May 1, 1923.

1,453,737

K. WILLIAMS

JIG FOR GRINDING PURPOSES

Filed June 13, 1921

3 Sheets-Sheet 1

Fig. 1

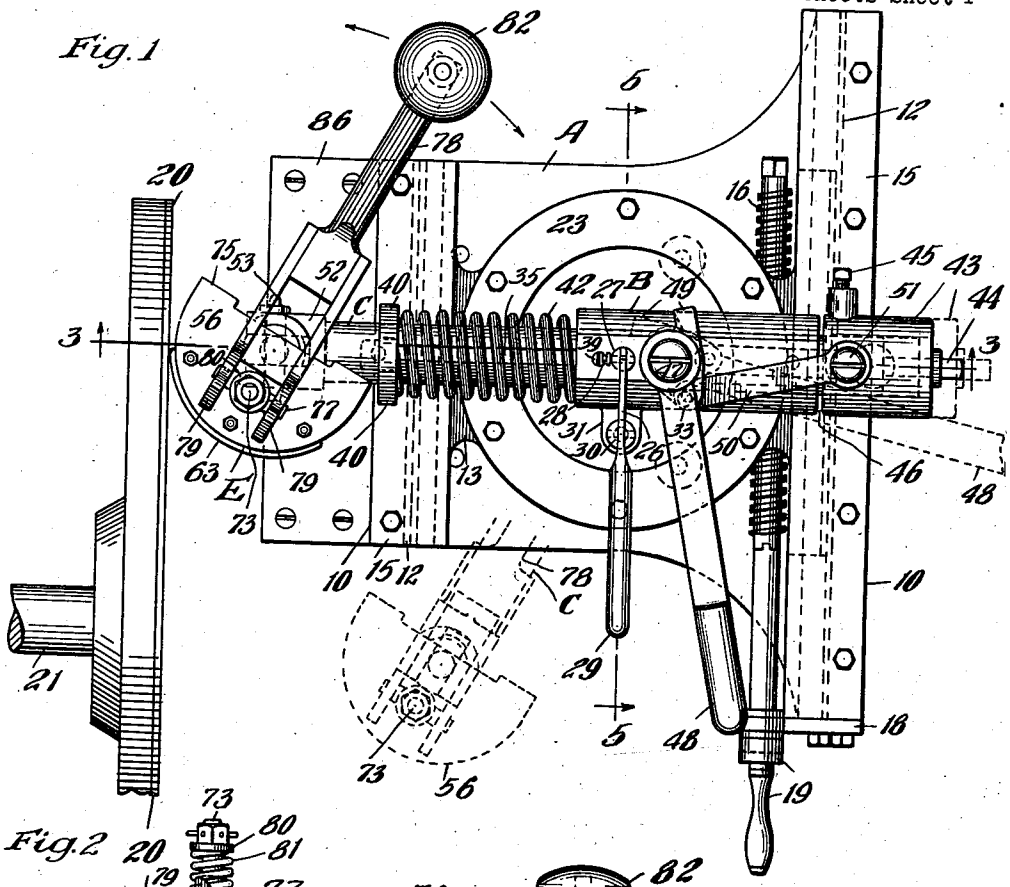
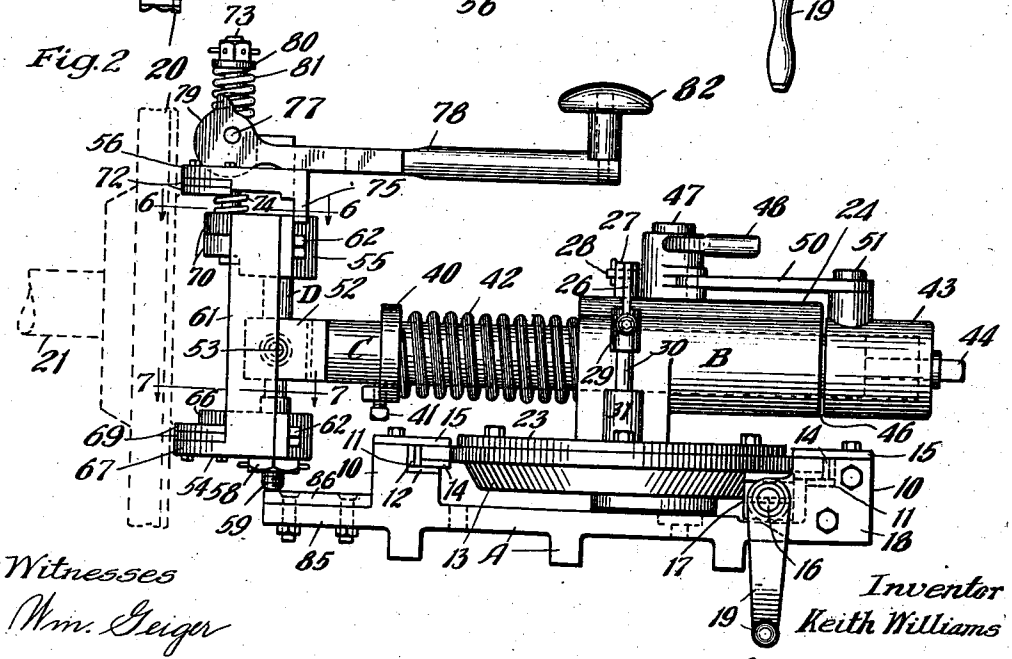


