F. H. KORFF AND S. H. HUMPHREY.

ADJUSTABLE CUTTER.

APPLICATION FILED MAY 29, 1919.

1,349,967. Patented Aug. 17, 1920.

Fig. 1.

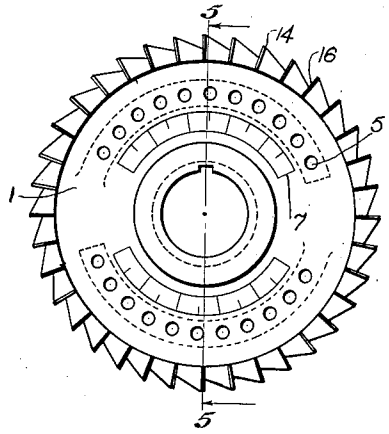


Fig. 2.

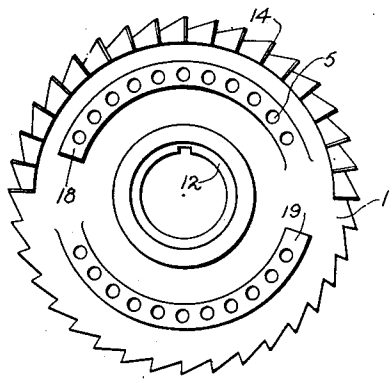


Fig. 3.

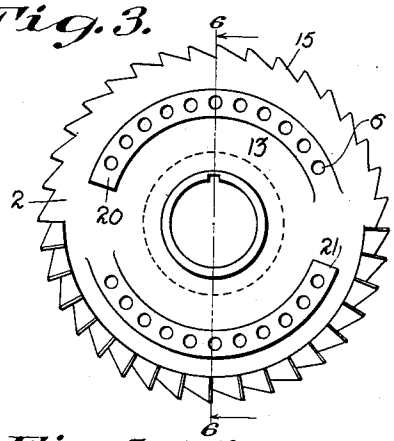


Fig. 4.

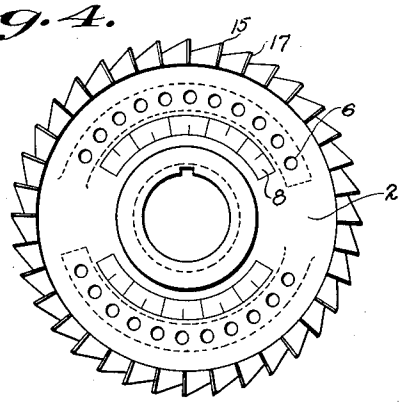


Fig. 5.

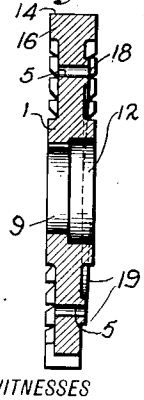


Fig. 6.

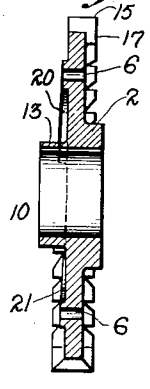


Fig. 7.

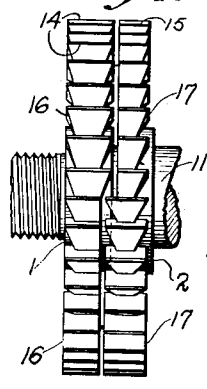
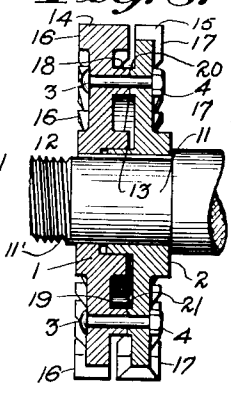


Fig. 8.



WITNESSES

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FREDERICK H. KORFF, OF BROOKLYN, AND STARLING H. HUMPHREY, OF NEW YORK, N. Y.

ADJUSTABLE CUTTER.

1,349,967. Specification of Letters Patent. Patented Aug. 17, 1920.

Application filed May 29, 1919. Serial No. 300,678.

To all whom it may concern:

Be it known that we, FREDERICK H. KORFF, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, and STARLING H. HUMPHREY, a citizen of the United States, and a resident of the city of New York, borough of Queens, in the county of Queens and State of New York, have invented new and Improved Adjustable Cutters, of which the following is a full, clear, and exact description.

