

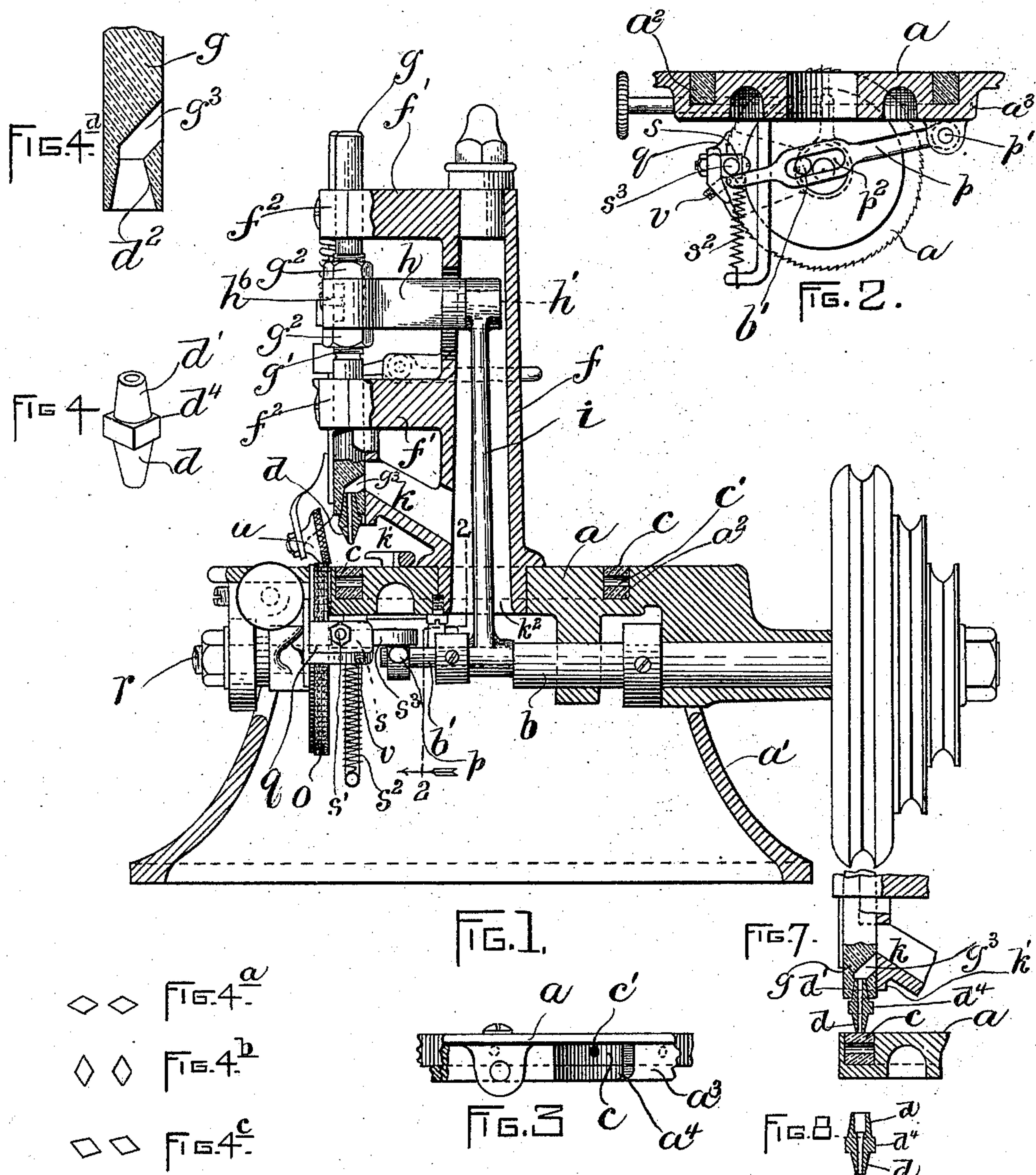
(No Model.)

2 Sheets—Sheet 1.

L. L. BARBER.  
LEATHER PUNCHING MACHINE.

No. 535,784.

Patented Mar. 12, 1895.



