E. L. RICHARDS.

JIG FOR DRILLING AND LIKE OPERATIONS.

APPLICATION FILED AUG. 7, 1907.

917,152. **Patented Apr. 6, 1909.**

Fig. 1.

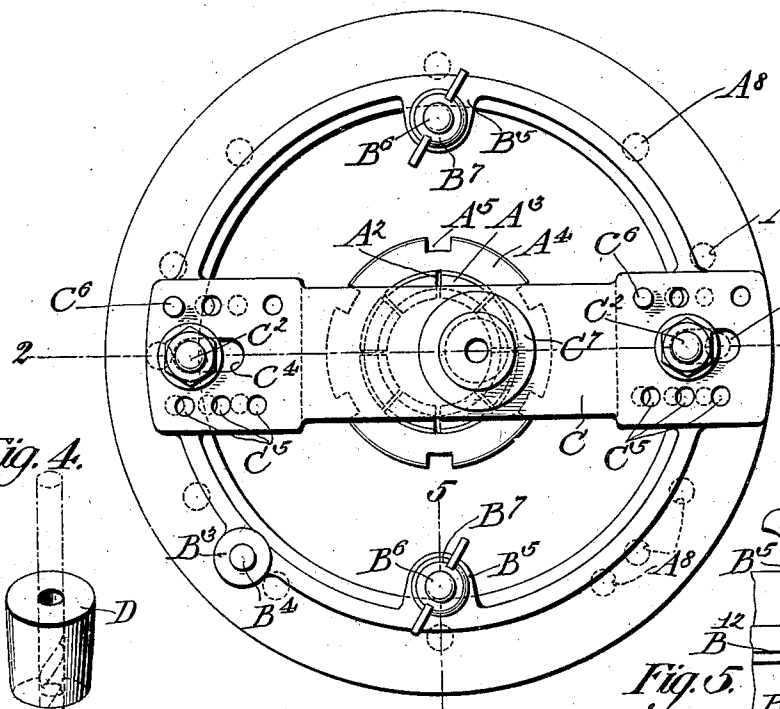


Fig. 4.

Fig. 5.

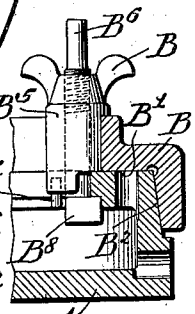


Fig. 2.

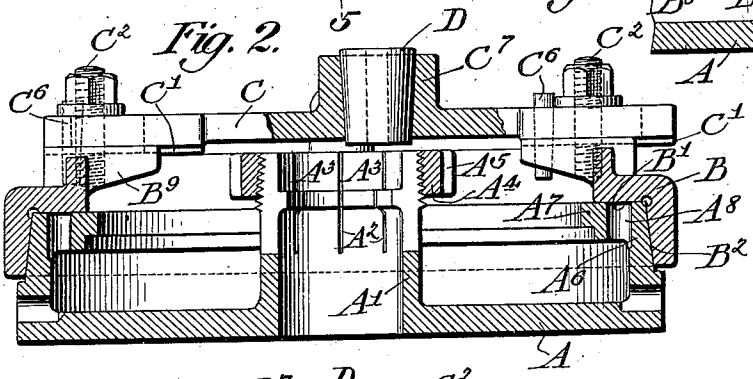
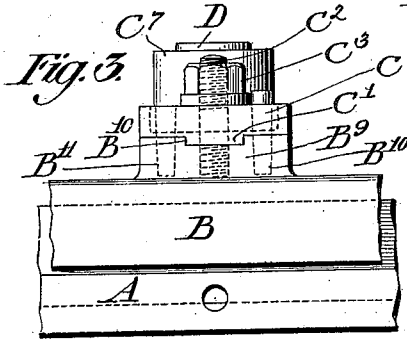


Fig. 3.



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JIG FOR DRILLING AND LIKE OPERATIONS.

No. 917,152. Specification of Letters Patent. Patented April 6, 1909.

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To all whom it may concern:

Be it known that I, EMANUEL L. RICHARDS, a citizen of the United States of America, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Jigs for Drilling and Like Operations, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

The present invention relates to jigs particularly designed for use in drilling or reaming one or more holes in a punch die or punch holder or the like, according to a definite pattern or design.

The object of the invention is the provision of a device in which the object to be operated on can be rapidly and easily centered and secured with a high degree of accuracy, and in which an adjustable tool guide is employed, by means of which the tool may be readily brought to the proper positions to drill or ream the various holes according to any desired pattern.

The various features of novelty which characterize my invention are pointed out with particularity in the claim annexed to and forming a part of this specification. For a better understanding of my invention, however, and the advantages possessed by it, reference may be had to the accompanying drawings and descriptive matter in which I have illustrated and described one of the forms in which my invention may be embodied.

