

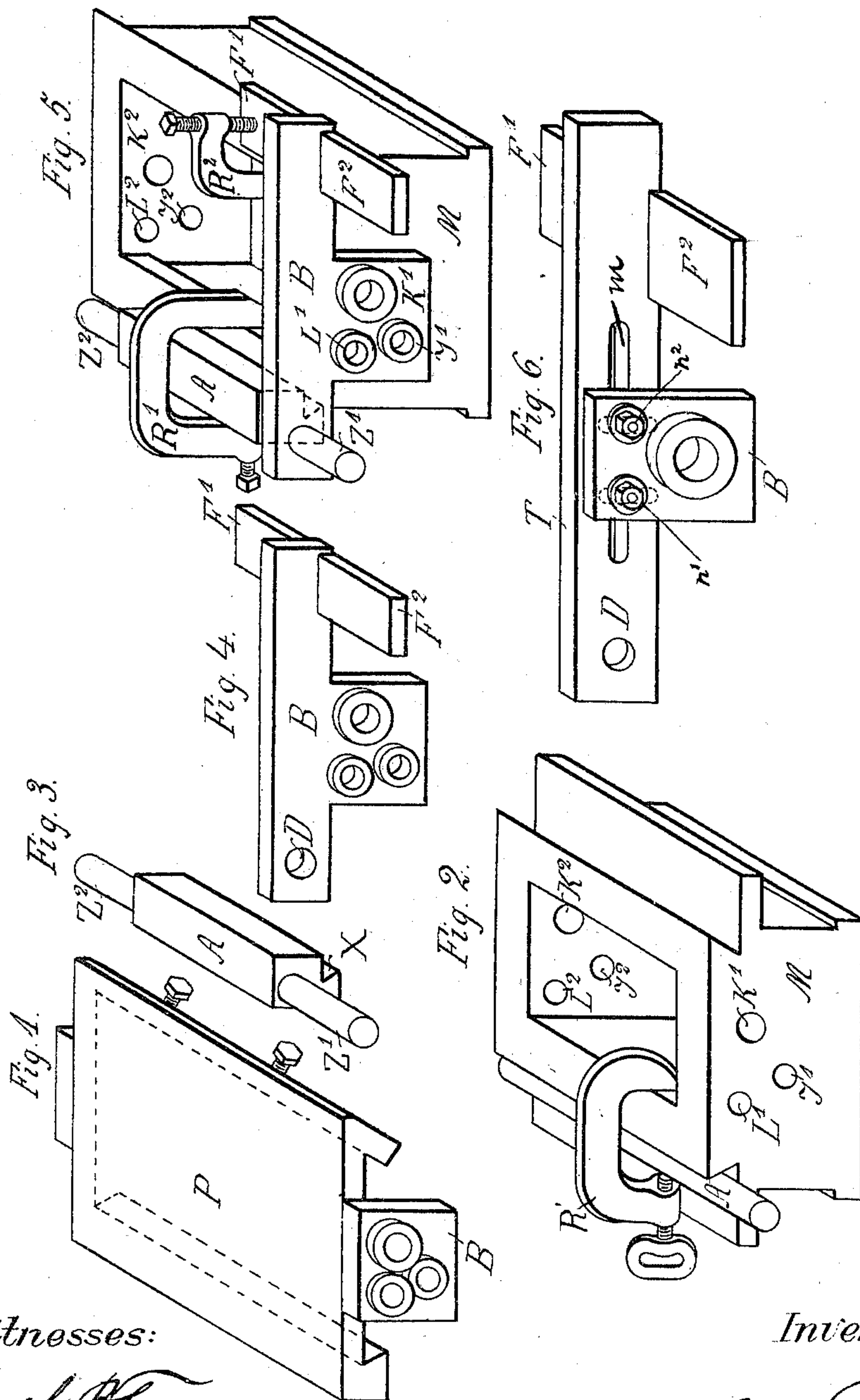
No. 626,488.

Patented June 6, 1899.

G. E. DIEHL.  
DRILLING APPARATUS.

(Application filed Feb. 8, 1899.)

(No Model.)



Witnesses:

Joseph P. Fox  
Engelhuber

Inventor

Gustav Emil Diehl



# UNITED STATES PATENT OFFICE.

GUSTAV EMIL DIEHL, OF CHEMNITZ, GERMANY.

## DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 626,488, dated June 6, 1899.

Application filed February 8, 1899. Serial No. 704,876. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAV EMIL DIEHL, a citizen of Germany, residing at Chemnitz, Kingdom of Saxony, Germany, have invented certain new and useful Improvements in Drilling Apparatus, of which the following is a specification.

In the construction of machinery holes have frequently to be drilled, the axes of which must be accurately in line. For this purpose either the center is marked or templets are used. These templets or guides are provided with hardened-steel bushings, within which the drill is guided. The drill-guide is generally fastened to a plate which is accurately adjusted on a faced surface of the article to be drilled, the plate having two guides, one for the front end and the other for the rear end. This frequently causes inaccuracies, because it is very difficult to bring both guides exactly in line.

