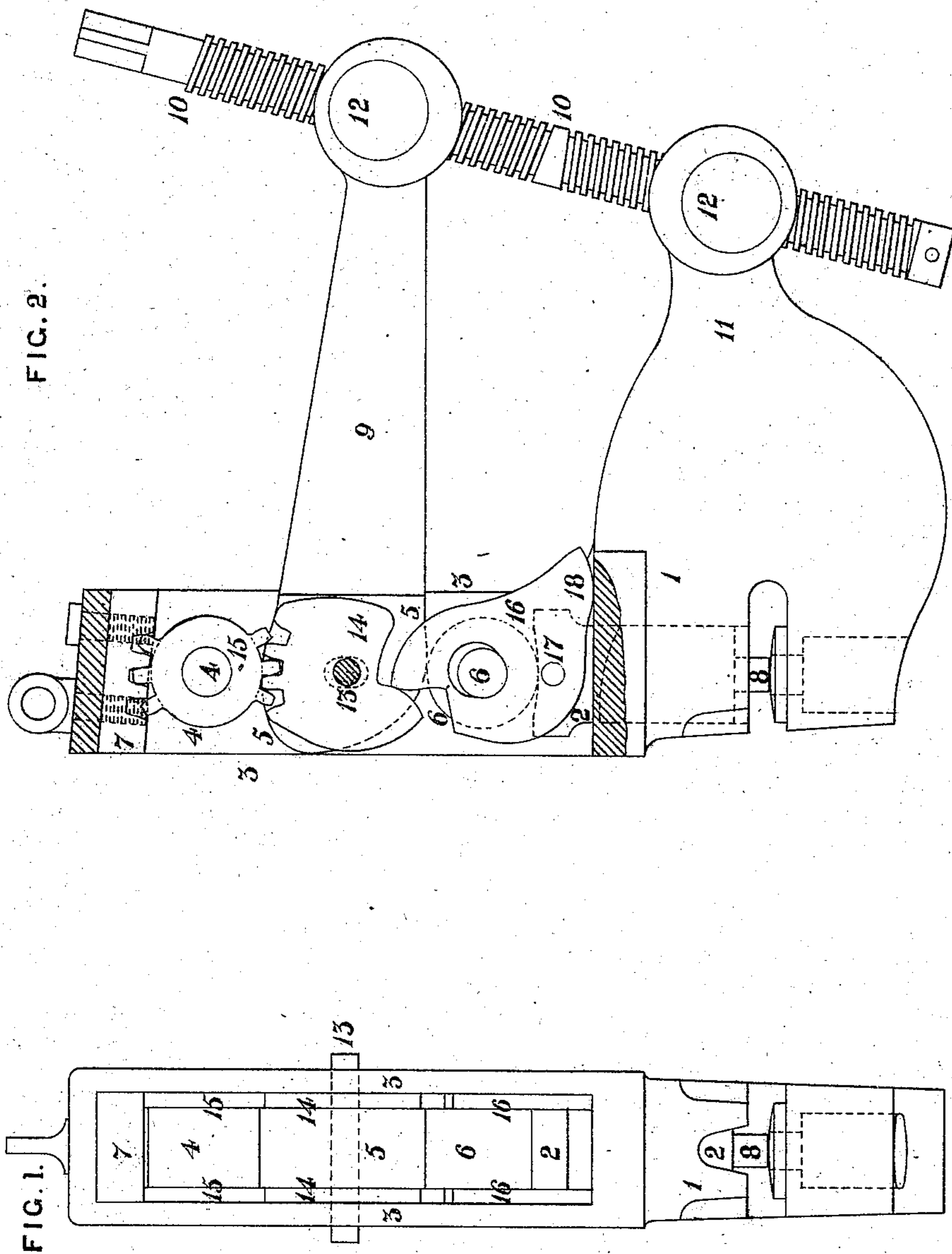


R. BAIRD.  
Punching-Machines.

No. 136,954.

Patented March 18, 1873.



Thomas Baird Witness  
Edmund Hunt Witness

Robert Baird

# UNITED STATES PATENT OFFICE.

ROBERT BAIRD, OF STIRLING, SCOTLAND.