Of the drawings, Figure 1 is a plan view. Fig. 2 is a sectional elevation on the line 2—2 of Fig. 1. Fig. 3 is an elevation of a portion of the apparatus. Fig. 4 is a perspective view of the tool guiding bushing with the tool shown in dotted lines, and Fig. 5 is a partial sectional elevation on the line 5—5 of Fig. 1.

In the drawings, A represents the base member of the apparatus, which, in the form shown, comprises a body portion in the form of a disk, having an integral hollow boss A′ rising from the center thereof. The boss A′ is divided at its upper end by kerfs A^2 into jaws A^3 which may be contracted to grip the work, usually cylindrical, to be operated upon by means of a nut A^4 screwed on to the externally threaded and tapered upper end of the boss A′ and provided with spanner openings A^5. At the periphery of the member A, and concentric with the boss A′, is an upwardly extending flange A^6 terminating at its upper end in a horizontal internally extending flange A^7.

The tool guide support, which is mounted on the base A, comprises an annular member B, having a surface B′ which fits against the upper surface of the flange A^7, and a downwardly extending portion which has its inner surface B^2 fitted to the outer surface of the flange A^6. By preference, the outer surface of the flange A^6 and the inner surface B^2 of the end of the member B are made conical, as shown. The annular member B is provided with an ear having a hole B^3, through which a pin B^4 may be moved into any one of the holes A^8 formed in the flange A^7. By a suitable location of the various holes A^8, any desired angular adjustment between the tool guiding carriage and the base member A may be obtained. When the parts are locked in the proper angular position by the pin B^4, the annulus B may be clamped to the base by means of T headed bolts B^6 passing through openings formed in the ears B^5 of the annulus, and having their heads B^9 drawn up against the flange A^7 by wing nuts B^7. The member B may be readily removed from the base member A by loosening the nuts B^7 and then rotating the bolts B^6 to carry the heads out from under the flange A^7. Pins B^{12} serve as stops for the bolt heads when the latter are in position to clear the flange A^7.

At diametrically opposed points the annulus B is provided with lugs or projections B^9, on which is mounted the tool guide C, as shown in Figs. 2 and 3. The tool guide C is provided at its ends with tongues C′ which enter grooves B^{10} formed in the upper surface of the lugs B^9. Stud bolts C^2 secured in the annulus B and passing through slots C^4 in the ends of the tool guide C, are provided at their upper ends with clamping nuts C^3, by means of which the tool guide can be adjusted in the direction of a diameter of the annulus B. The tool guide C is provided at its end with holes C^5, and corresponding holes B^{10} are formed in the boss B^9. Pins C^6, passing through the openings C^3 and B^{10} which are in register when the tool guide C is properly adjusted, serve to connect the parts together. By suitably arranging the holes C^5 and B^{10}, all the desired adjustments

of these two members relative to each other can be readily obtained. The tool guide C is provided with a hollow boss C^7, in which is inserted the bushing D through which the tool passes.

In operation, after the work is clamped in the chuck formed by the jaws A^3 the tool may be brought into the various positions necessary to bore, drill, or ream any desired pattern of holes by combinations of the angular adjustments of the tool relative to the work, obtained by turning the annulus B with reference to the base A with the adjustments of the tool toward and away from the center of the work, obtained by moving the tool guide in the direction of its length. The arrangement of the registering holes in the base member and annulus and in the latter member and the tool guide permits the adjustments to be quickly and accurately obtained, thus facilitating the production of interchangeable dies, punch holders, etc. After each adjustment the parts are firmly and positively clamped together by the various clamping bolts. As the clamping jaws A^3 are symmetrically disposed with respect to the center of the work, and are all drawn together in the same manner, the work is centered with entire accuracy, and the accuracy of the centering is not affected by the degree of force employed.

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

In a jig, a base member having a work support and a surrounding circular flange, an annular tool guide support mounted upon and angularly adjustable about said circular flange, said base member and tool guide support having holes which are brought into register at different angular adjustments of the support relative to the base member, a pin B^4 adapted to pass through the holes in register at the desired adjustment, a tool guide member C mounted on said tool guide support and adjustable with respect thereto in the direction of the diameter of said support, said tool guide support and tool guide having holes B^{11} and C^5 respectively, different ones of which are brought into register when the tool guide is adjusted to different positions, a pin or pins C^6 adapted to pass through the registering holes to secure the adjustments, means for clamping the annular tool guide support and base member together in the various relative positions assumed by them, and means for clamping the tool guide and annular support together in the various relative positions assumed by them.

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