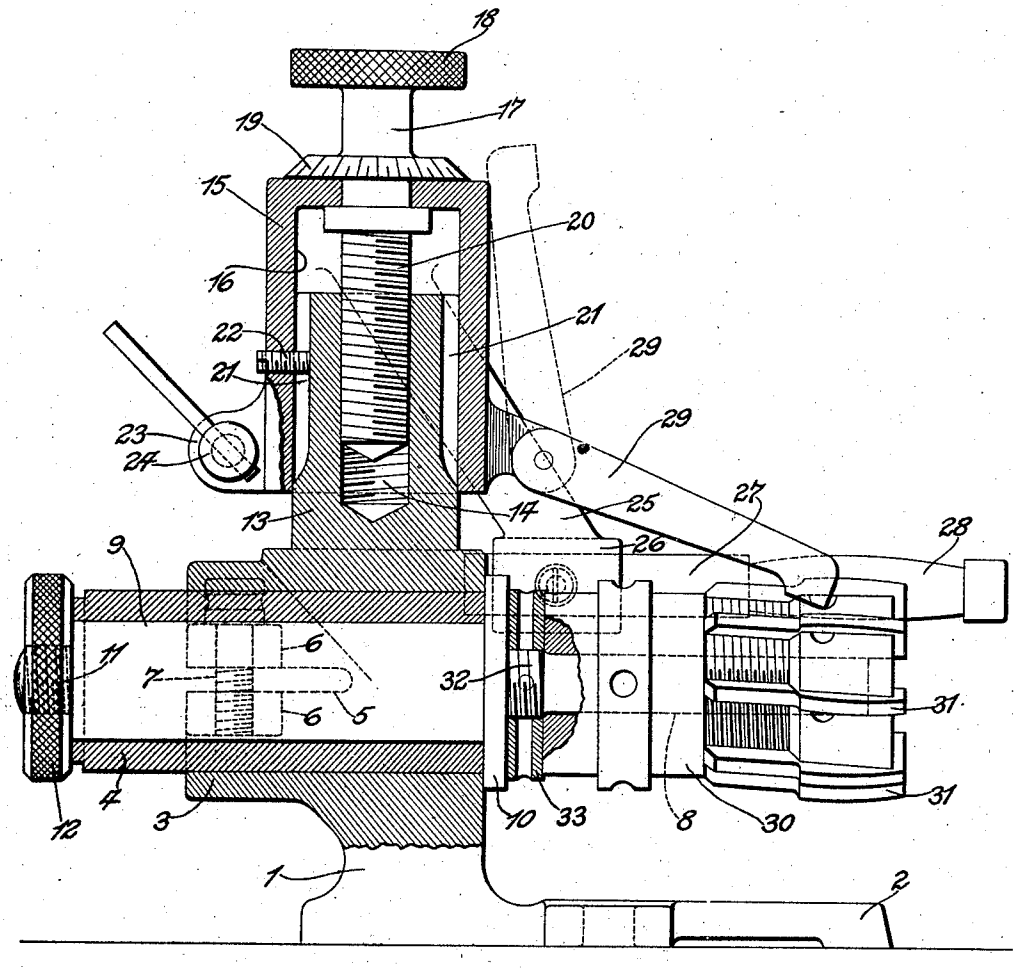
Jan. 4, 1927. 1,613,174

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DEVICE FOR STONING CUTTERS

Filed May 18, 1923 2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

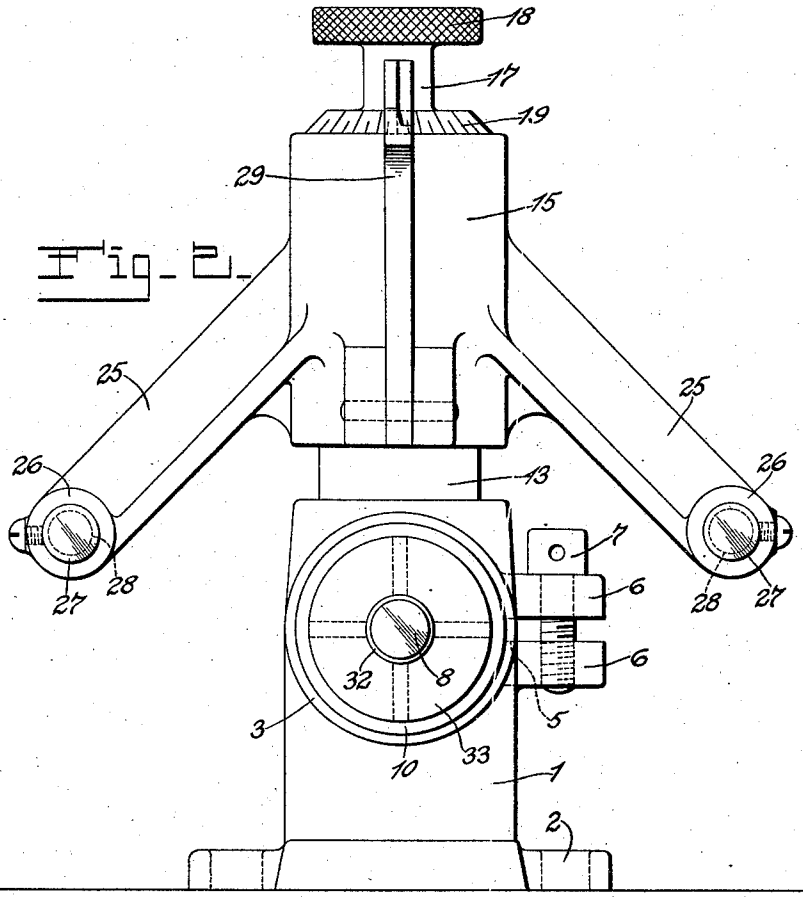
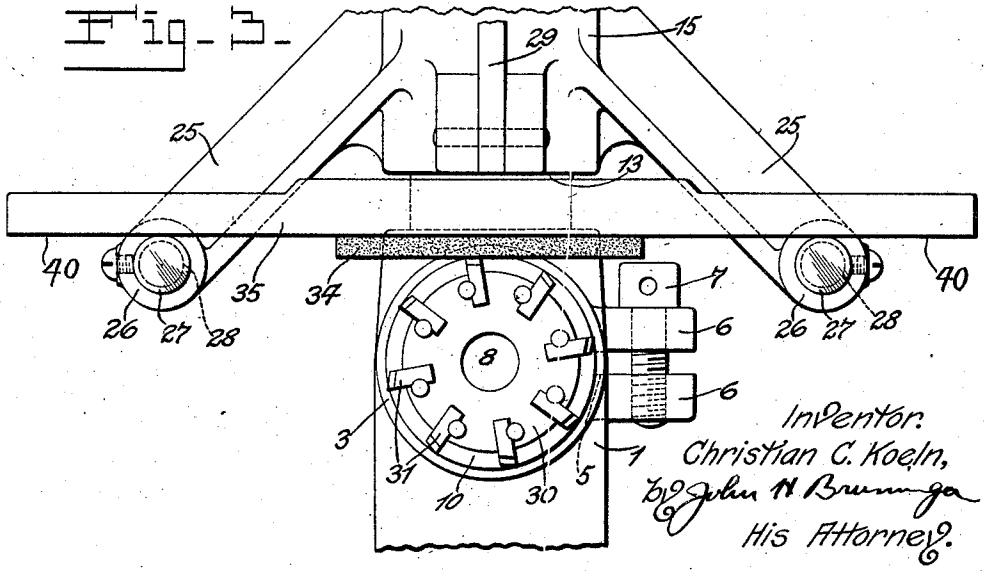


Fig. 3.



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UNITED STATES PATENT OFFICE.

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DEVICE FOR STONING CUTTERS.

Application filed May 18, 1923. Serial No. 639,799.

This invention relates to devices for stoning or whetting cutters, and more particularly such cutters as reamers, milling cutters and the like.

In sharpening a cutter, such as a reamer, particularly reamers of the expansion type, the reamer is ordinarily ground by means of an automatic machine which grinds each of the cutters separately. The machine may be adjusted so as to grind each cutting blade at a predetermined cutting angle and in such a way that the outside diameter of the reamer as a whole will be very slightly larger than the diameter of the hole to be reamed. After the reamer has been ground the cutters must each be whetted or stoned usually with a small oil stone. The whetting operation is for the purpose of improving the sharpness and smoothness of the cutting edge and for finally working the cutting diameter of the reamer to the exact size.

The edges of the cutters are ordinarily ground so as to be parallel with the axis of the reamer. If the whetting were also done so as to maintain such parallelism, the reamer when in use would have a tendency to cut a series of ridges in the bore to be reamed, these ridges being produced by the ends or corners of the cutting blades. In order to overcome this effect the whetting operation is carried out in such a way as to give the cutters a curved contour so that the largest diameter of the reamer comes at a point intermediate between the ends of the cutters. These ends are, therefore, at a slightly smaller diameter than the intermediate portions of the cutters and any tendency to groove the surface will be corrected by the intermediate portions which are at a larger diameter.