My invention consists in placing the drill-guide on an axle which is to be held against a surface or two surfaces parallel to the axis of the holes to be drilled, so that the drill-guide may be pivoted on it on either side of the article to be bored.

The nature of my invention will be best understood when described in connection with the accompanying drawings, in which—

Figure 1 is a perspective view illustrating a drill-guide such as generally used. Fig. 2 is a perspective view showing one method of securing a drill-guide axle to an article to be drilled. Fig. 3 is a perspective view of a modified form of an axle. Fig. 4 is a perspective view of a drill-guide. Fig. 5 is a perspective view of a casting with the improved drill-guide secured in place. Fig. 6 is a perspective view of an adjustable drill-guide.

Similar letters of reference designate corresponding parts throughout the several views of the drawings.

In Fig. 1 I have illustrated a drill-guide as formerly used, the templet or guide B being secured to the plate P, which fits into ways of the article to be drilled parallel to the axis of the holes.

Fig. 2 shows a piece of machinery M, in which three pairs of holes J' K' L' and J<sup>2</sup> K<sup>2</sup> L<sup>2</sup> are drilled, each pair having a common

geometric axis. The axle A, which is to serve as a stop for the templet or drill-guide, is placed upon the finished faces of the casting parallel to the axes of the holes to be drilled and is held by a suitable dog against these faces. The axle A may be long enough to project at both ends of the part to be drilled, so that the guide-plate may be placed at either end without shifting the axle, or when the axle is shorter it is shifted for placing the drill-guide to the other end of the article to be drilled. Instead of an axle cylindrical for its whole length a prismatic axle with cylindrical ends may be used—such, for instance, as the axle A, (shown in Fig. 3,) which has two cylindrical ends Z' and Z<sup>2</sup>, and which may have a wedge-shaped groove X to fit a corresponding projecting part of the article to be drilled parallel to the axes of the holes.

The guide-plate B, Fig. 4, is provided at one end with a hole D of exactly the diameter of the axle A or of its cylindrical ends Z' Z<sup>2</sup>. At the opposite end the guide-plate B has a stop-plate F' F<sup>2</sup>, projecting at right angles, and accurately faced to fit against a surface on the piece to be drilled parallel to the axes of the holes to be drilled. Thus two stops are provided for the templet, by which the guide-plate is brought to the proper positions at either end of the article to be drilled, and is held in the proper position by fastening devices, such as the screw-clamps or dogs R' R<sup>2</sup>, Fig. 5. The shape of the stop F' F<sup>2</sup> may of course be varied. It may, for instance, be a cylindrical rod or pipe projecting from the guide-plate B on either side. After the holes J' K' L' have been drilled on one side the axle A is shifted to the other end of the casting, so that the pin Z<sup>2</sup> projects beyond it and clamped in this position. The guide-plate is then passed over the pin Z<sup>2</sup>, turned down so that the stop F<sup>2</sup> bears against the casting, and clamped in this position, when the apparatus is in the proper position for drilling the holes J<sup>2</sup> K<sup>2</sup> L<sup>2</sup>.

For holes which must be drilled with a spindle and cutter two axles A may be used as well as two exactly equal guide-plates, and the spindle is then at the same time guided within the corresponding two bearings of the two guide-plates, whereby a correct parallel position of the spindle is secured.



As it would not be economical to have a separate guide-plate for every article, I use a universal guide-plate, such as shown in Fig. 6. In this device the plate B, with the drill-guides, is adjusted on a plate T with a hole D and stops  $F'$   $F^2$ , the plate B being adjusted on the plate T by a horizontal slot  $m$  and screws  $n'$   $n^2$ . The plate B may also have vertical slots, so as to be adjusted in a vertical direction by the same bolts  $n'$  and  $n^2$ . Marks engraved on plates B and T may be used for proper adjustment.

What I claim as new is—

1. In a drilling apparatus, the combination of a guide-axle with two cylindrical ends; said guide-axle being held against a finished surface or surfaces of the article to be drilled, parallel to the holes to be drilled; and a drill-guide pivoted at one end to one or the other of the cylindrical ends of the guide-axle, and at the other end being provided with stops secured against a suitable surface of the article to be drilled, so as to bring the holes at the two ends in line, substantially as specified.

2. In a drilling apparatus, the combination of a guide-rod A with cylindrical ends  $Z'$   $Z^2$ ,

secured against surfaces of the article to be drilled parallel to the axes of the holes; and a drill-guide provided at one end with a hole D fitting the cylindrical ends of the axle A and the other end provided with stops  $F'$   $F^2$  secured against finished surfaces of the article to be drilled, parallel to the axes of the holes, substantially as shown and described.

3. In a drilling apparatus, the combination of a guide-rod with cylindrical ends secured against a part of the article to be drilled parallel to the axes of the holes to be drilled, and a drill-guide provided at one end with a hole fitting the cylindrical ends of the axle, and at the other end with stops secured against corresponding surfaces of the article to be drilled parallel to the axes of the holes, said drill-guide consisting of two parts adjustable in relation to each other, substantially as and for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GUSTAV EMIL DIEHL.

Witnesses:

JOSEPH P. FOX,  
EUGEN NALUE.