WITNESSES:  
*A. D. Harrison*  
*Rollin A. Bell*

INVENTOR:  
*L. L. Barber*  
*by Night Brown & Dunby*  
*Attys.*

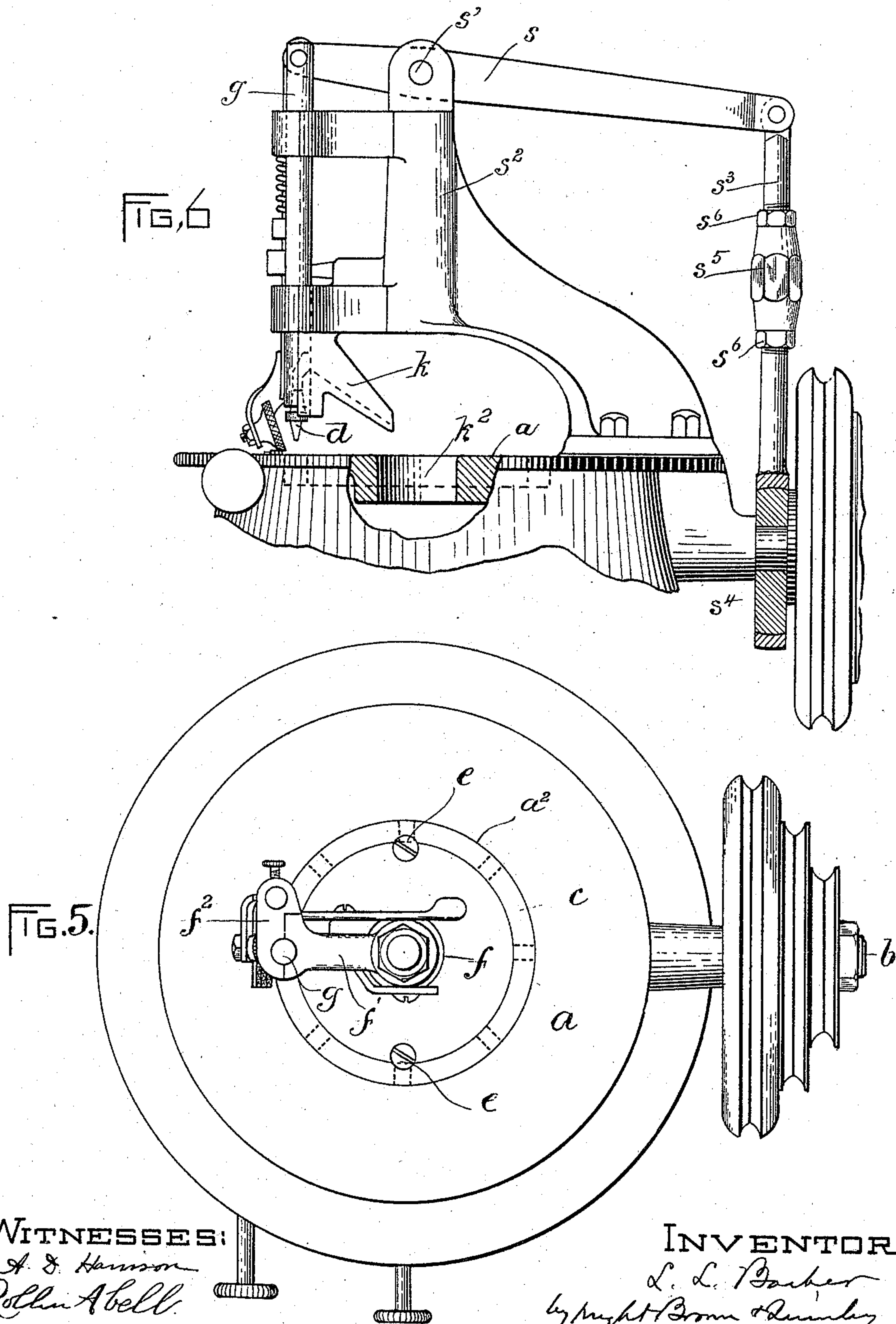
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Robert Abell

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Atty



# UNITED STATES PATENT OFFICE.

LYMAN L. BARBER, OF BOSTON, MASSACHUSETTS.

## LEATHER-PUNCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 535,784, dated March 12, 1895.

Application filed October 8, 1894. Serial No. 525,191. (No model.)