Fig. 2



Witnesses

Wm. Geiger

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3 Sheets-Sheet 2

Fig. 3

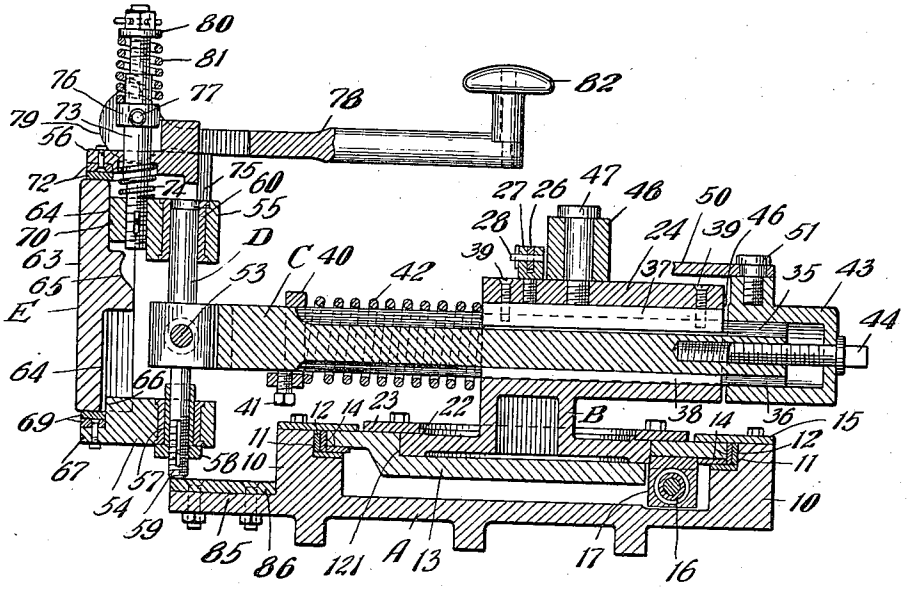


Fig. 4

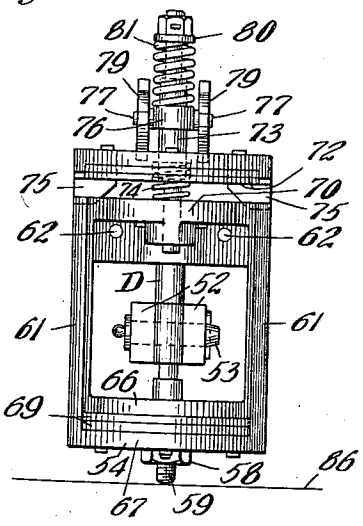
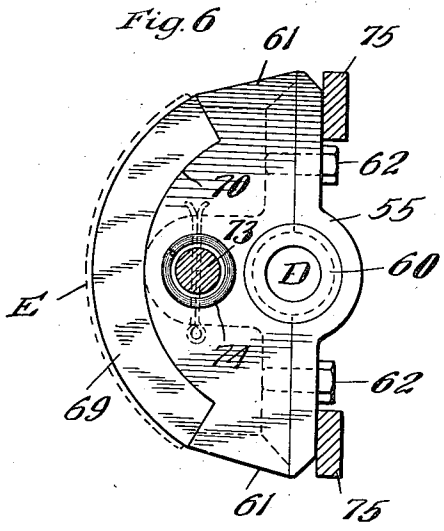


Fig. 6



Witnesses

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1,453,737

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3 Sheets-Sheet 3

Fig. 5

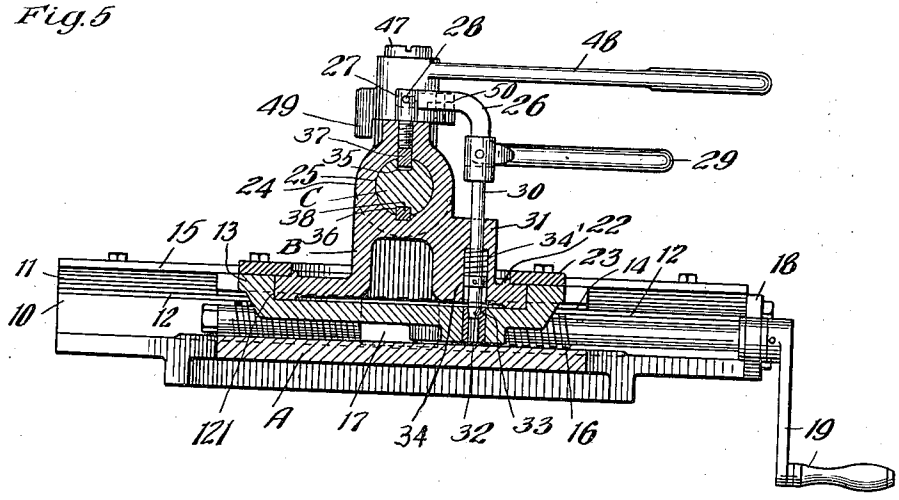
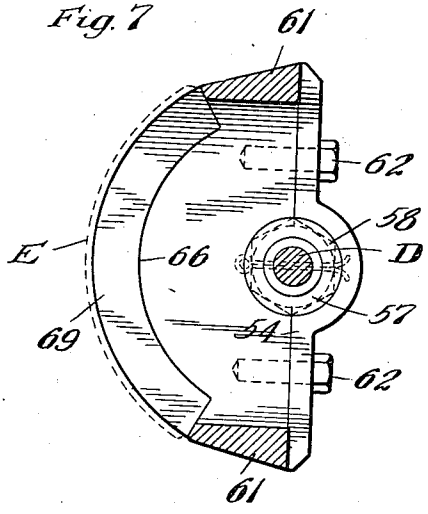


Fig. 7



Witnesses

Wm. Geiger

Inventor
Keith Williams

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His Atty.

Patented May 1, 1923. 1,453,737

UNITED STATES PATENT OFFICE.

KEITH WILLIAMS, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM H. MINER, OF CHAZY, NEW YORK.

JIG FOR GRINDING PURPOSES.

Application filed June 13, 1921. Serial No. 476,992.

To all whom it may concern:

Be it known that I, KEITH WILLIAMS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Jigs for Grinding Purposes, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to improvements in jigs for grinding purposes.

