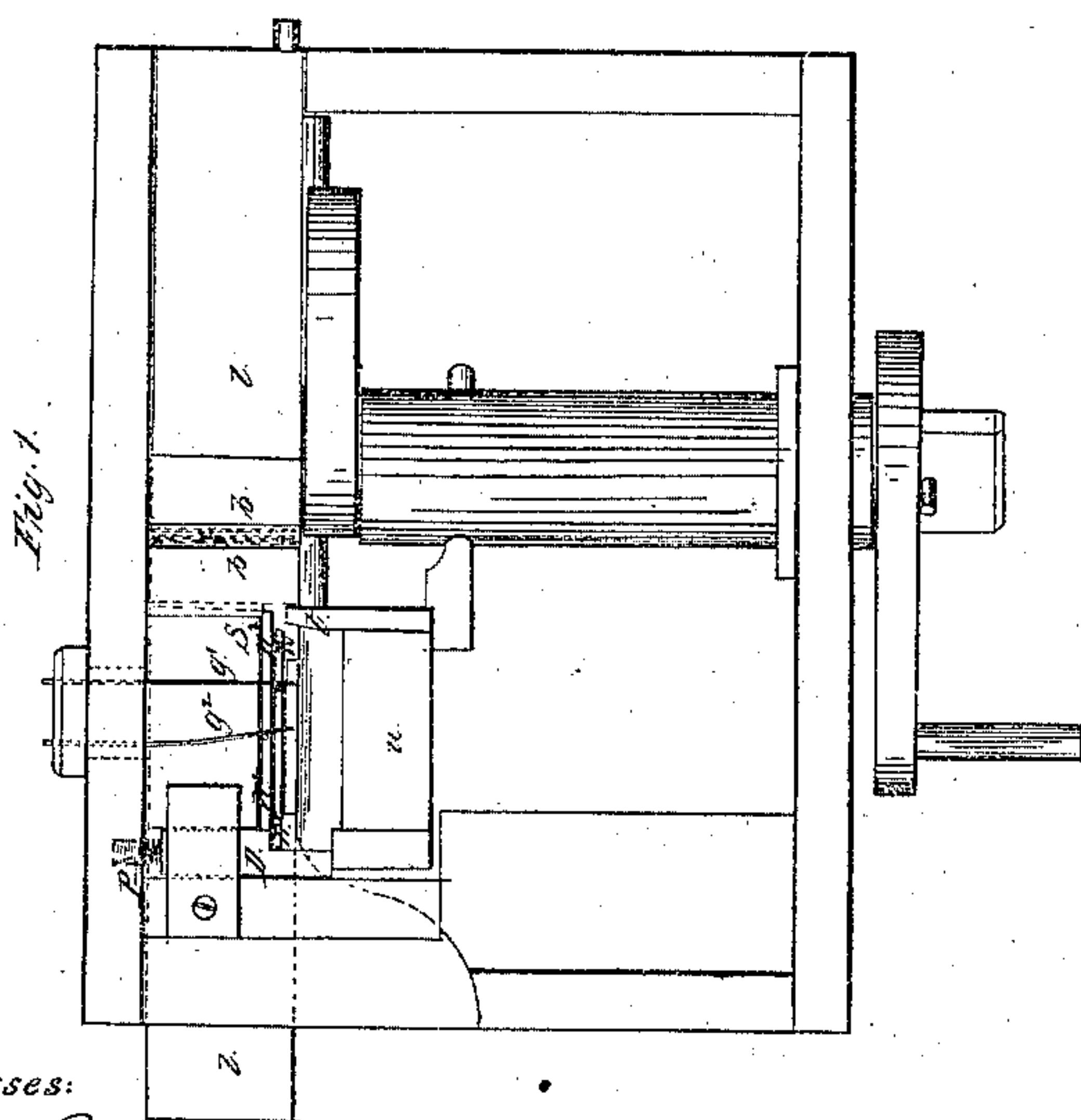
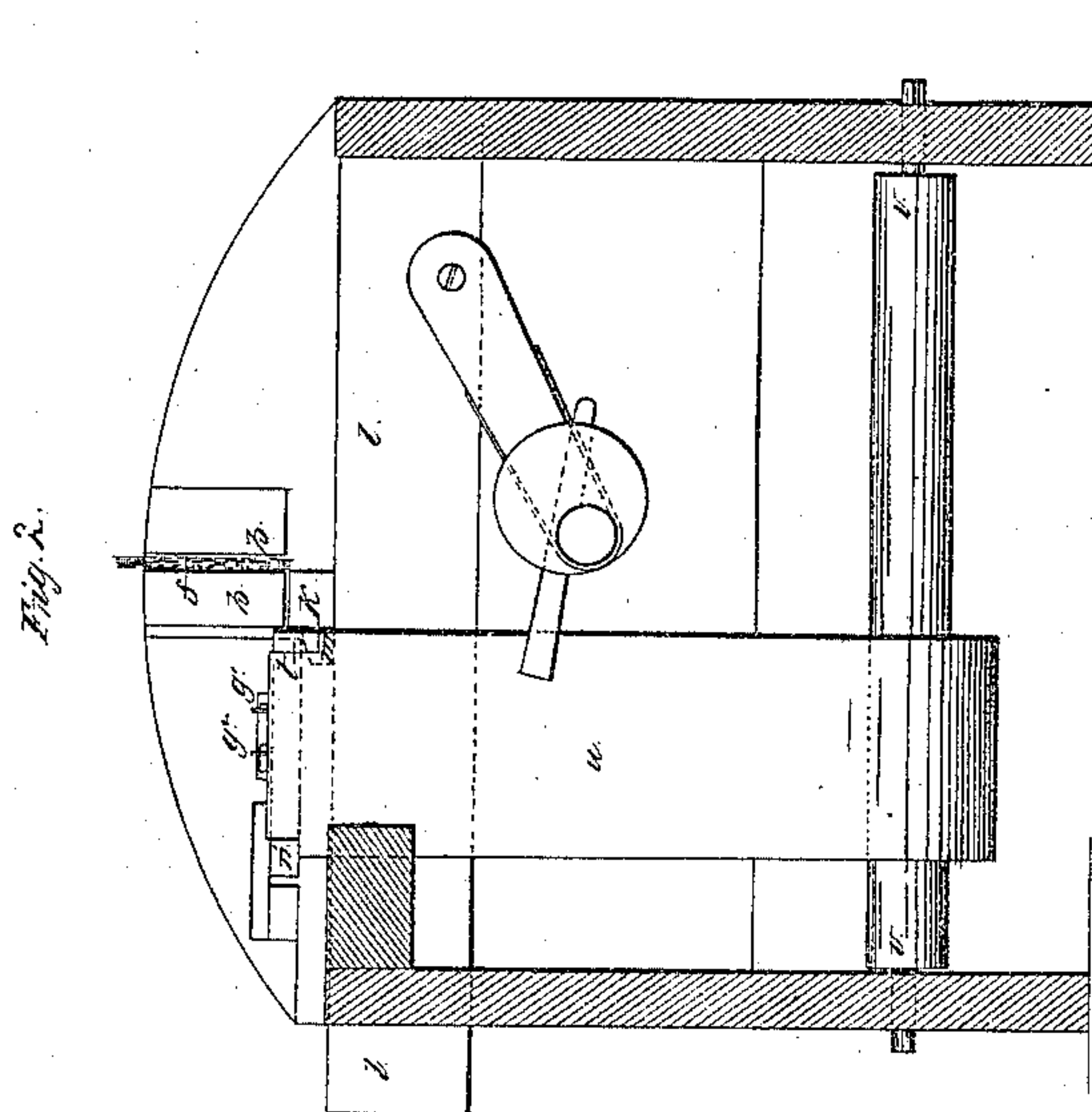