*To all whom it may concern:*

Be it known that I, LYMAN L. BARBER, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and  
5 useful Improvements in Leather-Punching Machines, of which the following is a specification.

This invention relates particularly to machines for ornamenting leather by perforating  
10 the same so as to form orifices of various ornamental forms near the edge of a piece of leather.

The invention has for its object to provide an efficient machine of this class adapted to  
15 perforate a piece of leather in such manner as to impart a neat and desirable ornamentation, and it consists in the improvements which I will now proceed to describe.

Of the accompanying drawings, forming a  
20 part of this specification,—Figure 1 represents a vertical central section of a leather-punching machine embodying my invention. Fig. 2 represents a section on the line 2—2 of Fig. 1, looking toward the left. Fig. 3 represents  
25 a side elevation of a part of the work-support or plate and of the punch-bed. Fig. 4 represents a perspective view of the punch removed from the bar which carries it. Figs. 4<sup>a</sup>, 4<sup>b</sup>, and 4<sup>c</sup> represent different arrangements  
30 of holes that may be made by adjusting the punch. Fig. 4<sup>a</sup> represents a sectional view of a portion of the punch-bar, the punch being removed. Fig. 5 represents a top view of a machine constructed as shown in Fig. 1. Fig.  
35 6 represents a side elevation and partial section of a modified form of the machine. Fig. 7 represents a sectional view of parts of the machine. Fig. 8 represents a sectional view of the punch.

40 The same letters of reference indicate the same parts in all the figures.

Referring for the present to Figs. 1 to 5, inclusive, *a* represents a work-support which is preferably in the form of a plate or table  
45 mounted on a base *a'* to which the work-support is or may be hinged so that it may be turned upwardly to expose the mechanism below it.

*b* represents a driving-shaft journaled in  
50 bearings on the work-support *a* and provided at its inner end with an eccentrically arranged extension *b'* which imparts motion as

hereinafter described to the punch and to the feed-wheel.

*c* represents the punch-bed, which is lo- 55  
cated on the work-support and is adapted to co-operate with the reciprocating punch *d*. The punch-bed as here shown is composed of a ring of brass or other metal suitable for co-  
operation with a punch, said ring being ad- 60  
justably inserted in an annular recess *a*<sup>2</sup> in the work-support *a*. The ring is adapted to be adjusted to bring a new part of its surface into co-operation with the punch by giving  
the ring a partial rotation in the recess *a*<sup>2</sup>. 65  
Means are provided for positively securing the ring at any position to which it may be adjusted, said means being here shown as two  
screws *e e* (Fig. 5) inserted in tapped orifices  
in the work-support and having their heads 70  
arranged to bear upon the upper surface of the ring. When the screws are loosened, the ring may be freely turned in the recess; and when the screws are tightened, the ring is  
clamped therein. To enable the operator to 75  
conveniently adjust the ring, I provide the ring with a series of radial orifices *c'* each adapted to receive a pin or handle, which may be movably inserted therein to partially rotate  
the ring. The recess *a*<sup>2</sup> is formed in a 80  
part of the work-support which has a thickened portion forming a projection *a*<sup>3</sup> (Figs. 2 and 3) on the under side of the work-support, one side of said projection being cut away, as  
shown at *a*<sup>4</sup> (Fig. 3), to expose a portion of 85  
the periphery of the annular bed *c*. The pin or handle used by the operator is inserted into one of the orifices *c'* of the bed, through the opening *a*<sup>4</sup>, which is of sufficient length  
to enable the ring to be turned by a pin in- 90  
serted in one orifice until the next orifice comes into position to receive the pin, so that the bed may be entirely rotated in this way,  
step by step. The bed is removable from the  
recess *a*<sup>2</sup>, so that after one side has been ren- 95  
dered useless by continued wear, it may be removed and inverted, bringing the other side into use. The sides of the ring may be dressed  
off from time to time, to remove their acting  
faces, and the thickness of metal thus re- 100  
moved may be compensated for by dropping a thin washer of paper or other suitable material in the bottom of the recess *a*<sup>2</sup>.

*f* represents a hollow standard affixed to



the central portion of the work-support *a*, said standard having two lateral arms *f' f'* which are provided with vertical guides in which the punch-bar *g* is fitted to slide.

