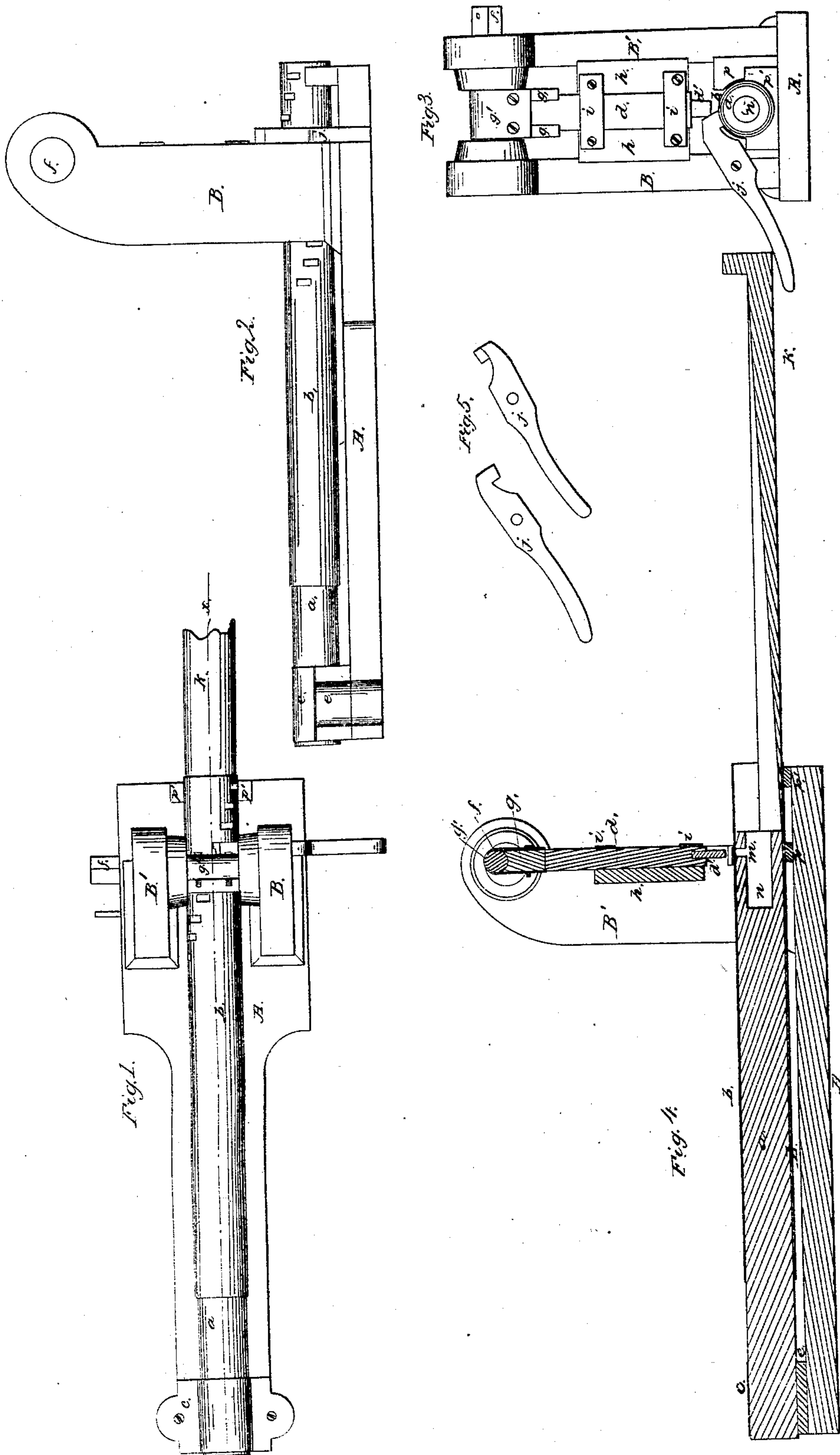


*B. Mackerley,*

*Cutting Apertures in Cylinders,*

*Patented May 4, 1858.*

*N<sup>o</sup> 20,165.*





# UNITED STATES PATENT OFFICE.

BENJAMIN MACKERLEY, OF NEW PETERSBURG, OHIO.

