

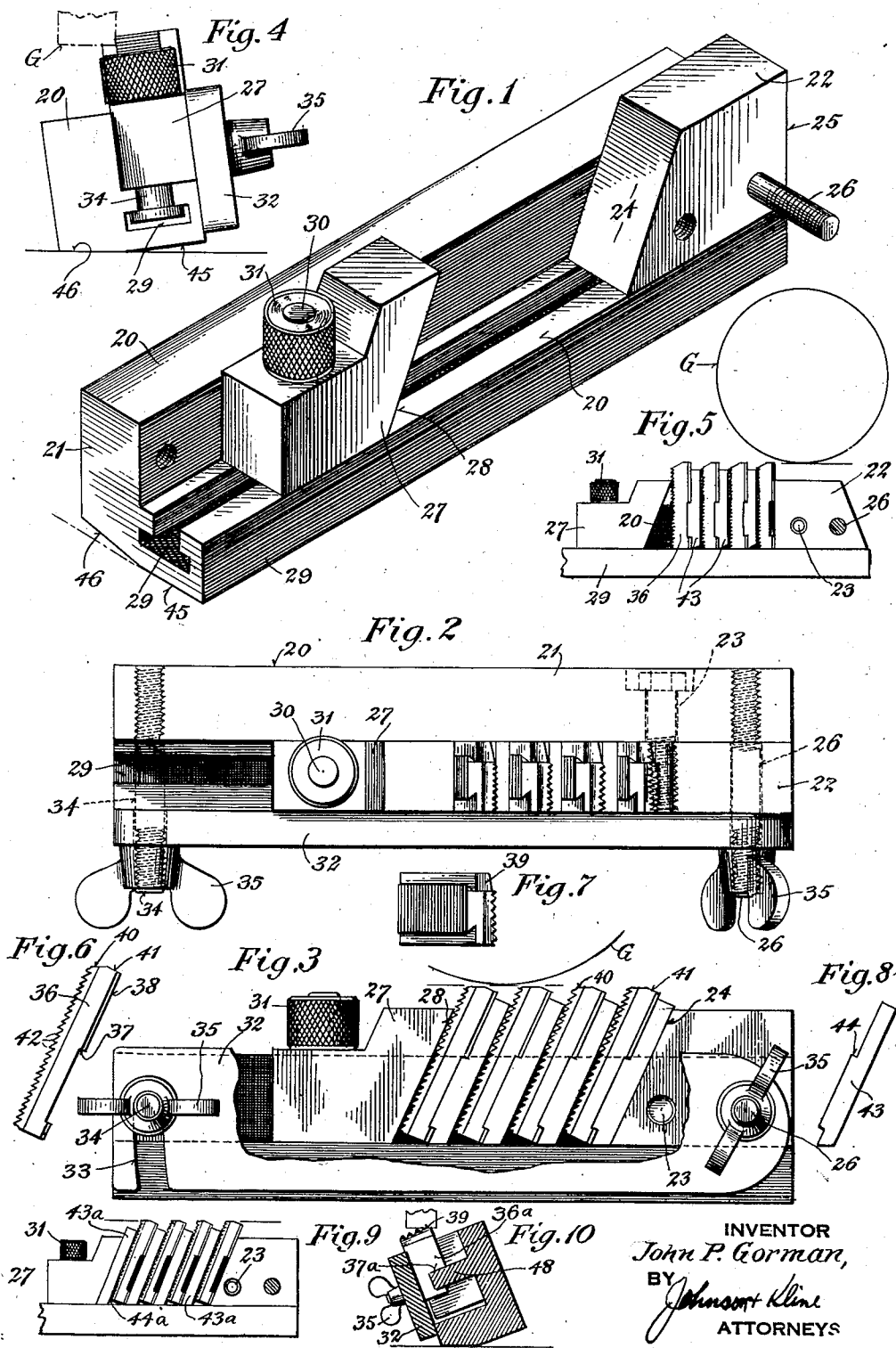
March 13, 1945.