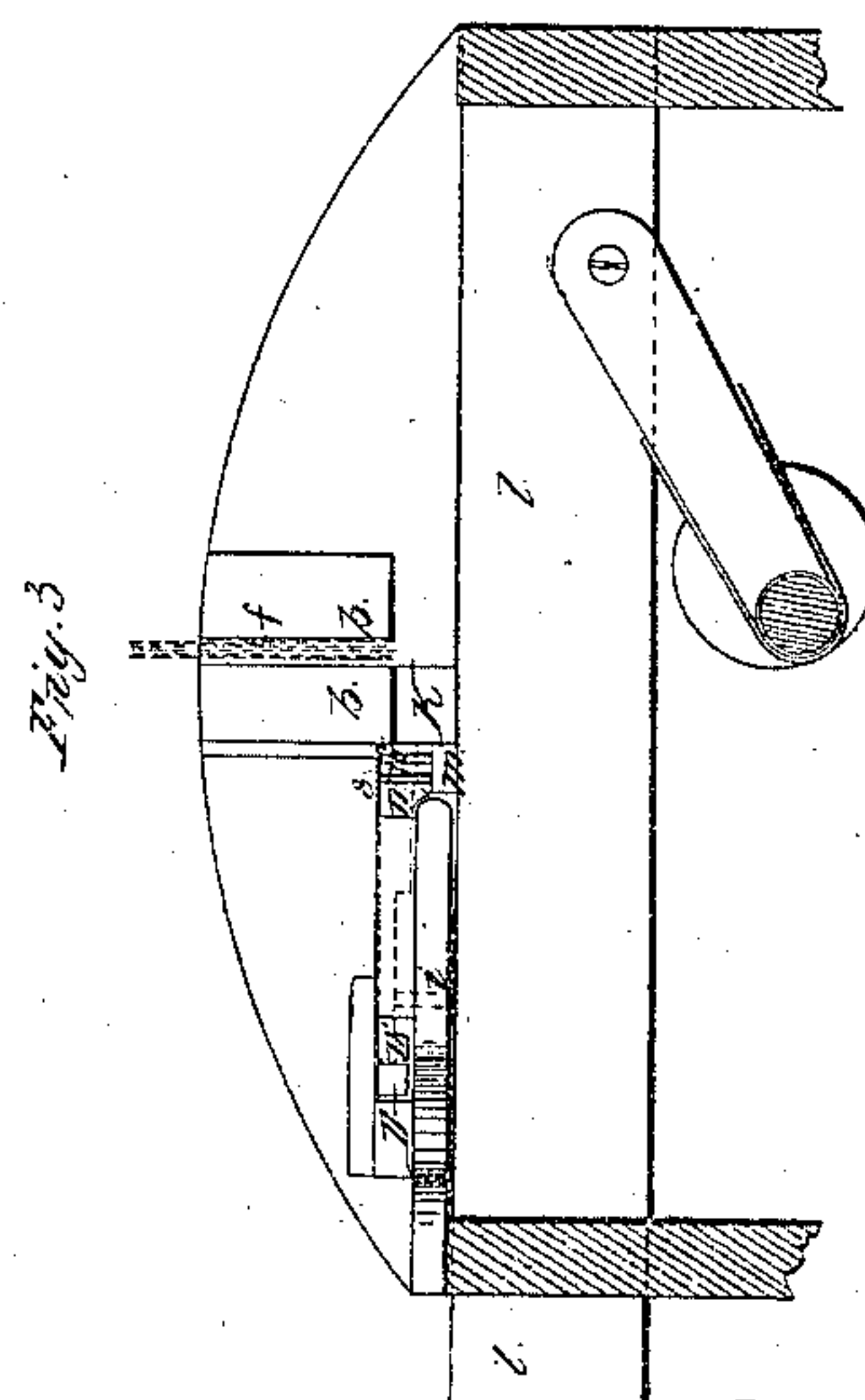
S. G. REYNOLDS.  
MACHINE FOR MAKING NAILS.

