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Memain

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[54] **PUNCHING MACHINE**

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[51] **Int. Cl.** **B26d 5/08**

[58] **Field of Search** 83/452, 453, 406, 667, 83/663, 559, 409, 412, 699, 138, 34, 686, 685; 269/69

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[57] **ABSTRACT**

Improvements in machines for punching, characterized by an orientable tool-holding gooseneck, the pivoting axis of which coincides with that of the tool, comprising means for the angular immobilization and frictionless support on a partly circular area, of the rotation of the said gooseneck permitting, on the one hand, increasing the punching capacity without altering the initial precision, and, on the other hand, obtaining, with the aid of a single tool, various cutouts in any desired positioning angle.

5 Claims, 4 Drawing Figures

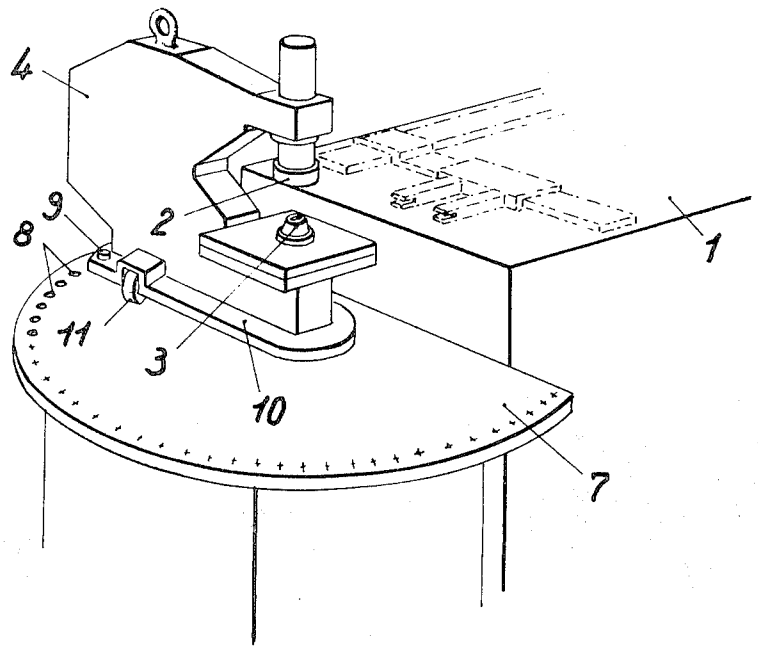


Fig.1

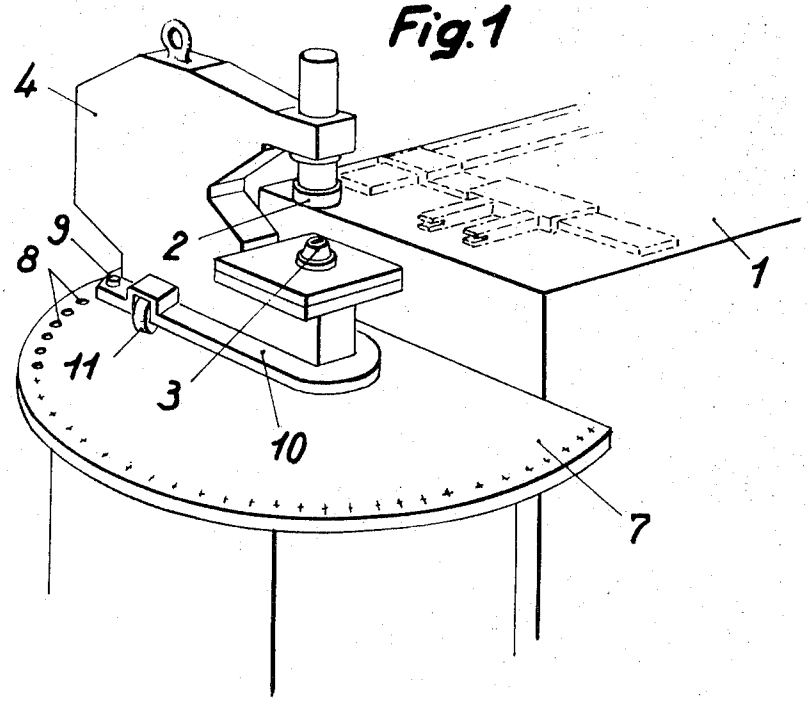


Fig.2

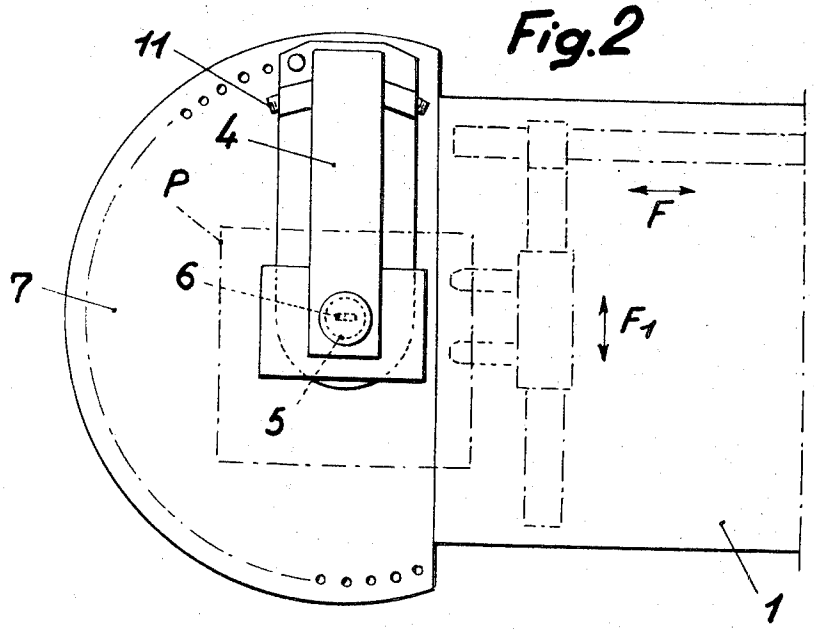


Fig.3

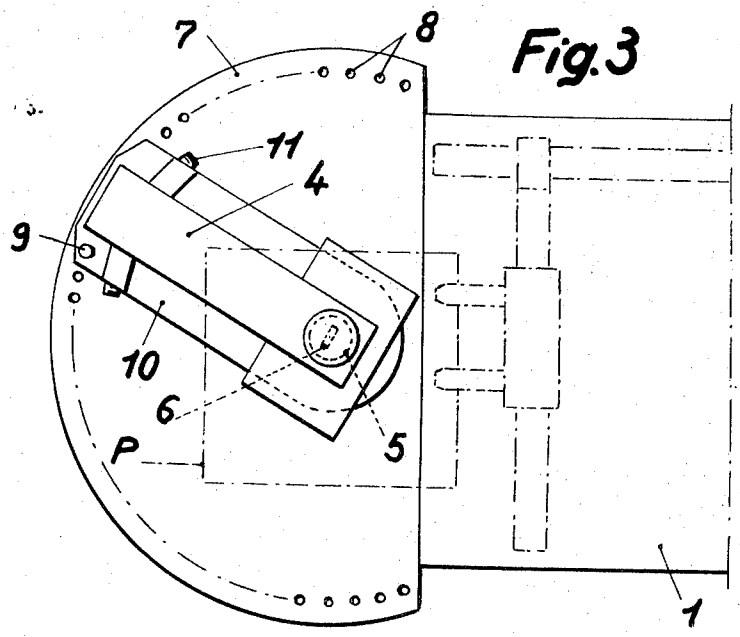
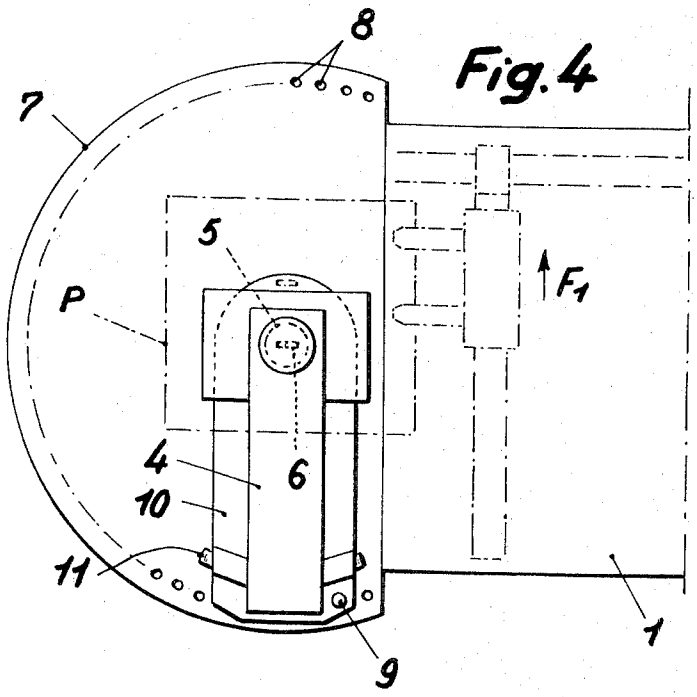


Fig.4



PUNCHING MACHINE

Punching machines, generally equipped with a fixed gooseneck for the tool, have the drawback of substantial weight and volume, conditioned by the maximum dimensions of the metal sheets for machining, which have to fit entirely within said gooseneck. The result is that the possibilities of displacement of the plate to be punched are relatively limited, with respect to the size of the machine, which limits the punching operations to certain areas on said plate, or requires turning the latter over, with all the resulting drawbacks, in particular the need for successive adjustments, to reset the precise positioning of the plate relative to the axis of the punch.