This invention relates generally to an improved cutter and more particularly to a cutter which may be adjusted to different sizes.

One of the objects of this invention is to provide an adjustable cutter which is simple and strong in construction, inexpensive to manufacture and which is so constructed as to be conveniently and readily adjusted to different predetermined sizes.

Heretofore certain means have been suggested to obtain an adjustable cutter, but such means have necessitated ofttimes the use of complicated constructions and the use of numerous parts which are not desirable. For example, an adjustable cutter has been suggested in which there have been merely added additional shims or spacing members between the different parts of the cutter. No claim is herein made to such a construction.

A further object of this invention is to provide a micrometer adjustable cutter having indicating marks thereon so that the effective cutting edges of the tool may be adjusted to a predetermined size.

Still a further object of this invention is to provide an adjustable cutter comprising a plurality of parts so constructed and arranged that the distance between the effective cutting surfaces thereof may be changed a predetermined amount by a relative rotary movement therebetween without necessitating the use of complicated constructions and many parts.

The above objects are substantially accomplished by providing a cutter having a plurality of parts secured together by a suitable means and having a means interposed therebetween, said means comprising preferably coacting tapered or inclined surfaces arranged so that the distance between the effective cutting edges of the cutter will be varied by a relative rotary movement between the tapered or inclined surfaces between the cutter parts.

More specifically in the preferred form the inner surfaces of each of the cutter parts are provided with a plurality of arc-like segments integral with the parts of the cutter, said segments having a tapered or inclined surface and being so positioned that the inclined surfaces of the respective parts of the cutter will be in engagement so that a relative rotary movement of the cutter will change the distance between the outer cutting edges of the tool. As a means of holding the parts in fixed relation when functioning, there is provided a series of openings in alinement in the respective cutter parts and a suitable means, such as a nut and bolt, is used for securing the parts in a fixed relation, but it is understood that any other suitable means may be employed. It is further understood that this invention is not to be limited to the specific arrangement of the coacting inclined surfaces between the cutter parts.

Other objects and advantages will be apparent from the following description and the accompanying drawings, showing one of the preferred forms of this invention. Similar characters of reference designate like parts in the several views.

Figure 1 is a front elevation of one of the parts of the cutter showing the outer side thereof and the indicating marks thereon.

Fig. 2 is a rear elevation of Fig. 1 showing the inner side of one of the parts of the cutter, showing an arc-like segment having an inclined or tapered surface.

Fig. 3 is an elevation view of the inner side of another part of the cutter showing the segmental arc having the inclined surface thereon, the said inner surface being adapted to contact with the inner surface shown in Fig. 2 when the cutter is assembled.

Fig. 4 is an elevation view of the outer side of the other part of the cutter or, in other words, is an elevation view showing the opposite side of Fig. 3.

Fig. 5 is a sectional view looking in the direction of the arrows and taken on the line 5—5 of Fig. 1.

Fig. 6 is a sectional view looking in the direction of the arrows and taken on the line 6—6 of Fig. 3. Figs. 5 and 6 are ar-

ranged in their proper relative position before being brought into engagement with each other.

Fig. 7 is an elevation view showing the parts of the cutter mounted on a suitable arbor.

Fig. 8 is a sectional view of the cutters in assembled position and shown as mounted on an arbor or suitable shaft shown in elevation. This figure shows the position of the coacting tapered segments when the cutter parts have been turned through an angle of about sixty-five degrees from the position shown in Figs. 5 and 6.

In the accompanying drawings showing one of the preferred forms of this invention, the adjustable cutter is there shown as comprising two main cutter parts 1, 2, which may be connected together and held in operative position by any suitable means, there being shown herein for this purpose bolt 3 and nut 4 connection, the bolt passing through suitable openings 5, 6 spaced in the respective cutter parts 1, 2 and in alinement therein to permit the passage of said bolt 3 therethrough.

