

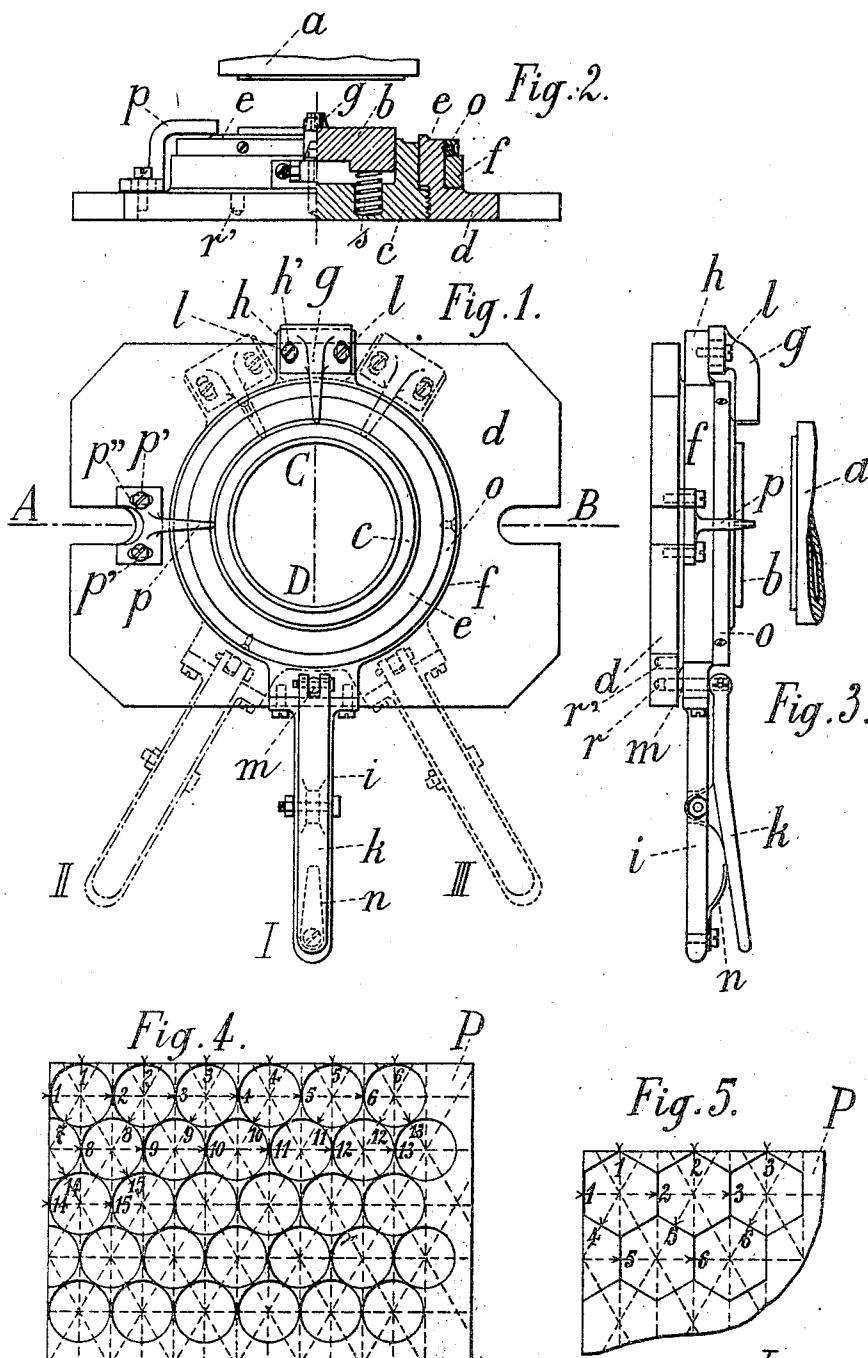
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G. P. HOFFMANN.

MACHINE FOR PUNCHING OUT BLANKS OF CIRCULAR OR REGULAR POLYGONAL SHAPE FROM PLATES OF SHEET METAL OR THE LIKE.

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Witnesses:
W. Rabiner
L. Staden.

Inventor:
Gottfried Philipp Hoffmann
Alfred Müller, atty.

UNITED STATES PATENT OFFICE.