No. 64,035.

Patented Apr. 23, 1867.



Witnesses:  
Isaac A. Byrnes.  
J. H. Corrie.



Inventor:  
S. G. Reynolds.

# United States Patent Office.

SAMUEL G. REYNOLDS, OF BRISTOL, RHODE ISLAND.

*Letters Patent No. 64,035, dated April 23, 1867; antedated April 8, 1867.*

## IMPROVEMENT IN MACHINES FOR MAKING NAILS.

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, SAMUEL G. REYNOLDS, of Bristol, in the county of Bristol, and State of Rhode Island, have invented certain new and useful Improvements in the Method of Making the Heads of Nails, Bolts, Rivets, &c., &c.; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan of the essential parts of a nail machine arranged with my improvements.

Figure 2 is a vertical section and elevation of the same; and

Figure 3 is a like view, with the heading parts removed, to give an unobstructed view of the parts to which my improvements relate.

Similar letters indicate corresponding parts in all the figures.

The usual mode of making the heads of nails, bolts, rivets, &c., by upsetting the metal, is by gripping the piece of metal in a die, with the end protruding, so that it may be crushed or upset with a suitable header. But by this method the size of the head must necessarily be limited, as the metal will cripple or bend when it protrudes sufficiently to form a large head.

My invention relates to the mode of constructing and operating the gripping die or part by which the piece of metal is held while being headed, to make a large head without crippling or bending the metal, and consists in constructing the gripping or moulding die, which holds and compresses the piece of metal to be headed, with a number of movable sections on the side where the head is formed, and while the header advances and is crushing or upsetting the end of the metal; in removing the sections of the die from the piece of metal one after the other, in a manner to uncover more and more of the metal, and thus make a number of consecutive upsets, so as to convert as much of the length of the piece of metal into a head as may be required to make one of the size desired without crippling or bending the metal, and by that means making an unsound head.