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2,371,515

METHOD AND MEANS FOR GRINDING CHASERS

Filed March 13, 1943



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2,371,515

METHOD AND MEANS FOR GRINDING
CHASERS

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Application March 13, 1943, Serial No. 479,002

17 Claims. (Cl. 51—218)

The present invention relates to the method and apparatus employed in grinding the desired surfaces on a plurality of chasers to provide identical surfaces on a whole set thereof.

Heretofore, in grinding the lead and clearance, and, in some cases, the primary and secondary surfaces, the chasers have been individually presented to the wheel for grinding. This required an enormous amount of time and labor. Also, due to the human error, it has been practically impossible when the chasers are individually ground to duplicate the surfaces on a complete set of chasers. Further, in many instances, due to the curvature of the grinding wheel and the manner of presenting the surface for grinding slightly concave surfaces have resulted.

The present invention avoids these difficulties by providing a method and means whereby the desired surfaces may be easily, quickly and accurately ground on one or more sets of chasers with the surfaces of each chaser being identical and without concavity. This is accomplished by providing a holder adapted to receive one or more sets of chasers. The holder has a part thereon which is disposed at an angle equal to the clearance angle or any other desired angle. The chasers are held against this surface so that they all have the same angular relation on the holder. The chasers are clamped in position and the holder moved relative to the grinding surface in a plane parallel to the grinding surface so that the grinding surface passes over and grinds identical secondary or other surfaces on all the chasers.

The holder, while located in a plane parallel to the grinding surface, may be turned about a longitudinal axis so that all of the chasers which are disposed thereon at an angle equal to the clearance angle, will be presented to the grinding surface at an angle equal to the lead angle. The holder is then moved relative to the grinding surface and the identical lead and clearance is ground on all of the chasers of the set in the single operation.

If it is desired to grind the primary surface, the member against which the chasers are held is reversed and the opposite side presented thereto which is provided with the required angle for the primary surface. The chasers are held against this surface and are presented to the grinding means in the same manner as when the secondary surfaces are ground.

A feature of the invention resides in supporting the chasers on the holder by a surface intermediate the ends thereof. Thus, if the bottom

edge of the chaser should become slightly rounded from tapping, as when the chaser is being located in the machine, it will not cause the chasers to be positioned differently on the holding device.

Another feature of the invention resides in moving the whole set of chasers in a plane parallel with the grinding surface so that as the grinding surface is moved thereover a flat surface will be ground, thus avoiding concavities in the finished surfaces.

The holder may be of magnetizable material so that it can be held by a magnetic chuck. In this case it is provided with two bottom surfaces, one which will support the holder with the plane of the axis of the chasers perpendicular to the grinding surface, and the other an angularly disposed surface which will support the holder so as to present the chasers to the grinding surface at the required lead angle.

In lieu of this construction, the holder may be arranged and clamped in a universal vise and adjusted to present the set of chasers to the grinding surface at the required angle for grinding in the manner just specified.

The member providing the clearance angle and primary surface angle is preferably detachably mounted so that it may be reversed to use the opposite sides thereof to provide the required angles, or it may be replaced to provide for other required angles.

With the present invention, it will be seen that, with one set-up all of the chasers of a set will be rigidly held in precise arrangement and the required surfaces ground thereon at one time to provide identical surfaces on each one of the chasers of the set.

It is to be understood that as many sets of chasers may be ground at a single time as the holder is arranged to accommodate.

Other features and advantages of the invention will be apparent from the specification and claims when considered in connection with the drawing, in which:

Figure 1 shows a perspective view of the holder with the clamping means removed.

Fig. 2 shows a plan view of the holder.

Fig. 3 shows an elevational view, partly broken away, of the holder.

Fig. 4 shows an end view of the holder.

Fig. 5 shows an elevational view of the holder with the clamping means removed and the chasers in position to have the primary surface ground thereon.

Fig. 6 shows a side view of a tangent chaser.

Fig. 7 shows a top view of the tangent chaser as positioned in the holder.

Fig. 8 shows one form of spacer.