Moreover, in this type of machine, the formation of identical holes, other than round ones, in the sheet metal plate to be machined, requires, the use of special tools as a function of the desired angular orientation.

The object of the present invention, which remedies these drawbacks, is a machine for punching by copying, remarkable in that the gooseneck constituting the tool holder can be oriented around a pivot whose axis coincides with that of the tool, this rotation of the tool holder, which is at least equal to **180°**, makes it possible on the one hand to increase the punching capacity, while maintaining precision, and on the other hand, to obtain, with the aid of a single tool, punchings in any desired angle of positioning.

According to one method of embodiment, the pivot of the gooseneck of the tool-holder is borne by a table, that is at least semicircular, which has on its circumference, close to the perimeter, a plurality of holes for angular adjustment of the said gooseneck, which has, for this purpose, a corresponding set screw that can cooperate with one of the said holes, as well as means for displacing it without friction, on the surface of the supporting table which is adjacent to the usual table bearing the device for attachment and adjustment of the metal plate to be punched, which can be placed under the dependency of a manual or electronic control according to the type of machine used.

In the attached drawings, which are referred to by way of indicative example only:

FIG. **1** shows in perspective, a punching machine with orientable gooseneck according to the invention.

FIGS. **2** to **4** are diagrammatic overhead view of the punch, showing certain possiblities of punching with the aid of a single tool.

Referring to the drawings, **1** is the usual table of a punching machine with its device for clamping and adjusting the plate P to be punched, which can be displaced in two perpendicular directions according to arrows F and F_1 (FIG. 2), either by hand or automatically by means of a programmed electronic control system, not shown, in order to bring said plate between the tool holder **2** and the matrix **3** in the space determined by the usual gooseneck carrying these elements.

According to the present invention, the gooseneck **4** is moveable in rotation on a pivot **5**, the axis of which coincides with that of tool **6**, with said pivot being borne by the center of a table **7** having the form of a segment of a circle equal to **180°** or more, adjoining the usual table **1**, and on which said gooseneck can be immobilized angularly.

With this in mind, the table **7** has, circumferentially, near its perimeter, a plurality of equidistant holes **8** corresponding to the usual divisions of the circumference, and with one of which a finger **9** can cooperate for the angular positioning of the gooseneck **4** borne by the sole **10** of the latter on the side opposite its pivot **5**.

Moreover, in order to facilitate the rotation of the gooseneck on table **7**, rollers **11**, borne laterally by sole **10**, insure its displacement without friction on the surface of said table.

A punching machine with orientable gooseneck thus constituted, permits, for example, the making a series of aligned holes in plate P and then, by rotating said gooseneck 180°, making a series of holes strictly similar and parallel to the preceding holes, by the manual or automatic displacement according to arrow F_1, of the device for adjustable displacement of the latter, FIG. **4**.

It is also possible with the same tool to make holes in any desired angular position which permits according to the form of its die and the successive angles of rotation imparted to the gooseneck, the obtention of diverse forms, different from those presented by said tool.

Thus, in the example represented, tool **6**, of oblong shape, makes it possible, after a first punching and after rotating the gooseneck 90°, to obtain cruciform perforations, or, by a rotation of 180° and cutouts juxtaposed by displacement of the plate holder, rectangular or square perforations. These various perforations can, according to the relative displacements of the moving parts of the machine, have an oblique arrangement relative to the sides of the plate, or can be distributed, for example, in line, staggered, stepped or circumferentially.

The present invention is not, of course, limited to the method of embodiment described and represented, but extends to all variants of pivoting, guidance and positioning of the tool-holding gooseneck.

I claim:

1. In a punching machine, in combination, an oblong punching tool and a matrix, said tool and said matrix having a common axis, a gooseneck supporting said punching tool and said matrix, a table on which said gooseneck is supported, means for pivoting and immobilizing said gooseneck relative to said table, the axis of pivoting of said gooseneck coinciding with said common axis of said tool and said matrix.

2. In a punching machine including in combination a punching tool, a gooseneck support said punching tool, means pivotally supporting said gooseneck and capable of retaining said gooseneck along the axis of said tool, means supporting the piece to be machined, and means for displacing said supporting means along two directions perpendicular to one another and situated in a plane perpendicular to the axis of rotation of said gooseneck.

3. In a punching machine, including in combination, a tool holding gooseneck, a table constituted by a segment of a circle at least equal to 180°, means supporting the piece to be machined, and means for displacing said support of said piece in two directions perpendicular to each other and situated in a plane perpendicular to the axis of rotation of said gooseneck.

4. Punching machine according to claim **3**, in which said table has holes disposed circumferentially and in which said gooseneck has at least one finger associated

therewith capable of penetrating into one of said holes to position said gooseneck angularly.

5. Punching machine comprising a punching tool, a gooseneck supporting said punching tool, and means pivotally supporting said gooseneck around the axis of said tool, a support for the piece to be machined which is moveable in two directions perpendicular to each other and situated in a plane perpendicular to the axis of rotation of said gooseneck.

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