One object of the invention is to provide a jig peculiarly adapted for holding an element formed with a cylindrical surface to be ground true against an emery or other disc grinder to the end that the cylindrical surface may be accurately finished with a minimum of effort may be accurately finished with a minimum of effort by even unskilled operators.

A more specific object of the invention is to provide a jig of the character indicated which is especially adapted for holding what are known as "friction shoes" of that type found in the so-called Miner friction draft gears, one example of which is illustrated in O'Connor Patent 1,220,264, dated March 27, 1917.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings forming a part of this specification, Fig. 1 is a top plan view of a jig showing my improvements embodied therein and illustrating its position with respect to an emery wheel of the disc type. Fig. 2 is an elevational view of the structure illustrated in Fig. 1. Fig. 3 is a vertical sectional view corresponding substantially to the line 3—3 of Fig. 1. Fig. 4 is an end elevational view of the jig looking toward the left hand end as illustrated in Figs. 2 and 3. Fig. 5 is a vertical sectional view corresponding substantially to the line 5—5 in Fig. 1. Fig. 6 is an enlarged horizontal sectional view corresponding substantially to the line 6—6 of Fig. 2. And Figure 7 is a view similar to Fig. 6 and corresponding substantially to the line 7—7 of Fig. 2.

In carrying out my invention, I provide a suitable base plate or member A which is adapted to be secured on a suitable standard or frame or which may constitute a part thereof. Said base plate A is provided with upstanding longitudinally extending parallel spaced ribs 10—10 rabbeted on their upper adjacent corners as indicated at 11—11, the rabbets being lined with suitable machined hardened wear plates 12—12. Horizontally slidably mounted within the guide ways formed by the lined or faced rabbets above described, is a cross-head 13, the edges of which are also preferably provided with finished steel wear plates 14—14 to facilitate the horizontal adjustments. The cross-head is held in operative position in the guides by cover plates 15—15 bolted to the ribs 10—10. The horizontal adjustment of the cross-head 13 is effected by any suitable means as for instance the worm 16 which cooperates with a suitable nut 17 secured to the underside of the cross-head 13 as shown in Fig. 3. The end of the worm 16 is swivelled in a plate 18 secured to the end of the rib 10. On its outer end, the worm 16 is provided with a crank handle 19 so that, by turning the worm, the position of the cross-head can be adjusted horizontally, or stated in another manner, radially with respect to the emery disc wheel 20 carried by the shaft 21.

On its upper side, the crosshead 13 is provided with a circular recess 121 in which is rotatably mounted a circular base or flange 22 formed integrally with what may be termed an upright base or support B. The circular flange 22 is held against accidental removal by a suitable annular retaining plate 23 bolted to the crosshead 13.

The post or support B is provided at the top thereof with a horizontally extending heavy tube-like section or sleeve 24 having a cylindrical opening 25 extending therethrough to accommodate a horizontally sliding or reciprocating bar or plunger C. The rotating or oscillating movement of the post or support B is effected by means of a lever 26 pivoted in a forked support 27 screwed into the top of the sleeve 24. The pivotal connection between the lever 26 and support 27 is made by means of a pin 28 and elongated slot as best shown in Fig. 5 for the purpose hereinafter described.

Said lever 26 is bent downwardly and thence horizontally so as to provide a handle 29 by which the lever may both be lifted upwardly and then oscillated in a horizontal plane. At the angle between the handle 29 and the remaining portion of the lever there is pivotally attached a pin 30

which extends downwardly through a suitable aperture provided in a lateral enlargement 31 of the support B, the lower end of said pin being tapered as indicated at 32 and adapted to enter into one of two openings 33—33 in the crosshead 13. A collar 34 is secured to the pin and between the collar and the top of the recess in the enlargement is an expansion spring 34′ normally tending to depress the pin 30 into the corresponding hole 33 below. When the pin 30 is in its lower or depressed position, it is evident that the post or support B is held against rotation but by lifting the handle 29 the pin 30 is withdrawn and the support B may be swung from the full line position shown in Fig. 1 to the dotted line position shown in the same figure and vice versa.