GOTTFRIED PHILIPP HOFFMANN, OF THUN, SWITZERLAND.

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Specification of Letters Patent.

Patented Aug. 29, 1905.

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To all whom it may concern:

Be it known that I, GOTTFRIED PHILIPP HOFFMANN, a citizen of Switzerland, residing at Thun, Canton of Berne, Switzerland, have
5 invented certain new and useful Improvements in Machines for Punching Out Blanks of Circular or Regular Polygonal Shape from Plates of Sheet Metal or the Like, of which the following is a specification.

10 This invention relates to machines for punching out blanks of circular or regular polygonal shape from plates of sheet metal or the like. In order to properly position the plates between the puncher and the die, stops
15 are used which usually are arranged at a fixed angle of ninety degrees with relation to each other, so that the centers of adjacent blanks to be cut out form when connected by lines rectangles.

20 The present invention has for its principal object to cut the blanks in such a manner that each row of blanks will be offset with relation to the preceding row, so that the centers of adjacent blanks form when connected by lines
25 equilateral triangles, whereby a considerable saving in material is obtained. To this end, two stops for positioning the plates, from which the blanks are to be cut out, between the puncher and the die are provided, one of
30 which stops is adapted to be rotated around the axis of the puncher and to be secured in various angles with relation to the other stop, which only is adapted to be adjusted in a radial direction with respect to the axis of the
35 puncher, whereas the other stop can be adjusted circumferentially as well as radially.

In the accompanying drawings, Figure 1 is a plan view of my improved device, and Fig. 2 a front elevation, partly in section, on a
40 a plane through the line A B of Fig. 1. Fig. 3 is a side view viewed from the left of Fig. 1, whereas Figs. 4 and 5 represent plates, showing the various forms of the blanks cut out and showing how each row of blanks to be cut
45 out is offset with respect to the preceding row.

Similar reference characters are used to designate similar parts in all the figures.

50 *a* represents the puncher, adapted to be moved up and down away from and toward the support *b*, which is arranged within the socket *c* and supported by springs *s*, held in suitable apertures in the said socket *c*. The latter is secured in a base *d*, provided with
55 an upward annular extension *e*, projecting

slightly above the upper end of the socket *c* and forming the die. The inner diameter of the extension *e* corresponds to the diameter of the punch *a*.

The extension *e* is loosely surrounded by a 60 ring *f*, having fastened to it by means of screws *l* the stop *g*. The screws *l* pass through slots *h'* of a lug *h* made integral with the stop *g*, so that the latter can be adjusted to vary its distance from the axis of the puncher 65 *b* at will. The ring *f* is further provided with a handle *i*, having pivoted to it the locking-lever *k*, one arm of which is normally raised by a spring *n* so that a locking-pin *m* is held in engagement with an aperture *r*, pro- 70 vided in the base *d*, thereby securing the handle *i* and the ring *f* in their positions. There are three apertures *r*, *r'*, and *r''* in the base-plate *d* and by forcing down the free end of the locking-lever *k* against the pres- 75 sure of the spring *n* the locking-pin *m* at the other end of the lever is lifted out of one of the apertures, and then by moving the handle *i* in one or the other direction the ring *f* and therewith the stop *g* are also moved until the 80 locking-pin *m* is opposite another aperture, when by releasing the pressure on the free end of the lever *k* the pin *m* will be forced by the spring *n* into the said aperture, thereby locking the ring *f* and the stop *g* in their 85 positions.

To prevent the ring *f* from leaving the extension *e*, a ring *o* is fastened by screws or similar means to the extension *e*, as shown in Fig. 2, whereby the ring *f* is securely 90 held against any movement in axial direction.

A second stop *p* is secured to the base-plate *d* by means of screws *p'*, passing through slots *p''* in the base of the stop, whereby the stop can be adjusted radially with respect to 95 the axis of the puncher *a*, whereas the stop *p* cannot be adjusted in a circumferential direction.

In order to cut out from a plate circular blanks, as shown in Fig. 4, the puncher *a* and 100 the die *e* must be of course of circular form. After the handle *i* has been moved into the position shown in Fig. 1 in full lines, which position is designated by I, the movable stop *g* will form with the fixed stop *p* an angle of ninety 105 degrees. Both stops are then radially adjusted so that the distance between their engaging faces and the axis of the puncher *a* is like half the diameter of a blank to be cut out. The plate *P* (shown in Fig. 4) is then placed 110

with its left-hand upper corner on the support *b*, so that the stops *p* and *g* are in contact with the edge of the plate at the points 1 1, Fig. 4, when the first blank is cut out.