Fig. 9 shows a side view of the holder with the clamping means removed and a different type of spacer employed.

Fig. 10 shows another form of the invention employed in grinding chasers of the geometric type.

As shown in Figure 1, the holder comprises a base 20 having an upstanding wall 21 at one side thereof. It has a block 22 detachably mounted at one end by means of a bolt 23. However, the bolt may be replaced by a locating pin or other similar means since the clamping member to be described will hold the block in place.

The removable block has a surface 24 whose angle with respect to the upper surface of the base is equal to the clearance angle for the chaser to be ground and the opposite face 25 is provided with the required angle for the primary surface of the chasers. The surface having the clearance angle may also be used in grinding the secondary surface of the chaser, as will be described.

The block while reversibly and replaceably mounted is firmly held in place by the member 23 and the bolt 26 of the clamping means. The other end of the base supports a slidable holding member 27 which has an inclined surface 28 facing the surface 24.

The member 27 is adjustably mounted on the base so that it can be moved into engagement with the chasers to hold them against the surface 24 or 25 as shown in Fig. 3.

The member may be locked in position in many ways. However, in the herein illustrated form of the invention the base is provided with a T slot 29 for receiving the head, not shown, of bolt 30 and is clamped to the base by the thumb nut 31. If desired, block 22 may be similarly clamped in position in lieu of using bolt 23 and the clamping means.

After the chasers have been positioned on the holder and held against the surface 24, they are clamped in position. In the illustrated form of the invention this is accomplished by a clamping means comprising an arm 32 which is pivotally mounted on the member 26 and has at its other end a slot 33 which passes over a bolt 34 as shown in Fig. 3.

Wing nuts 35 threaded on the bolts 26, 34 or other suitable clamping means, draw the arm to clamp the chasers against the wall 21.

In illustrating the present invention, a set of tangent chasers are employed. It is to be understood however that it may be arranged for other types. As shown in Figs. 6 and 7, the chasers 36 have a recess 37 at the bottom of their cutting faces 38. The lead and clearance, to be ground, is indicated by the surface 39, the secondary surface is indicated at 40, and the primary surface is indicated at 41. The back of the chaser is provided with serrations 42 for the full length thereof which aid in positioning and holding the chaser in the machine in which it is used.

In mounting the chasers on the holding device for grinding, it is preferred to support the chasers by a surface other than the bottom edge thereof since the latter oftentimes becomes slightly rounded due to tapping with a hammer or the like during the installation of the chasers.

Accordingly, in one form of the invention shown in Figs. 1 to 8, a spacer 43 is used which is provided on its one face with a shoulder 44 for

engaging the wall in the recess 37 on the front of the chaser to support the chaser thereby. Since the wall of the recess in the chaser is never hit or tapped, it will always remain unchanged and each of the chasers will, therefore, be precisely set on the holder. The other face of the spacer is parallel to the face having the shoulder thereon so that all of the chasers will be supported on the holder at the same angle as surface

24. In the form of the invention shown in Fig. 9, the spacers 43a are provided with complementary serrations 44a for engaging the serrations 42 on the back of the chasers to support them without reference to the bottom edge. With this type of support the chasers can be ground until the cutting surfaces are completely used.

The spacers and chasers are assembled as shown in Figs. 3 or 9 and are held against the angular surface of the block 22 by the member 27 which is locked in place.

The holder is now disposed in a plane parallel to the plane of the grinding surface of a grinding wheel G or other suitable grinding means and by movement relative to the grinding surface all of the chasers so held will have the identical surfaces formed thereon.

In the form of the invention shown in Figs. 1 to 4, the base is made of magnetic material so that it can be held by a magnetic chuck. In this form of the invention, the bottom surface of the base 45 is parallel with the upper surface 26 so that when the device is supported on the surface 45 the chasers carried thereby will be positioned with the plane of their axes perpendicular to the grinding surface.

In this position, when the holder is moved relative to the grinding surface all of the secondary surfaces are ground on the chasers.