One of the objects of this invention is to provide a device for whetting or stoning the cutters or cutting blades of a reamer or the like by which the whet stone may be guided so as to properly sharpen the cutter.

Another object of this invention is to provide such a device adapted to guide the whet stone in properly contouring the cutting edges.

Another object of this invention is to provide such a device in which the stone may be properly guided so as to contour all the blades of a multiple blade cutter alike.

Another object of this invention is to provide such a device which may be adjustable for varying the contour of the cutting blades and for operating on various kinds of cutters.

Further objects will appear from the detail description taken in connection with the accompanying drawings, in which:

Figure 1 is a vertical section of a device embodying this invention showing a reamer in place thereon;

Figure 2 is a front elevation shown without the reamer; and

Figure 3 is a detail showing the relation of the whet stone to the cutter during the stoning operation.

Referring to the accompanying drawings, 1 designates a base having a forwardly projecting foot 2 for stabilizing the same and provided with a horizontal bearing 3. The bearing 3 is bored to fit a hollow sleeve 4 which is movable therein for adjustment along the axis of the bore. The rear part of the bearing 3 is split as indicated at 5 and provided with lugs 6 and a clamping screw 7 so as to clamp the sleeve 4 in position when the adjustment has been made.

An arbor 8 is provided having a shank 9 adapted to fit the bore of the sleeve 4. The arbor portion 8 may be formed to fit the bore of the cutter to be operated on. It may thus be either cylindrical or tapered or any other suitable shape for the purpose. The shank portion 9 is terminated by a collar 10 at one end and a screw 11 of reduced diameter at the other. The shank portion 9 is slightly shorter than the sleeve 4 so that when inserted in said sleeve up to the shoulder 10 a knurled nut 12 may be screwed on to the screw 11 against the end of the sleeve 4 so as to securely clamp the arbor in the sleeve. It will thus be evident that with the sleeve clamped in the bearing 3 and the arbor clamped in the sleeve, the arbor will be securely fixed in the base 1. Surmounting the upper portion of the base 1 is an upright pillar 13 having a threaded bore 14. Mounted for sliding movement on the pillar

13 is a carrier 15 having a bore 16 to fit the pillar. The carrier 15 has mounted therein a micrometer adjusting screw 17 having a knurled head 18 for manipulation, a graduated indicating head 19 and a threaded shank 20 having a micrometer thread adapted to fit that of the bore 14. The pillar 13 is provided with one or more vertical grooves 21 adapted to be engaged by a guide screw 22 so as to guide the carrier in its movement on the pillar. The lower part of the carrier is split and provided with clamping lugs 23 and a clamping screw 24 for clamping the carrier in adjusted position. The carrier 15 is provided with a pair of downwardly and outwardly extending arms 25 provided at their ends with sockets 26 adapted to receive the shanks of a pair of guides 27. These guides have a portion 28 thereof contoured to a curved form as illustrated in Figure 1 for a purpose which will be hereinafter more fully set forth. The carrier 15 is also provided with a movable stop or index 29 which may be lowered to the position shown in solid lines in Figure 1 so that a cutter may be adjusted thereagainst to set the same for operation thereon. After such adjustment, the stop 29 may be raised to the position shown in dotted lines in Figure 1.

In the use of this device a reamer or other cutter 30, whose cutting blades 31 are to be whetted, is mounted on the arbor 8. This arbor may be provided with a screw thread 32 adapted to receive a threaded collar 33 which may be screwed up against the collar 10 before the reamer is placed on the arbor and which may, by unscrewing the same, be used to force the reamer off the arbor in case it should stick. With the reamer in place on the arbor 8 the clamping screw 7 is loosened and the sleeve 4 is adjusted in the bearing 3 so as to bring the cutters 31 opposite the desired portion of the contoured sections 28 of the guides. The sleeve 4 is then clamped in the bearing 3. The stop 29 is now lowered and the nut 12 is loosened so that the arbor may be rotatively adjusted in the sleeve so as to bring a cutter 31 to the desired position against the stop 29, after which the arbor is clamped by the nut 12. The clamping screw 24 is then loosened so as to free the carrier 15 for movement along the pillar 13 by operation of the screw 17. After raising the stop 29 the whet stone 34 suitably mounted in a support 35 is brought into operative relation with the adjusted cutter by placing the support 35 with its planed ends 40 resting on the contoured portion 28 of the guides as illustrated in Figure 3. The head 18 may now be adjusted so as to raise or lower the stone 34 until just the proper contact is obtained with the cutter, after which the clamp 24 may again be tightened so as to secure the carrier in adjusted position. With the adjustment completed the stone 34 is now moved backward and forward, that is, to the left and right Figure 3, across the edge of the cutter so as to whet the same in a well known manner. During this movement the support 35 is moved progressively back and forth across the contoured surface of the guides 28. The stone is guided, therefore, by the portions 28 so as to give the cutter a contoured edge corresponding to the contour of the portions 28. This may have any desired form and by placing the cutter in the proper position with respect to the portions 28 any desired form may be given to the cutters. As the operation on each cutter is completed, the nut 12 is loosened and the arbor rotated so as to bring the next cutter against the stop 29 which is lowered for that purpose.