5 The plate *P* is then moved into a position where the stops *p* and *g* come in contact with the plate at 2 2, after which another blank is cut out. Each time after a blank has been cut out the plate is moved until the stops come

10 in contact with the plate successively at 3 3, 4 4, &c. After the first row of blanks has been thus cut out the handle *i* is moved into the position designated in Fig. 1 by II, whereby the stop *g* is moved from its former position over

15 an arc of thirty degrees. The plate *P*, Fig. 4, is now again placed first with its upper left-hand corner on the support *b*, so that the stop *g* comes in contact with the plate at 7, whereas the left-hand side of the plate is

20 placed in the center line *C D* of the support *b*. In this position of the plate only half a blank is first cut out, after which the plate is moved until the stops *p g* are in contact with the plate at 8 8, Fig. 4. A full blank is now

25 cut out and the plate is then moved on as above successively into the position where the stops *p g* come in contact with the plate at 9 9, 10 10, 11 11, 12 12, and after each adjustment of the plate a blank is cut out. After

30 the next to the last blank in the second row has been cut out the handle *i* on the ring *f* again is moved, this time into the position shown in dotted lines and designated by III in Fig. 1, whereby the movable stop *g* is

35 moved toward the stop *p* the distance between the two stops, thus including an arc of sixty degrees. The plate *P* is now so positioned on the support that the stops *p* and *g* come in contact with this plate at 13 13, Fig.

40 4. In order to punch out the blanks in the third row, the movable stop *g* remains in the position last referred to, whereas for cutting out the fourth row the stop *g* is again returned to the position which the stop occupied to cut out the second row.

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As seen from Fig. 4 the centers of three adjacent blanks to be cut out form the corners of an equilateral triangle and the stop *g*, as described, is alternately positioned, so that

50 its distance from the fixed stop *p* includes first an arc of 90° , then of $90^\circ + 30^\circ = 120^\circ$, and then of $90^\circ - 30^\circ = 60^\circ$.

Of course other than circular blanks can be cut out in the same manner or following the

55 same principles. Fig. 5, for instance, shows a portion of a plate *P'* from which blanks in

the form of regular hexagons are cut out, and also in this case the centers of three adjacent hexagons form the corners of an equilateral triangle and the stop *g* is also for this operation alternately so adjusted, so that its distance from the fixed stop *p* includes first an arc of 90° , then of $90^\circ + 30^\circ = 120^\circ$, and then of $90^\circ - 30^\circ = 60^\circ$.

Having now fully described my invention, 65 what I claim as new, and desire to secure by Letters Patent, is—

1. In a punching apparatus the combination with a movable puncher, a die and a resilient support for the work, of two stops for determining the position of the work, one stop having a fixed position and the other being movable, a loose ring carrying said second stop and adapted to be rotated around the axis of the puncher, whereby the distance of the second stop from the first can be varied at will.

2. In a punching apparatus the combination with a movable puncher and a die, of two stops for determining the position of the work, one stop having a fixed position, and a movable ring carrying the other stop and adapted to be rotated around the axis of the puncher, and a handle attached to said ring, whereby the ring and the stop carried by it can be moved toward and away from a fixed stop.

3. In a punching-machine the combination with a movable puncher and a die, of two stops, one of said stops being attached to a movable ring adapted to be rotated around the axis of the puncher and held against axial movement, a handle secured to said ring and a locking-lever pivoted to said handle, a locking-pin at one end of said lever and a spring pressing against the other end thereof to force said pin into one of a series of apertures arranged in the base-plate of the machine to hold the ring in its various positions.

4. In a punching-machine the combination of a movable puncher and a die cooperating therewith, of two stops, one of said stops being adapted to be moved away from and toward the other stop, both stops being radially adjustable with respect to the axis of the puncher.

In testimony whereof I affix my signature in presence of two witnesses.

GOTTFRIED PHILIPP HOFFMANN.

Witnesses:

A. LIEBERKNECHT,
C. H. CLOTTER.