The base is also provided with an angularly disposed supporting surface 46, the angularity of which equals the lead angle for the chasers. When the holder is supported on this surface, as shown in Fig. 4, the chasers will be presented to the grinding surface at an angle equal to the lead angle.

The holder is then moved relative to the grinding surface and in a single grinding operation the identical lead and clearance is formed on each of the chasers.

If it is desired to grind the primary surfaces on the chasers, the block 22 is reversed and the chasers moved in engagement therewith, as shown in Fig. 5. The holder is supported on the surface 45 and moved relatively to the grinding surface so that as the grinding wheel moves thereover the identical primary surfaces will be ground on all of the chasers of the set.

If chasers of the geometric type are used, such as shown at 36a in Fig. 10, which do not have the recesses in the front face thereof as do the tangent chasers of Fig. 6, but instead are provided with a recess in one side, the form of the holder shown in Fig. 10 may be employed. This is substantially the same as the holder in Fig. 1, except that a bar or rib 48 projects from the wall and engages the recess 37a in the chaser to support it in proper position on the holder so that the lead and clearance of all the chasers will be ground identically on all of the chasers. In this form of the invention, spacers 43 may be dispensed with.

If the invention is to be used in a grinding machine which does not have a magnetic chuck, the holding device can be mounted in any well

known universal vise and the clamping member may be dispensed with if desired. When the holding device is mounted in a universal vise, it is unnecessary to provide the surfaces 45 or 46 thereon since the vise can be adjusted to present the chasers to the grinding surface at the angles required. By moving the holder in a plane parallel to the grinding surface the ground surfaces will be absolutely flat and identical on all of the chasers.

By the present invention a new method of grinding chasers has been devised in which a complete set of chasers are held in identical positions on a holding device and are presented to a grinding means so that the corresponding surfaces ground on all of the chasers of the set are identical.

It will be apparent that by the present invention a set of chasers may be more rapidly and accurately ground. Not only is the accuracy increased but the time and labor required to grind a set of chasers is greatly reduced for once the chasers have been set on the holding device they need not be handled further and the laborious prior process of handling each chaser separately is completely eliminated.

Variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

I claim:

1. The process of grinding a set of chasers comprising the steps of supporting a plurality of chasers on a holder at the same desired angle thereto, locating the holder in a plane parallel to the grinding surface with all of the chasers disposed in the same position with respect to said grinding surface and causing relative movement of the holder and the grinding surface to cause the latter to pass over the group of chasers to simultaneously grind identical surfaces on the whole set of chasers.

2. The process of grinding a set of chasers comprising the steps of supporting a plurality of chasers on a holder at an angle thereto equal to the clearance angle therefor, disposing the holder at an angle to the grinding surface equal to the lead angle for the chasers, and passing the grinding surface over the group of chasers to simultaneously grind identical lead and clearance on the whole set of chasers.

3. The process of grinding a set of tangent chasers comprising the steps of supporting a plurality of chasers on a holder at an angle thereto equal to the clearance angle therefor, disposing the holder at an angle to the grinding surface equal to the lead angle for the chasers, and passing the grinding surface over the group of chasers to simultaneously grind identical lead and clearance on all of the chasers and changing the angular relation of the holder with respect to the grinding surface and simultaneously grinding identical secondary surfaces on all of the chasers.

4. The process of grinding a set of tangent chasers comprising the steps of supporting a plurality of chasers on a holder at an angle thereto equal to the clearance angle therefor, disposing the holder at an angle to the grinding surface equal to the lead angle for the chasers, and passing the grinding surface over the group of chasers to simultaneously grind identical lead and clearance on all of the chasers and changing the angular relation of the holder with respect to the grinding surface and simultaneously grinding identical secondary surfaces on all of

the chasers, changing the angular position of the chasers on the holder while maintaining the holder in the same angular relation to the grinding surface and simultaneously grinding identical primary surfaces on all of the chasers.

