

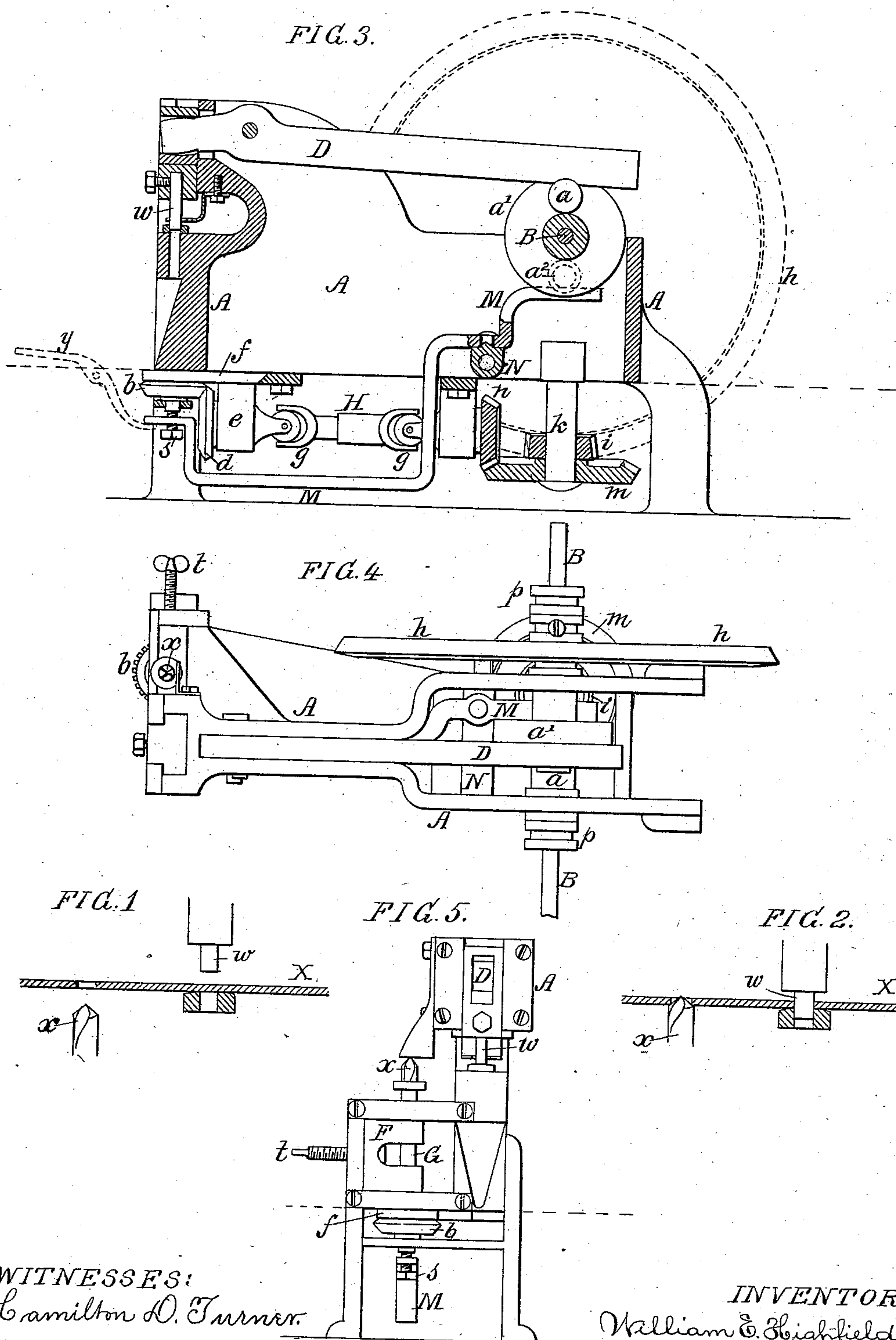
(No Model.)

W. E. HIGHFIELD.

COMBINED PUNCHING AND COUNTERSINKING MACHINE.

No. 289,835.

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WITNESSES:
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UNITED STATES PATENT OFFICE.

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COMBINED PUNCHING AND COUNTERSINKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 289,835, dated December 11, 1883.

Application filed March 5, 1883. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. HIGHFIELD, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented a Combined Punching and Countersinking Machine, of which the following is a specification.

The object of my invention is to so combine a countersinking-tool with a punch that the operation of countersinking one opening in a plate or bar can be performed simultaneously with the punching of another opening therein; and this object I attain in the manner which I will now proceed to describe, reference being had to the accompanying drawings, in which—

Figures 1 and 2 are diagrams illustrating the object of my invention; Fig. 3, a longitudinal section of the combined punch and countersinking-machine; Fig. 4, a plan view of the same, and Fig. 5 an end view without the driving mechanism.