The bar or plunger C is preferably of cylindrical form throughout the greater portion of its length and is provided on the top and bottom thereof with longitudinally extending key ways 35 and 36 into which extend keys 37 and 38 respectively, carried by the sleeve 24. In this manner the plunger C is prevented from rotation but is allowed free movement horizontally. The lower key 38 is preferably permanently fixed in position whereas the upper key 37 is made removable and adjustably held by screws 39—39 as shown in Fig. 3. At its inner end, that is the end nearest the grinder, the plunger C is provided with a longitudinally adjustable collar 40 adapted to be held in any position desired by a set screw 41. A relatively heavy expansion spring 42 encircles the plunger between the collar 40 and the adjacent end of the sleeve 24 so that said spring normally tends to project the plunger toward the grinder.

At its outer end, that is the right hand end as viewed in Fig. 3, the plunger C has mounted thereon a hollow cap or cup 43. Said cap 43 is adjustable axially of the plunger C by means of an adjusting screw 44 threaded into the plunger as shown in Fig. 3. A set-screw 45 may also be employed to hold the cap in its desired position on the plunger. The cap 43 is so adjusted on the plunger C that, when the latter is in position to forcibly but yieldingly press the article being ground against the emery wheel, there will be a slight clearance as indicated at 46 between the adjacent parts of the sleeve 24 and cap 43.

Pivotally mounted on the sleeve 24 by suitable screw post 47 is a plunger operating lever 48. The hub of said lever, as best shown in Fig. 5, is provided with a dependent lug 49, adapted to engage with the upstanding portion of the sleeve 24 to limit the throw of the lever 48 from its full line position to the dotted line position shown in Fig. 1. Pivotally connected to the lever 48 is one end of a link 50 the opposite end of said link being pivotally connected by a suitable screw post 51 to the cap 43. The pivotal connections of the link 50 are so located that, when the lever 48 is moved to the dotted line position shown in Fig. 4, the pivotal connection between the link and the lever 48 will pass slightly beyond the line connecting the screw posts 47 and 51 so that the lever 48, link 50, cap 43 and plunger C will automatically be held in their dotted line positions shown in Fig. 1 against the action of the spring 42.

At its outer end, the plunger C is forked as indicated at 52—52 and pivotally mounted between said forks on a horizontally extending pivot pin 53 is a spindle D which projects above and below the plunger as clearly shown in Figure 3. With this arrangement, it is obvious that the spindle D is adapted for oscillation in a vertical plane.

Oscillatably mounted on the spindle D is the chuck or clamping arrangement proper. Said clamping arrangement comprises a lower heavy clamping plate 54, an upper backing plate or block 55 and an upper clamping plate 56. The lower clamping plate 54 is provided with a bushing 57 to provide a suitable bearing over a sleeve nut 58 which is vertically adjustably threaded on the lower end 59 of the spindle D. The upper backing plate or support 55 is also provided with a suitable bushing 60 to provide a suitable bearing on the upper end of the spindle D. The clamping plate 54 and backing plate 55 are preferably integrally united by vertically extending side flanges 61—61 and in this connection it will be understood that the clamping plate 54 and backing plate 55 may be made in detachable sections suitably bolted together as by the bolts 62—62 shown in Fig. 2 in order to facilitate the insertion of the bushings 57 and 60.

In illustrating the use of my invention, I have shown a so-called Miner friction shoe indicated generally by the reference E. Such shoe is formed on the outer side with a cylindrical surface 63 and on the inner side with also cylindrical surfaces 64—64, separated, however, by an intermediate radially inwardly projecting wedge section 65. The lower clamping plate 54 is formed with a rounded edge 66 and with a projecting arcuate shelf 67, the latter being preferably lined on the top thereof with two layers of leather facing 69 so that the lower end of the shoe E is adapted to rest on the leather as clearly shown in Fig. 3. The backing block 55 is formed with a curved outer face 70 forming a suitable backing for the inner side of the shoe E.