5. The process of grinding a set of chasers comprising the steps of supporting a plurality of chasers on a holder by an intermediate surface on the chasers and in predetermined angular relation thereto equal to the clearance angle therefor, disposing the holder at an angle to the grinding surface equal to the lead angle for the chasers, and passing the grinding surface over the group of chasers to simultaneously grind identical lead and clearance on all of the chasers.

6. The process of grinding a set of chasers each having a recess therein intermediate the ends thereof, comprising the steps of supporting a plurality of chasers on a holder by engagement with a wall of the recess and with the chasers disposed at an angle thereto equal to the clearance angle therefor, disposing the holder at an angle to the grinding surface equal to the lead angle for the chasers, and passing the grinding surface over the group of chasers to simultaneously grind identical lead and clearance on the whole set of chasers.

7. A device for holding a plurality of chasers for grinding the lead and clearance angles thereon comprising a base; a member mounted on the base having a surface disposed at an angle to the base equal to the clearance angle for the chasers; means for holding the chasers against said surface to have the same angularity with respect to the base as said surface; and means for supporting the base in an angular position about a longitudinal axis to present said chasers to the grinder at an angle equal to the lead angle therefor, whereby the plurality of chasers, when the device is so located, are ground with the same lead and clearance in a single grinding operation.

8. A device for holding a plurality of chasers for grinding the surfaces thereof comprising a base; a member mounted on the base having a surface disposed at an angle to the base equal to the clearance angle for the chasers; means supporting the chasers intermediate the ends thereof; means for holding the chasers against said surface to have the same angularity with respect to the base as said surface; and means for supporting the base in an angular position about a longitudinal axis to present said chasers to the grinder at an angle equal to the lead angle therefor, whereby the plurality of chasers, when the device is so located, are ground with the same lead and clearance in a single grinding operation.

9. A device for holding a set of tangent chasers for grinding the surfaces thereof comprising a base; a reversible member mounted on the base having one surface disposed at an angle to the base equal to the angle of the clearance and secondary surface for the chasers and an opposite surface provided with an angle equal to the angle of the primary surface of the chaser; and means for holding the chasers against one of said surfaces to have the same angularity with respect to the base as said surface, said base having a flat supporting surface perpendicular to the plane of the axis of said chasers and a flat supporting surface angularly disposed to the plane of the axis of said chasers, the angularity of said surface being equal to the lead angle for the chasers whereby the plurality of chasers, when the de-

vice is located on the first supporting surface may have the primary and secondary surfaces ground thereon and when supported on the second supporting surface, are ground with the same lead and clearance in a single grinding operation.

10. A device for holding a set of tangent chasers for grinding the surfaces thereof comprising a base; a reversible member mounted on the base having one surface disposed at an angle to the base equal to the angle of the clearance and secondary surface for the chasers and an opposite surface provided with an angle equal to the angle of the primary surface of the chaser; and means for holding the chasers against one of said surfaces to have the same angularity with respect to the base at said surface, said base being adapted to be supported in a plane parallel to the grinding surface with the plane of the axis of said chasers perpendicular to said grinding surface and also with the plane of the axis of said chasers at an angle to the grinding surface equal to the lead angle for the chasers whereby the plurality of chasers, when the device is supported in the first position may have the primary and secondary surfaces ground thereon and in the second position are ground with the same lead and clearance in a single grinding operation.

11. A device for holding a set of tangent chasers, each having a shoulder thereon intermediate the ends, for grinding the surfaces thereof comprising a base; a reversible member mounted on the base having one surface disposed at an angle to the base equal to the angle of the clearance and secondary surface for the chasers and an opposite surface provided with an angle equal to the angle of the primary surface of the chasers; spacers between the chasers having a portion to engage the shoulders to support the chasers in proper position on the base; and means for holding the assembled chasers and spacers against one of said surfaces to have the same angularity with respect to the base as said surface, said base being adapted to be supported in a plane parallel to the grinding surface with the plane of the axis of said chasers perpendicular to said grinding surface and also with the plane of the axis of said chasers at an angle to the grinding surface equal to the lead angle for the chasers whereby the plurality of chasers, when the device is supported in the first position may have the primary and secondary surfaces ground thereon and in the second position are ground with the same lead and clearance in a single grinding operation.