A preliminary understanding of my invention may be had by reference to Figs. 1 and 2, in which *w* represents the punch, *x* the countersinking-tool, and *X* the plate or bar in which the countersunk openings are to be formed. The tool *x* is located at one side of the punch and at a distance therefrom equal to the distance between the holes in the plate, so that as the punch operates to form one hole the tool *x* may be operating to countersink the hole adjacent thereto, as shown in Fig. 2.

The organized machine for effecting the operations described is shown in Figs. 3, 4, and 5. A is the frame of the machine, in which are formed bearings for the driving-shaft B, the latter having a crank-pin, *a*, which acts upon the long arm of the punch-lever D, the short arm of the same being adapted to a slot in the guided slide carrying the punch *w*, as usual. A block, F, is adapted to guides at the front end of the machine, so as to be adjustable laterally from and toward the punch *w*, and in this block are formed bearings for the vertical spindle G, which carries the countersinking-tool *x*, the lower end of said spindle having a bevel-wheel, *b*, which gears into a pinion, *d*, on a shaft, H. The rear end of the shaft H is adapted to a fixed bearing on the frame; but the front end of the shaft is carried by a bearing, *e*, on an arm, *f*, of the block F, so that as the block is

adjusted the front end of the shaft H will be moved with it. To permit such movement I make the shaft H in sections and connect these sections by flexible joints *g*; but other means may be adopted in carrying out this portion of my invention. For instance, the pinion *d* may be carried by a transverse shaft, to which the pinion is keyed so that it can be moved thereon with the block, but cannot turn independently of the shaft. The shaft H is driven from the shaft B through the medium of the bevel-gearing shown in Figs. 3 and 4, a wheel, *h*, on the shaft B, gearing into a pinion, *i*, which turns on a stud, *k*, and is secured to a wheel, *m*, the latter gearing into a pinion, *n*, on the shaft H. Any desired arrangement of gearing may, however, be substituted for this. The disk *a'*, which carries the crank-pin *a*, has another crank-pin, *a''*, the latter acting upon the short arm of a lever, M, the long arm of which has a set-screw, *s*, bearing upon the lower end of the spindle G, so that as the lever M is vibrated the said spindle will be elevated and permitted to fall. The lever M is pivoted to a transverse bar, N, and the latter is pivoted to the frame of the machine at each end, so that the lever M is free to vibrate vertically under the action of the crank-pin, and also laterally to permit the adjustment of the block F. This adjustment is effected in the present instance by a screw-bolt, *t*, swiveled to the block and adapted to a threaded opening in the frame; but any desired arrangement of adjusting and retaining screws may be used.

The operation of the machine is as follows: The block F is first adjusted to such a distance from the punch *w* that when the punch is forming an opening in the plate the countersinking-tool *x* will be in line with an opening already formed therein. The adjustment of the block is required as the distance between the openings may vary in different plates. As the punch descends, the spindle G is elevated, and is held in its elevated position while the tool *x* makes a sufficient number of revolutions to properly countersink the opening to which it has been applied, the spindle and tool being then allowed to descend, and the punch caused to rise prior to a readjustment of the plate and repetition of the operation. Suitable clutches, *p p*, are provided, whereby the

gearing for rotating the spindle G and the crank-pins for operating the punch-lever D and lifting-lever M can be readily thrown into or out of action, and a foot-lever, *y*, (shown 5 by dotted lines in Fig. 1,) is provided, in order to permit the elevation of the spindle G independently of the crank-pin *a*².

The countersinking-tool may be arranged so as to act on the top of the plate instead of 10 beneath the same; but the latter arrangement is preferred, as it permits a more convenient disposal of the gearing.

I claim as my invention—

1. The combination of a punch, a counter- 15 sinking-tool alongside of the same, and mechanism for operating the said tools, whereby one opening can be countersunk while another is being punched, as set forth.

2. The combination of a punch, a counter- 20 sinking-tool alongside of the same, and mechan-

ism, substantially as described, for operating the punch and for rotating and intermittently elevating the countersinking-tool, as set forth.

3. The combination of a punch, a countersinking-tool, laterally-adjustable bearings for 25 the spindle of said tool, and mechanism, substantially as described, whereby the punch and countersinking-tool are operated, as set forth.

4. The combination of the spindle G and its adjustable bearings with a lever, M, pivoted 30 to a rocking bar, N, and with a crank-pin, *a*², for actuating said lever, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM E. HIGHFIELD.

Witnesses:

HARRY L. ASHENFELTER,
HARRY SMITH.