5 *h* represents the punch-bar carrier, which is secured at one end to the punch-bar by means hereinafter described, its other end projecting into the hollow standard *f*, where it is connected with the upper end of a rod or  
10 pitman *i*. The lower end of said rod or pitman is connected with the eccentric extension *b'* of the driving-shaft, so that the rotation of said shaft vertically reciprocates the rod or pitman *i*, the carrier *h*, and the punch-bar *g*.  
15 The carrier is preferably adjustably connected with the punch-bar, so that the latter can be vertically adjusted to compensate for wear of the punch or to adjust the limit of the downward movement thereof. To this  
20 end, the carrier is provided with a vertical orifice through which the punch-bar passes, and the punch-bar has a threaded portion *g'* passing through the carrier and provided with check-nuts *g<sup>2</sup> g<sup>2</sup>* bearing upon the upper and  
25 lower surfaces of the carrier, said nuts being vertically adjustable on the punch-bar, so that the bar can be affixed to the carrier at various heights.

To permit the convenient removal of the  
30 punch and punch-bar from the machine, I provide the arms *f'* with detachable caps *f<sup>2</sup>* which constitute parts of the guides for the punch-bar and are secured to the arms by screws, so that they can be readily removed. The carrier is provided at its inner end with a reduced portion or stud *h'* which enters an orifice formed in the rod or pitman *i* and is removable horizontally from said orifice, so that  
40 when the caps *f<sup>2</sup>* are removed, the punch-bar and carrier may be readily detached from the machine, thus enabling the punch to be sharpened or cleared from obstructions caused by chips, without removing it from the punch-bar, therefore without requiring the adjust-  
45 ment of the punch as to its position relatively to the corresponding indentation in the bed. The stud *h'* and the orifice or socket in the rod *i* which receive said rod constitute a loose connection between the carrier and the rod,  
50 there being no positive attachment between said parts.

I prefer to connect the punch *d* with the punch-bar *g* in such manner that the punch can be readily turned or partially turned independently of the bar, so that the figure cut  
55 by the punch can stand in any desired direction on the work. For example, if the punch is made to cut a diamond-shaped hole, the punch may be adjusted so that the series of  
60 holes will have their longer axes in line with each other, as shown in Fig. 4<sup>a</sup>, or their shorter axes in line with each other, as shown in Fig. 4<sup>b</sup>, or may be arranged with their longer axes diagonally to the line of holes, as shown in  
65 Fig. 4<sup>c</sup>. To this end, I provide the punch with a frusto-conical shank *d'* and the punch-bar with a seat or socket *d<sup>2</sup>* formed to closely fit

said shank, so that when the shank is pressed into the socket it will be held by friction with sufficient firmness to keep it in the desired  
70 position. Between the body *d* and shank *d'* of the punch, I form an intermediate section *d<sup>4</sup>* which is polygonal in form, so that it can be readily grasped by a wrench for the purpose of loosening it from its socket either for  
75 removing or adjusting the punch. This construction enables the punch to be readily inserted and removed, and to be adjusted so that the punch will cut a hole extending in any desired direction.  
80

The punch-bar is provided with an outlet *g<sup>3</sup>* for the chips that are forced up through the bore of the punch by the operation of the latter, said outlet extending from the upper end of the bore of the punch diagonally to  
85 one side of the punch-bar. *k* represents an inclined spout or chute which is affixed to the standard *f* and is arranged so that when the punch-bar is raised, the outlet *g<sup>3</sup>* will be in position to discharge chips or cuttings into  
90 the upper end of the spout. The spout is provided with a downwardly projecting guard *k'* which is arranged to cover the outlet *g<sup>3</sup>* in the punch-bar when the latter is depressed, so that chips cannot escape from the punch-bar  
95 excepting into the spout. The work-support is provided with a chip-outlet *k<sup>2</sup>* which is arranged to receive the chips that slide down the spout. Said outlet is shown in Fig. 1 as a part of the opening in the work-support  
100 that receives the hollow standard *f*, so that the chips fall through the lower portion of said standard and into the hollow base of the machine. The bore of the punch is slightly tapered from the cutting end of the punch  
105 partly to the upper end of the shank *d'*, and from thence is chambered, the taper being sufficient to give clearance to the chips, as they pass upwardly, and prevent their becoming wedged in the punch. The outlet *g<sup>3</sup>*,  
110 however, is considerably larger than the largest portion of the bore of the punch, so that as the chips emerge from the punch they have room to move freely in all directions, and therefore are in a loose condition in the  
115 outlet *g<sup>3</sup>*, so that they readily pass from the latter into the spout *k*. I find that by making the bore of the punch slightly tapering, so that the chips can pass easily upward without being able to move sidewise far enough  
120 to enable two or more chips to be arranged side by side in the punch, and by making the outlet *g<sup>3</sup>* considerably larger, as described, I prevent all liability of the chips being jammed or crowded within the punch, so as to obstruct  
125 the latter. I prefer to make the bottom of the spout *k* flat, and considerably wider than the outlet *g<sup>3</sup>*, this form enabling the chips to pass off with great freedom.