The said improvements are more particularly applicable to the machinery for making wrought-iron nails invented by me, and described in Letters Patent No. 8,677, and dated January 20, A. D. 1852, as follows, and with reference to the accompanying drawings:

"The rod or plate of heated metal is fed through a space between two stationary cutters *b b*, below which vibrates a double-edged cutter, *K*, by which a piece to form a nail is cut off at each motion, the rod or plate being vibrated at each cut so as to give the taper alternately on opposite sides. With each of the stationary cutters *b b* is combined a gripping die, *S*, and with the movable cutter *K* are combined two dies *m*, one on each side, and inclined to the cutting edges in opposite directions, so that, as the movable cutter *K* moves in one direction a piece is cut off from the rod or plate, carried along, and finally gripped on two faces, between one face of the movable cutter *K* and one of those attached to one of the stationary cutters *b b*, and on the other two faces between the under face of the stationary cutter *b b* and one of the dies attached to the movable cutter *K*, and there compressed so as to give the required form to the shank. The head is then formed on the thick end by a punch or header, *t*, the moment the gripping takes place. On the return motion of the movable cutter the nail is discharged, and another nail is formed in the same way on the other side, the rod or plate of iron having been vibrated in the mean time to make the taper on the opposite side." \* \* \* "The movable cutter *K* [is] attached to a carriage, *l*, formed of two bars, adapted to slide in the frame." \* \* \*

\* \* \* "The head is formed on the large end by means of a header, *t*, attached to the upper end of the lever *u*, that turns on a fulcrum pin at *v*," and operated to upset the head by a cam on the main shaft.

It is evident that if the heading end of the piece of metal protrudes at some length from the gripping die *S*, or sufficiently so to make a large head, it will be liable to cripple or bend, instead of being regularly upset, and an unsound head will be made in consequence. And to avoid this, I make use of a compound gripping or moulding die, that is sufficiently wide to permit only a short piece of the metal to protrude therefrom, not enough to be liable to bend, and I construct the said gripping die *S* with one or more movable sections or sliding pieces *n<sup>1</sup> n<sup>2</sup>*, that are moved into position to complete the formation of the die by means of the studs *i* (in dotted lines) on the sliding carriage *l*, and are held in such position by the sliding block *D*, which has a corresponding movement with the header, from the same source of motion, until the header has advanced so far as to properly upset so much of the metal as protrudes from the die, when the block *D* slides from behind the first section *n<sup>1</sup>*, and permits it to recede by the action of the spring *g<sup>1</sup>*, as shown at fig. 1, and thus uncover from the die a



length of the metal equal to the width of the section with which to continue the upsetting operation; and when this portion is upset, the header has so far advanced as to remove the sliding block from the rear of the next section  $n^2$ , which recedes by the action of its spring  $g^2$ , and uncovers more of the metal from the die, to make another upset, and be converted into a head in like manner, by the continued movement of the header; and thus the operation continues until a sufficient length of the metal has been upset to make the head of the required size; after which the two parts of the die separate by the return of the movable cutter, and the nail is discharged from the die. At the same movement of the sliding carriage the movable sections  $n$  are returned to their former position, as component parts of the die, and the sliding block returns by the action of the spring  $P$ , with the receding movement of the header, to its former position behind the sections  $n$ , to hold them firmly and solidly in position to grip the succeeding piece of metal, which, by the return movement, is cut from the plate  $f$ , and afterwards subjected to a like operation with that just described, to make a head thereon.

Having thus described my improvement, it should be understood that the said movable sections are component parts of the compound gripping die that holds the piece of metal to be headed, so that no more of the metal protrudes from the die at any time than can be regularly upset without bending, and, as such, are to be distinguished from an independent piece or support between the die and the header, for enclosing a long protruding end, and controlling the crippling or bending of the same beneath the header, as it advances to crush it into the form of a head, which, as a means and mode of making a head, is hereby disclaimed. And I also wish it understood that the said compound die is susceptible of manifold variations of form or construction, without changing its character or affecting its ability to perform its function substantially in the manner and with the effect described and set forth.

What I claim, and desire to secure by Letters Patent, is—

Making the head of nails, bolts, rivets, &c., &c., by a number of consecutive upsets of a long piece of metal, by liberating or uncovering from the enclosure of the die more and more of the metal, as the header advances to upset the same, by means of successively receding sections, of which the die is in part composed, or their equivalents, substantially as described.

I also claim the sliding block, substantially as described, in combination with the compound gripping or moulding die, the springs  $g^1$   $g^2$ , and heading lever or their equivalents, as described, for the purpose of operating the movable sections of said die, substantially in the manner and with the effect herein set forth and described.

In testimony whereof I have hereunto set my hand this thirtieth day of January, A. D. 1866.

S. G. REYNOLDS.

Witnesses:

ISAAC A. BROWNELL.

D. K. HOXSIE.