## IMPROVEMENT IN PUNCHING METALLIC TUBES.

Specification forming part of Letters Patent No. 20,165, dated May 4, 1858.

### *To all whom it may concern:*

Be it known that I, BENJAMIN MACKERLEY, of New Petersburg, in the county of Highland and State of Ohio, have invented an Improved Machine for Forming Corresponding Series of Spirally-Located Apertures in Cylinders; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making a part of this specification.

Figure 1 is a top view of said machine; Fig. 2, a side elevation of the same; Fig. 3, an end view; Fig. 4, a section in the line  $x x$  of Fig. 1; and Fig. 5, a representation of a portion of the machine detached.

Similar letters indicate corresponding parts in all the drawings.

The mandrel  $a$ , which supports the tube  $b$  during the punching operation, is secured to the left-hand end of the platform A by means of the box  $e$ , the cap  $c$ , and a pair of bolts, (or it may be secured by any other suitable device,) while the opposite end of said mandrel rests loosely in the bearings  $p p'$ , located at the opposite end of said platform. The bearing  $p$ , which loosely embraces about three-fourths of the periphery of the mandrel  $a$ , is firmly secured between the cheeks B B, which rise from the right-hand end of the platform A. The block  $h$ , which is securely confined in its place between the cheeks B B', has a vertical groove formed in its face for the reception of the stock  $d$  of the punch  $d'$ , the said punch-stock being retained in its guiding-groove by means of the clamps  $i i$  or other suitable fastenings. A crank-shaft  $f$  works in apertures in the upper ends of the cheeks B B, or in journal-boxes combined with said cheeks. The stock of the punch  $d'$  is combined with the central crank or an eccentric on the shaft  $f$  by means of the hinged head-piece  $g$  and the strap  $g'$ , substantially as represented in the drawings. A socket  $n$  is formed in the loose end of the mandrel  $a$ , and immediately beneath the punch  $d'$  an aperture  $m$  is formed in the periphery of the mandrel, which leads into the said socket  $n$ , and through which the clippings of the punch are discharged into said socket. A detent of the shape particularly shown in Fig. 5 is secured by means of a fulcrum pin or screw to the right-hand side of the cheek B. The laterally-

projecting tooth at the inner end of the detent  $j$  corresponds in size and shape with that of the punch  $d'$ , and the said detent is placed in such a position relatively to that of the punch  $d'$  that after the punch has formed one aperture in the tube  $b$  the proper position for the next succeeding aperture to be formed in said tube will be indicated with the utmost precision, and the tube be held securely during the punching operation, by pressing the tooth of the detent  $j$  into the aforesaid aperture and retaining it in that position until the before-mentioned succeeding aperture has been formed by the punch. It will therefore be perceived that when it is desired to form a double series of spirally-located apertures in a cylinder, which shall be diametrically opposite each other, it is only necessary to properly locate the commencing apertures of each series to have all the succeeding apertures of the same occupy their appropriate relative positions from end to end of the cylinder. A gouge-shaped wedge  $k$ , whose length corresponds with that of the tube to be punched, is inserted into the mouth of the tube and is pressed between the under side thereof and the under side of the mandrel, for the purpose of keeping the upper side of the mandrel firmly pressed against the upper side of the tube during the operation of punching apertures therein.

Having thus fully described my improved machine for forming corresponding series of spirally-located apertures in cylindrical tubes, what I claim therein as my invention, and desire to secure by Letters Patent, is—

1. The combination of the mandrel  $a$ , the punch  $d'$ , and the detent  $j$ , substantially in the manner and for the purpose herein set forth.

2. The use of the gouge-shaped wedge  $k$ , in combination with the mandrel  $a$  and the punch  $d'$ , substantially in the manner and for the purpose herein set forth.

The above specification of my improved machine for punching spirally-located apertures in metallic tubes signed and witnessed this 27th day of February, 1858.

BENJAMIN MACKERLEY.

Witnesses:

HENRY HIATT,  
JAMES E. MACKERLEY.