The upper clamping plate 56 is of substantially semi-circular form as best shown in Fig. 1 and is also preferably lined on its under side with layers of leather 72 to engage the upper edge of the shoe E. Said

clamping plate 56 is vertically movable on a post 73 which is adjustably threaded into the backing plate 55. An expansion spring 74 is interposed between the top of the backing plate 55 and bottom of the clamping plate 56 thereby normally tending to elevate the clamping plate. To prevent oscillation of the clamping plate with respect to the backing plate 55, the former may be provided with dependent flanges 75—75 as shown in Figs. 2 and 4, said flanges riding against the backing plate 55.

Eccentrically pivoted to a collar 76 on the post 73, as by means of the horizontally extending pins 77, is a forked cam lever 78 having the cam sections 79—79 adapted to engage the upper face of the clamping plate 56. The collar 76 is slidable on the post 73 and interposed between said collar and a washer 80 on the top of the post is a spring 81. The lever 78 is provided at its free end with a suitable knob or hand grip 82. The capacity of the springs 74 and 81 and the conformation of the cam section 79 are made such, that when the lever 78 is in the horizontal position shown in the drawings, the clamping plate 56 will be held in its lower position with sufficient force to securely hold the shoe E in place. The base plate A is provided with laterally extended flange or shelf 85 to which is secured a hardened strip of metal 86 forming a support or shelf for the lower rounded end of the spindle D.

The operation is as follows, assuming a shoe E in position: The operator grasps the knob 82 and swings it back and forth about the vertical axis provided by the spindle D as indicated by the small arrows in Fig. 1. In this manner, it is evident that the face of the shoe E to be ground will be moved back and forth over the emery wheel and a cylindrical surface finish obtained. Furthermore, should there be any inequalities in the surface of the shoe E in a vertical direction, the shoe will automatically be adjusted about the horizontal pivotal mounting of the spindle D, it being understood that the plunger C is always being pressed outwardly under the action of the spring 42. Stated in another manner, a universal mounting of the chuck or clamping mechanism proper is provided, the same being under spring pressure so as to insure proper finishing of the surface to be ground. Assuming the surface of the shoe E to have been properly finished, the operator first throws the lever 48 from the full line to the dotted line position shown in Fig. 1 in which position the plunger C will be automatically held in the retracted position as heretofore described. The operator then lifts the lever handle 26—29 so as to disengage the pin 30 and then swings the support B to the dotted line position shown in Fig. 1. The operator next lifts the lever 78 so as to swing the cam section 79 about the fulcrum pins 77, thereby releasing the upper clamping plate 56 and allowing the shoe to fall out freely. Another shoe is next clamped into position by depressing the lever 78 to horizontal position and the reverse procedure followed until the parts are returned to the full line position shown in Fig. 1.

In the arrangement shown, unskilled labor may be employed in grinding the surfaces of the shoes and the truing is obtained substantially automatically and at comparatively high speed. All manipulations required of the operator are of the utmost simplicity.

I have herein shown and described what I now consider the preferred manner of carrying out the invention, but the same is merely illustrative and I contemplate all changes and modifications that come within the scope of the claims appended hereto.

I claim:

1. In a jig of the character described, the combination with clamping plates, one relatively axially movable toward the other; of a spindle on which said plates are mounted; a slidable plunger on which said spindle is swiveled to freely oscillate about an axis at right angles to the axis of the spindle; and a support on which said plunger is slidably mounted, said support being rotatable about an axis perpendicular to the line of sliding movement of the plunger.

2. In a jig of the character described, the combination with a base member; of a support rotatably mounted on said base member; a bar reciprocatingly mounted on said support; and a pair of clamping plates universally adjustably freely swiveled on said bar.

3. In a jig of the character described, the combination with a support; of a bar extending horizontally therefrom; a spindle pivotally mounted on said bar to freely oscillate about an axis at right angles to the spindle; a pair of clamping plates oscillatably mounted on said spindle, one of said clamping plates being adjustable toward and from the other; and means for oscillating said plates about said spindle.

