, which will, by means of pitman *e*, impart a reciprocating motion to the head-piece *f*. The shaft *i* will also, by means of the key or feather *j*, revolve the wheel *m*, which will revolve the wheel *l*, which will, by means of the feather or key *r*, revolve the shaft *h*, and thereby impart a circular motion to the cutter *g*, which is brought to and from the work by lowering and raising the shaft *h* by means of some known and suitable mechanism.

Thus, by the combination of the reciprocating and revolving motion of the shaft *h* and the circular motion of the cutter *g*, any de-

sired size of elliptic or oval openings can be made in boiler-heads, &c.

Having thus described the nature, construction, and operation of my improvement in machines for cutting oval or elliptic openings, what I claim as of my invention is—

The combination and arrangement of the wheels *l*, *m*, *n*, and *o*, shafts *h*, *i*, and *k*, disk

*P*, slot 2, wrist 9, pitman *e*, head-piece *f*, and cutter *g*, constructed, arranged, combined, and operating substantially as herein described, and for the purpose set forth.

JAMES McBRIDE.

Witnesses:

JAMES J. JOHNSTON,  
JAMES O. FANNING.