*o* represents a feed-wheel, which projects  
130 upwardly through a slot in the work-support and is rotated step by step through devices operated by the extension *b'* of the driving-shaft, said devices including a lever *p* pivoted



at  $p'$  to the work-support and having a slot  $p^2$  which receives the eccentric extension  $b'$ ; a yoke  $q$  mounted to oscillate on a boss formed on one side of the feed-wheel, said feed-wheel being mounted to rotate upon a stud  $r$  affixed to the work-support; a dog  $s$  which is pivoted at  $s'$  to the yoke  $q$  and is held normally by a spring  $s^2$  out of engagement with the side of the feed-wheel, said dog having an arm  $s^3$  which projects over the outer end of the lever  $p$ . The lever  $q$  is oscillated vertically by the rotation of the driving-shaft. Each upward movement of the lever  $p$  causes it to turn the dog  $s$  on its pivot, and thus cause the dog to bite against the side of the feed-wheel and impart a partial rotation to the latter, the yoke  $q$  being adapted to oscillate vertically so that it is raised with the dog and partakes of the movement of the feed-wheel. When the lever  $p$  moves downwardly, the spring  $s^2$  immediately disengages the dog from the side of the feed-wheel, so that the latter remains in the position in which it was left by the upward movement of the lever  $q$ . The yoke  $q$  is provided with an adjustable stop-screw  $v$  which is arranged to bear against the dog and prevent it from being moved by the spring  $s^2$  far enough to cause it to engage the feed-wheel during the downward movement of the dog. The end of the dog is at right angles with its sides, and its arrangement is such that when moved upwardly by the lever  $p$ , one of its angles will bite the side of the feed-wheel, the stop-screw preventing the other angle of the dog from biting the feed-wheel when the dog is moved downwardly. Said stop-screw also compensates for wear of the acting angle of the dog upon the side of the feed-wheel.

The machine is provided with a suitable presser-foot  $u$  adapted to be raised and lowered in the usual or any suitable manner, and to co-operate with the feed-wheel as usual.

In Fig. 6 I show a modified construction of the machine, in which the punch-bar is connected at its upper end with a lever  $s$  which is pivoted at  $s'$  to a standard  $s^2$ , the latter being of offset form and attached to the work-support near one edge thereof. One arm of the lever  $s$  is connected by a rod  $s^3$  with an eccentric  $s^4$  on the driving-shaft. In this modification, the chip-spout  $k$  is formed on one of the arms which guide the punch-bar. In this modification the vertical adjustment of the punch-bar may be effected by the following means: The rod  $s^3$  is made in two separate sections, the ends of which are provided one with a right-hand, and the other with a left-hand screw-thread, said threaded ends being engaged with a correspondingly threaded nut  $s^5$ , so that the rotation of said nut in one direction will raise the upper section of the rod  $s^3$ , thus lengthening said rod and through the lever  $s$  depressing the punch-bar and punch. An opposite rotation of the nut will in like manner raise the punch-bar. Check-nuts  $s^6$   $s^6$  are provided to hold the nut  $s^5$  in

any position to which it may be adjusted. It is obvious that the same result may be produced in a variety of ways, my invention not being limited to the particular means here shown.