In accordance with this invention, therefore, a device is provided for stoning cutters by means of which the cutting blades may be whetted and concurrently shaped to any desired contour. The adjustments of the sleeve 4 in the bearing 3 provide for adjusting the cutters with respect to the contoured portions 28 of the guides so that the form of the cutters may be adjusted as desired. By these means the highest part of the cutter may be placed midway between its ends, or if desired nearer to either end. The vertical adjustment of the carrier 15 on the pillar 13 provides for stoning the cutters so as to insure not only an accurate adjustment of the diameter of the reamer, but to insure that all the cutters of a reamer will be stoned to exactly the same diameter and the same contour and the graduated head 19 provides for measured changes of adjustment. The guides 27 are removable and different guides having different shaped cutters may be inserted so that a wide variety of shapes may be imparted to the cutters.

It is obvious that various changes may be made in details of construction without departing from the spirit of this invention; it, is, therefore, to be understood that this invention is not to be limited to the specific details shown and described.

Having thus described the invention, what is claimed is:

1. A device for stoning cutters by hand, comprising, a cutter holder, an index for adjusting the cutter, and a contoured guide adapted to guide the stoning element in operative relation with the cutter.

2. A device for stoning cutters, comprising, a cutter holder, an index for adjusting the cutter, a guide adapted to guide the stoning element in operative relation with the cutter, and graduated means for adjusting said guide.

3. A device for stoning cutters, comprising, a cutter holder, an index for adjusting the cutter, and a pair of guides adapted to

guide the stoning element and engaging the same on opposite sides of said holder.

4. A device for stoning cutters, comprising a cutter holder, an index for adjusting the cutter, and a pair of contoured guides adapted to guide the stoning element so as to contour the cutter and engaging the same on opposite sides of said holder.

5. A device for stoning cutters, comprising, a cutter holder, an index for adjusting the cutter, and a pair of guides adapted to guide the stoning element and provided with stops.

6. A device for stoning cutters, comprising, a cutter holder, an index for adjusting the cutter, a guide for the stoning element, and a micrometer for adjusting said guide transversely of the cutter.

7. A device for stoning cutters, comprising, a cutter holder, an index for adjusting the cutter, a guide for the stoning element, means for adjusting said guide transversely of the cutter, and means for adjusting said holder so as to adjust the cutter along said guide.

8. A device for stoning cutters, comprising, a cutter holder, an index for adjusting the cutter, a guide for the stoning element, means for adjusting said holder adapted to permit movement of said holder in said adjusting means to a series of adjusted positions, and means for clamping said holder.

9. In a device of the class described, a base having a bearing, a holder having a shank, a sleeve in said bearing adapted to receive said shank, means for adjusting said sleeve, and means for clamping said holder.

10. In a device of the class described, a base having a bearing and a pillar, a holder mounted in said bearing, and a guide mounted on said pillar.

11. In a device of the class described, a base having a bearing and a pillar, a holder mounted in said bearing, a guide mounted on said pillar, means for adjusting said holder and means for adjusting said guide.

12. In a device of the class described, a base having a bearing and a pillar, a sleeve mounted for adjustment in said bearing, a holder mounted in said sleeve, and a guide mounted on said pillar.

13. In a device of the class described, a base having a bearing and a pillar, a sleeve mounted for adjustment in said bearing, a holder mounted for adjustment in said sleeve, and a guide mounted on said pillar.

14. In a device of the class described, a base having a bearing and a pillar, a sleeve mounted for adjustment in said bearing, a holder mounted in said sleeve, and a guide mounted for adjustment on said pillar.

15. In a device of the class described, a base having a bearing and a pillar, a sleeve mounted for adjustment in said bearing, a holder mounted for adjustment in said sleeve, and a guide mounted for adjustment on said pillar.

16. In a device of the class described, a base having a bearing and a pillar, a holder mounted in said bearing, and a guide mounted for adjustment on said pillar.

In testimony whereof I affix my signature this 11th day of April, 1923.

CHRISTIAN C. KOELN.