12. A device for holding a set of tangent chasers for grinding the surfaces thereof comprising a base; a detachable member mounted on the base having a surface disposed at an angle to the base equal to the clearance and secondary angle for the chasers, means for supporting the chasers in predetermined relation on the base; adjustable means for holding the chasers against said surface to have the same angularity with respect to the base as said surface; and means for clamping the chasers in position, said base being adapted to be supported in a plane parallel to the grinding surface with the plane of the axis of said chasers perpendicular to said grinding surface and also with the plane of the axis of said chasers at an angle to the grinding surface equal to the lead angle for the chasers whereby the plurality of chasers, when the device is supported in the first position may have the secondary surfaces ground thereon and in the

second position are ground with the same lead and clearance in a single grinding operation.

13. A device for holding a set of tangent chasers for grinding the surfaces thereof comprising a base; a reversible block detachably mounted on the base, said block having one surface disposed at an angle to the base equal to the clearance and secondary angle for the chasers and an opposite surface disposed at an angle equal to the primary angle for the chasers; means for holding the chasers against said surfaces to have the same angularity with respect to the base as said surface; means for clamping the chasers in position on the device; and means for supporting the base in position with the plane of the axis of the chasers perpendicular to the grinding surface whereby the identical primary and secondary surfaces on the set of chasers are ground and in another position to present said chasers to the grinding surface at an angle equal to the lead angle therefor, whereby the plurality of chasers, when the device is so located, are ground with identical lead and clearance in a single grinding operation.

14. A device for holding a plurality of chasers, each having a recess intermediate the ends thereof, for grinding the surfaces thereof comprising a base; a member mounted on the base having a surface disposed at an angle to the base equal to the clearance angle for the chasers; means disposed on the base for engaging a wall of the recess to support the chaser thereby; means for holding the supported chasers against said surface to have the same angularity with respect to the base as said surface; and means for supporting the base in an angular position about a longitudinal axis to present said chasers to the grinder at an angle equal to the lead angle therefor, whereby the plurality of chasers, when the device is so located, are ground with the same lead and clearance in a single grinding operation.

15. A device for holding a plurality of chasers for grinding the surfaces thereof comprising a base; a detachable member mounted on the base having a surface disposed at an angle to the base equal to the clearance angle for the chasers; and means for holding the chasers against said surface to have the same angularity with respect to the base as said surface, the base having an angularly disposed supporting surface, the angularity of said surface being equal to the lead angle for the chasers, whereby the plurality of chasers, when the device is supported on said supporting surface, are ground with the same lead and clearance in a single grinding operation.

16. A device for holding a plurality of chasers having a recess in the side edge for grinding the surfaces thereof comprising a wall; a rib extending from the wall intermediate the top and bottom thereof for engaging the recess in the chasers to support the chasers thereon, a member mounted on the wall having a surface disposed at an angle to the top of the wall equal to the clearance angle for the chasers; means for holding the chasers against said surface to have the same angularity as said surface; and means for supporting the wall in an angular position about a longitudinal axis to present said chasers to the grinder at an angle equal to the lead angle therefor, whereby the plurality of chasers, when the device is so located, are ground with the same lead and clearance in a single grinding operation.

17. A device for holding a plurality of chasers

having a recess in the side edge for grinding the surfaces thereof comprising a base; an upstanding wall at one side thereof; a flat bar extending from the wall parallel to the top edge for engaging the recesses in the chasers to support said chasers in predetermined position on the device; a member mounted on the base having a surface disposed at an angle to the base equal to the clearance angle for the chasers; means for holding the chasers against said surface to have the

same angularity with respect to the base as said surface; and means for supporting the base in an angular position about a longitudinal axis to present said chasers to the grinder at an angle equal to the lead angle therefor, whereby the plurality of chasers, when the device is so located, are ground with the same lead and clearance in a single grinding operation.

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