The openings 5, 6 in the respective cutter parts 1, 2 are preferably arranged in series thereon and suitable micrometer markings 7, 8 are placed adjacent the openings so that the cutter parts may be rotated relative to each other a certain predetermined amount. Each of the cutter parts 1, 2 is provided with a centrally disposed opening or bore therein 9, 10 respectively, of substantially the same size so that the said parts, when secured together, may be positioned on a suitable shaft or arbor 11 and there held by a suitable means, such as a nut carried on a threaded part 11′ of the arbor or shaft 11. A part of said arbor or shaft may be of a larger diameter, thus affording a shoulder which serves to position one side of the cutter.

In order to facilitate the positioning of the cutter parts, one of said cutter parts 1 is provided with a recess or bore 12 of larger diameter than the shaft or arbor 11 and the other cutter part 2 is provided with a collar or shoulder 13 of substantially the same size as the bore or recess 12 so that it will be guided therein when the parts are connected together. The periphery or circumferential surface of the cutter parts 1, 2 may be provided with suitable cutting edges 14, 15, and the outer sides thereof may also be provided with cutting edges 16, 17, so that it is seen that with the cutter parts assembled, a slot may readily be formed thereby, or if end surfaces are to be milled or faced, it is apparent that the outer surfaces of the cutter would be used for such a purpose.

Note is to be taken of the manner in which the inner side of each of the cutter parts are formed with respect to each other, a certain portion of the inner surface of the cutter parts being cut away so that the teeth on the corresponding part of the inner surface of the other cutter part may overlap, such a construction being provided to assure a clean cut at the bottom of the slot for it is obvious that if the cutting edges on the inner surfaces of the cutter parts were spaced apart in the same radial plane, a ridge of metal would remain as the sides of the slot were cut away. If, however, the cutting edges on the outer surfaces of the cutter parts were used merely to finish surfaces, the precaution of having the overlapping cutting edges would not be required.

As a means of obtaining an adjustment of the distance between the cutter parts and to permit a cutter to be used for a wider variety of work, there is provided, in the preferred construction, a plurality of coöperating tapered or inclined surfaces positioned between the cutter parts so that a relative movement of said tapered or inclined surfaces will cause a relative axial movement of the cutter parts in opposite directions, thus affording a convenient and ready method for changing the distance between the effective cutting edges of the respective cutter parts.

In the preferred construction arc-like segments or ridges 18, 19, 20, 21, each of said ridges having a tapered or inclined surface, are provided on the inner side of the cutter parts, preferably being integral therewith. In the preferred construction the inner sides of the cutter parts are provided with a plurality of tapered arc-like segments, the segments being disposed on opposite halves of the inside surface of the respective cutter parts, being so positioned that when assembled, the tapered surface of the respective segments will be in alinement and in contact with each other to cause a relative axial movement between the coacting tapered segments. If the coacting tapered surfaces in engagement are moved relative to each other, such a movement would result in a relative axial movement of the cutter parts in opposite directions, which in turn would change the distance between the effective cutting edges 16, 17 on the outer surface of the cutter parts 1, 2.

In the preferred construction the series of openings 5, 6, extending through the respective cutter parts 1, 2, is positioned on the tapered arc-like segments. In the preferred form shown, the arc-like tapered segment extends over an arc of about one hundred and forty-three degrees. The values placed opposite the indicating marks 7, 8, adjacent the respective openings 5, 6 of the cutter parts 1, 2, will depend upon the slope or angle of the tapered or inclined surface

of the segment or ridge, which may be varied in the design to meet circumstances, as desired.

If the cutter parts have been assembled, as shown in Figs. 7 and 8, and it is desired to increase the distance between the cutting edges 16, 17 of the respective cutter parts 1, 2, the nuts 4 would be taken from the bolts 3 and said bolts would be withdrawn from the opening in the cutter part 2 so that said cutter part 2 could be moved anti-clockwise looking to the left of the figures, the desired distance relative to the cutter part 1, which distance would be determined by noting the micrometer graduations on the outer surface of the cutter parts.

This invention is not limited to the arrangement of the coöperating tapered surfaces positioned between the cutter parts or the securing means therefor.

While there has here been shown but one of the preferred forms of the invention, it is understood that various changes and modifications may be made without departing from the spirit and scope of this invention.

Having thus described the invention, what we claim as new and desire to obtain by Letters Patent is:

1. In a cutter, the combination of a plurality of cutter parts, means for holding said parts in operative position and an adjusting means carried by one of the parts and adapted to cause a change in the distance between the effective cutting edges upon the relative movement of the cutter parts.