4. In a jig of the character described, the combination with a support; of a bar extending horizontally from said support and slidable horizontally thereon; a spindle pivotally mounted on said bar to oscillate about a horizontal axis; clamping means oscillatably mounted on said spindle; and yieldable means interposed between said bar and said support, normally acting to force said bar in a direction toward the spindle.

5. In a jig of the character described, the combination with a support; of a bar horizontally slidably mounted on said support; spring means interposed between said bar and support normally acting to project said

bar in one direction; and chucking means universally adjustably mounted on the end of said bar.

6. In a jig of the character described, the combination with a carrier; of a clamping plate fixed to said carrier; a co-acting clamping plate slidably mounted on said carrier for movement toward and from the fixed plate; yielding means normally tending to move one of said plates away from the other; and means for moving the same toward the other and locking it in position, said means including a cam.

7. In a jig of the character described, the combination with a pair of clamping plates one relatively movable toward and from the other; of a member on which said clamping plates are carried; yielding means normally tending to move one of said plates away from the other; and means for moving said plate toward the other and locking it in position, said means including a cam lever and a spring over-balancing said yielding means.

8. In a jig of the character described, the combination with a pair of clamping plates one relatively movable toward and from the other; of a spindle on which said clamping plates are oscillatably mounted; spring means normally tending to move one of said plates away from the other axially of the spindle; and means for moving said plate toward the other and locking it in position, said last named means including an operating lever, said lever being also operatively connected to said plates, for oscillating the same.

9. In a jig of the character described, the combination with a pair of clamping plates one relatively movable toward and from the other; of a spindle on which said clamping plates are oscillatably mounted; spring means normally tending to move one of said plates away from the other axially of the spindle; and means for moving said plate toward the other and locking it in position, said means including a cam lever and a yieldingly controlled fulcrum therefor.

10. In a chuck of the character described, the combination with a lower clamping plate; of a backing plate above said clamping plate and rigid with respect thereto; an upper clamping plate movable toward and from said bottom clamping plate; and yieldable locking means for retaining said upper clamping plate in operative position.

11. In a jig of the character described, the combination with a yieldingly controlled horizontally slidable bar; of a spindle pivotally mounted on said bar to oscillate about an axis; and upper and lower clamping plates oscillatably mounted on said spindle.

12. In a jig of the character described, the combination with a base plate; of a crosshead adjustably mounted on said base plate; a support rotatably mounted on said crosshead; a spring influenced bar slidably mounted on said support; means for retracting said bar and holding it in retracted position against the influence of the spring; a spindle pivotally mounted on the end of said bar; and clamping means carried by said spindle.

13. In a jig of the character described, the combination with a base plate; of a crosshead adjustably mounted on said base plate; a support rotatably mounted on said crosshead; a spring influenced bar slidably mounted on said support; means for retracting said bar and holding it in retracted position against the influence of the spring; a spindle pivotally mounted on the end of said bar; and clamping means carried by said spindle, said means including a lower clamping plate, an intermediate backing plate, an upper clamping plate, a cam lever cooperable with said upper plate and a spring controlled fulcrum on which said lever is pivoted.

14. In a jig adapted to cooperate with a rotary grinding wheel; the combination with work holding means; of means for oscillating said work-holding means about an axis parallel to the face of the grinding wheel, said work-holding means being also mounted to freely oscillate about an axis at right angles to said first named axis to permit automatic adjustment of the face of said work parallel to said grinding wheel.

15. In a jig of the character described; the combination with a support; of a bar reciprocatingly mounted on said support; a work-holding means adjustably mounted on said bar; and means for reciprocating said bar, including a lever and a toggle link connection between said lever and bar.

In witness that I claim the foregoing I have hereunto subscribed my name this 4th day of June 1921.

KEITH WILLIAMS.

Witnesses:
CARRIE GAILING,
ANN BAKER.