## IMPROVEMENT IN PUNCHING-MACHINES.

Specification forming part of Letters Patent No. 136,954, dated March 18, 1873.

*To all whom it may concern:*

Be it known that I, ROBERT BAIRD, formerly of Greenock, but now of Stirling, both places being in Scotland, have invented certain Improvements in Punching Apparatus, of which the following is a specification:

My invention relates to an improved application and configuration of certain movable pieces, which act between the punch-holder and a peculiar abutment-piece, whereby the working strain is better distributed and sustained than in ordinary apparatus. My improved apparatus is also contrived to yield the greatest pressure relatively to the power applied at the commencement of its action when it has to resist the entire thickness of the plate to be punched, instead of the pressure unnecessarily increasing as the punch progresses through the plate, as is the case in many existing kinds of punching apparatus, all as will be fully described hereinafter in detail.

Figure 1 is a front elevation of my improved apparatus. Fig. 2 is a corresponding sectional side elevation with one of the cheeks supposed to be cut away.

The upper jaw 1, down through which the punch-holder 2 works, has formed with it two cheeks, 3, extending upward and joined at the top, and between these cheeks there are three movable pieces, 4 5 6, by whose action between an abutment-piece, 7, fixed in the top and the head of the punch-holder 2 the punch 8 is forced downward. The middle one, 5, of the three pieces is made with a lever-arm connected by a screw-spindle, 10, to a lug or arm, 11, formed on the back of the jaws, the lever-piece 5, as it may be termed, being moved by turning the screw-spindle 10. The screw-spindle 10 is shown partly right-handed and partly left-handed, and is screwed into nuts made with transverse journals 12, to swivel in forked eyes formed for them in the ends of the lever-arm 9 and fixed arm 11. The spindle is made with a squared end to receive a wrench or hand-lever for turning it by. The two remaining movable pieces 4 6 are simply interposed between the middle or lever piece 5 and the abutment 7 and punch-holder head 2, in order to obtain a rolling motion between the parts. The lever-piece 5 is formed with a gradually-varying diameter, as shown, so that as it is turned not only does its own center move downward, but it also causes the lower interposed piece 6 to move somewhat further downward. The interposed pieces 4 6 roll in

opposite directions, the upper one, 4, on the under side of the abutment 7, and the lower one, 6, on the top of the punch-holder head 2, and the surfaces of this head 2 and of the abutment 7 are inclined so as to still further increase the downward motion of the punch-holder, which results from the combined action of all the parts.

The pressure acting on the punch being, for equal increments of power applied to the lever end 9 or screw-spindle 10, inversely as the corresponding spaces traversed by the punch, any desirable variation of such pressure is obtainable by shaping the contact-surfaces to suit. Thus the abutment 7 and punch-holder head 2 are shaped with slight concavities, in consequence of which the pressure is greater at first and gradually diminishes as the punch gets through the plate.

The lever-piece 5 is kept from being displaced by a pin, 13, in its center, working in short vertical slots in the cheeks 3. Displacement is further prevented by side plates 14 fixed on the sides of the middle piece 5, and which have their upper parts toothed to gear with teeth on similar side plates 15 set on center bosses on the upper piece or roller 5, these latter plates gearing by means of teeth with the abutment 7. Side plates 16 are applied on the sides of the lower roller 6, and the upper parts of these plates 16 and the lower parts of the side plates 14 on the middle piece 5 are formed with corresponding tooth-shaped contact-surfaces, so that the middle plates 14 turn the lower plates 16 whenever the lever 9 is turned up, and thereby the lower plates 16 are made to lift the punch-holder 2 after the punching stroke. For this purpose the plates 16 are centered on pins 17 on the punch-holder 2, and projecting heels 18 are formed on the plates to bear on the top of the jaw 1, and act as a fulcrum when lifting the punch-holder.

I claim—

The combination of the lever-piece 5 with its varying diameter and upper and lower lever-pieces 4 and 6 with the right and left hand screw-spindle 10 passing through lever-arm 9 and stationary arm 11, all constructed, arranged, and operating substantially as described, for imparting a reciprocating motion to the punch 8, as set forth.

ROBERT BAIRD.

Witnesses:

THOMAS BAIRD,  
EDMUND HUNT.