2. An adjustable cutter comprising a plurality of cutters, the said cutters having coöperating tapered surfaces thereon, a series of openings in said cutters, and a means passing through said openings to maintain said cutters in operative position.

3. In a device of the character described, comprising a plurality of cutters and a means for holding said cutters in operative position, a means for obtaining a relative movement of said cutters in opposite directions by a relative rotary movement between the cutters.

4. In a device of the character described, comprising a plurality of cutters and a means for holding said cutters in operative position, a means for obtaining a relative movement of said cutters in opposite directions by a relative rotary movement between the cutters, said means including a plurality of coöperating tapered surfaces positioned between the said cutters.

5. In a device of the character described, comprising a plurality of cutters and a means for holding said cutters in operative position, a means for obtaining a relative movement of said cutters in opposite directions by a relative rotary movement between the cutters, said means including a plurality of coöperating tapered surfaces positioned between the said cutters, said means including a plurality of coacting arc-like segments carried by each of the cutters.

6. In a device of the character described, the combination of an arbor, an adjustable cutter mounted thereon, said cutter comprising a plurality of parts, and a means for holding said parts in operative position, each part including a plurality of arc-like tapered segments so that when said cutters are in operative position, a relative rotary movement between the cutter parts will cause axial movement of the cutter parts in opposite directions.

7. An adjustable cutter comprising a plurality of cutters, means for holding said cutters in operative position, said means including a bolt and nut connection, means integral with the cutters for obtaining a relative axial movement of the cutters in opposite directions by a relative rotary movement thereof, said means including a plurality of arc-like segments having coöperating tapered surfaces, a recess formed in one side of one of the cutters and a collar carried by the other cutter, said recess functioning as a guide for said collar to maintain the cutters in proper relative position.

8. An adjustable cutter comprising a plurality of cutter parts, means passing through said cutter parts for holding them in proper relative position, a shoulder on one of the parts, a recess in the other part to act as a guide for said shoulder, a plurality of inclined surfaces on the inner side of each of the cutters, said inclined surfaces being positioned to engage each other when the cutters are in assembled position, so that by a relative rotary movement between the two cutter parts, said parts will receive a relative axial movement, and indicating markings carried by each of said cutters.

9. An adjustable cutter comprising a plurality of cutter parts, each part having a plurality of arc-like tapered segments, a series of openings in each of said segments, the said segments and openings being positioned so that when the cutter parts are placed adjacent each other, the said tapered segment surfaces will be in contact and the openings in said segments will be in alinement, and a means passing through said openings to maintain the cutter parts in proper relative position and micrometer markings on each of said cutter parts adjacent the series of openings therein.

10. A cutter comprising a plurality of cutter parts, means for securely positioning said cutter parts with respect to each other and a means positioned between the cutter parts to obtain a relative axial movement upon a relative rotary movement of said

cutter parts, one of said cutter parts having a recess and the other part having a projection to be guided within said recess to facilitate the positioning of the parts relative to each other.

11. A cutter comprising a plurality of cutter parts, means for securely positioning said cutter parts with respect to each other and a means positioned between the cutter parts to obtain a relative axial movement upon a relative rotary movement of said cutter parts, one of said cutter parts having a recess and the other part having a projection to be guided within said recess to facilitate the positioning of the parts relative to each other, each of said cutters having cutting edges on the outer side thereof and other cutting edges extending around the circumferential surface thereof, the inner end of part of the cutting edges disposed on said surface being cut away to fit a correspondingly cut-away portion of the adjacent cutter part so as to present a continuous cutting surface between the cutting edges on the outer side of the cutter parts.

12. An adjustable cutter comprising a plurality of cutter parts, means for holding said parts in fixed relation and means for obtaining a relative axial movement of said cutter parts by a relative rotary movement therebetween, said means including a plurality of coacting tapered surfaces positioned between the cutter parts and carried integral therewith, each of said cutter parts having cutting edges on the outer sides thereof and other cutting edges on the circumferential surface thereof, the latter being so arranged as to present continuous cutting edges, when in operation, throughout the width of said circumferential surface when the parts receive a relative axial movement.

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