To prevent the punch-bar from being turned in its bearings when it is being vertically adjusted by means of the nuts  $g^2$   $g^2$ , I provide the carrier with a screw  $h^6$  which enters a longitudinal groove formed in the punch-bar, and thus prevents the rotation of the punch-bar in the carrier, said groove being of sufficient length to permit any desired adjustment of the punch-bar.

I do not limit myself to the use of a wheel-feed in connection with the described improvements, and may use a step-feed or any other suitable feed without departing from the spirit of my invention.

Having thus explained the nature of my invention and described a way of constructing and using the same, though without attempting to set forth all the forms in which it may be made, or all the modes of its use, what I claim, and desire to secure by Letters Patent, is—

1. A punching machine comprising a reciprocating punch, a work-support or plate having an annular recess extending below its upper surface, and an opening or slot such as  $a^4$  below said upper surface communicating with said recess, and a soft metal annulus adjustably fitted in said groove with one side substantially flush with the upper surface of the work-plate, said side constituting a punch-bed, another portion of said annulus being accessible through the opening  $a^4$  so that the bed may be adjusted by a tool inserted in said opening.

2. A punching machine comprising a work-support having a punch-bed, a fixed arm or standard, a punch-bar fitted to reciprocate in guides on said standard and provided with a hollow or tubular punch and with a chip-outlet extending from the upper end of the bore of the punch to one side of the bar, mechanism for reciprocating said bar, and a fixed inclined chip-chute or spout arranged to coincide with the chip-outlet in the bar when the latter is raised, and with a downwardly-projecting guard arranged to cover the said outlet when the bar is depressed.

3. A punching machine comprising a work-support having a punch-bed and a chip-receiving orifice, a fixed arm or standard having a fixed inclined chip-spout or chute arranged to discharge chips into said orifice, and a reciprocating punch-bar having a hollow or tubular punch and a chip-outlet extending from the bore of the punch to one side of the bar, said outlet being arranged to coincide with the chip-spout when the bar is raised and to be covered by the chip spout when the bar is depressed.

4. A punching machine, comprising a work-support having a punch-bed, a fixed hollow standard rising from said bed, rigid guides



formed on or affixed to the standard and offset therefrom to project over the punch-bed, a punch-bar fitted to reciprocate in said guides and provided with a punch centrally  
5 located on its lower end, a driving shaft below the work-support, a rod or pitman eccentrically connected to the driving shaft and extending into the hollow standard, and an arm or carrier connecting the rod or pitman with  
10 the punch-bar, the said guides positively controlling the punch-bar and determining the position of the punch, the latter being substantially concentric with the guides.

5. A punching machine comprising a work-  
15 support having an adjustable punch-bed, a fixed hollow standard having guides located at one side of the standard and rigidly connected therewith, said guides being composed in part of detachably secured caps, a punch-  
20 bar movable in said guides, a driving shaft below the work-support, a rod or pitman eccentrically connected with the driving-shaft and extending into the hollow standard, and a carrier attached at one end to the punch-bar  
25 and having at the other end a loose separable connection with the rod or pitman whereby when the said caps are removed the punch-bar and arm may be disconnected from the said rod or pitman.

30 6. A punching machine comprising a work-support having an adjustable punch-bed, a fixed hollow standard having guides located

at one side of the standard and rigidly connected therewith, a punch-bar movable in  
said guides and having a screw-threaded por- 35  
tion, a driving-shaft below the work-support, a rod or pitman eccentrically connected to the driving-shaft and extending into the hollow standard, an arm or carrier connected at one  
end with the said rod and provided at the 40  
other end with a socket through which the threaded portion of the punch-bar passes, and check-nuts engaged with said threaded por-  
tion above and below the carrier, whereby the punch-bar may be secured to the carrier at 45  
different heights.

7. The combination with the work-support, punch-bed, and punch; of the feed-wheel; the oscillating yoke having the pivoted dog ar-  
ranged to engage the feed-wheel, and the 50  
adjustable stop-screw; an oscillating lever adapted to intermittently move the dog into engagement with the side of the feed-wheel; and a spring adapted to move the dog out of  
engagement with the feed-wheel and against 55  
the stop-screw.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 28th day of September, A. D. 1894.

LYMAN L. BARBER.

Witnesses:

HORACE BROWN,  
A. D. HARRISON.