J. P. MILLS
EXPANDING FLY CUTTER
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INVENTOR.
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BY
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To all whom it may concern:

Be it known that I, JAMES P. MILLS, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Expanding Fly Cutters, of which the following is a specification.

My invention relates to an improved form of expanding fly cutter for use where a shell cutter must be employed as distinguished from a solid cutter, and it is a further feature of my invention to provide such a device with improved means of accurately grinding the fly cutter to a desired cutting radius.

My improved construction is particularly applicable for use in connection with the finishing of bearings or seats for bearings where a central bore is finished by the same operation that outside bores of lesser diameter are finished by means of the same boring bar.

My invention will best be understood by reference to the accompanying drawings showing a preferred embodiment thereof in which—

Fig. 1 shows the device in longitudinal section view. 30
Fig. 2 is an end view of the parts shown in Fig. 1. 35
Fig. 3 is a plan view of one of the cutters employed, and Fig. 4 shows the cutter in side elevation. 40

Similar numerals refer to similar parts throughout the several views.

As shown in Fig. 1 my device consists of a sleeve 10 having on opposite sides thereof, inclined grooves 11 and 12 for receiving the bars 13 and 14 respectively, said bars having inclined inner faces corresponding with the inclination of the bottoms of the grooves. The ends of the bars 13 and 14 are beveled to be engaged by internally threaded collars 15 and 16 which engage corresponding threads formed on the ends of the shell 10. The collars 15 and 16 are held in any desired adjustment by the locking collars 17 and 18 respectively which are internally threaded and fit on the threads on the ends of the shell 10. One of the bars 13 and 14 has a cutter 19 or 20 projecting outwardly from it, this cutter being preferably inclined somewhat to the axis of the shell 10 as indicated for the cutter 19 in Figs. 3 and 4. Pins 21 project inwardly from the shell 10 to engage a driving bar on which the shell may be mounted when the cutter is in use.

In preparing my improved cutter construction for use, the shell 10 is mounted on the arbor of a grinding machine, the threaded collars are adjusted so that the cutter 19 and the projection 20 both project slightly beyond the required finished radius of the cutter, and then the cutter 19 and the projection 20 are ground by rotation of the arbor carrying the shell 10 until the diameter over the cutter 19 and the projection 20 is exactly the desired cutting diameter for the tool. As is well known in the art, for certain operations which are contemplated by the present invention, a fly cutter must be employed to give good results, as distinguished from a cutter having a plurality of cutting edges and to produce this construction, after the tool has been ground as described, the projection 20, has an additional amount ground from its edge which is just sufficient to clear the depth of cut of the cutter. This it will be readily seen does not disturb the cutting radius of the cutter, and the device may be placed on a boring bar and used with the certainty that the bored hole will have the desired diameter. When it is necessary to sharpen the cutter, the threaded collars are released and moved along the sleeve 10 so that the bars 13 and 14 are moved outwardly enough to permit their outer edges to be ground off to bring the cutter and the projection again to the desired radius.

It will be understood that the boring bar supporting the cutter forming the subject matter of this invention, particularly where the boring bar is used as above referred to, to bore a plurality of bearings or seats for bearings by the same operation and by the same boring bar, is preferably supported at both ends to prevent vibration and insure accurate work. In the event of boring several bearings or seats for bearings by the same operation, particularly where the bearings or seats for bearings are of different diameter, as for example the crank shaft bearings in the crank case of an internal combustion motor, a separate cutter is used for each bearing or bearing seat, the construction of boring bar preferably permitting ready engagement of the boring bar by the pins 21 of the cutter and ready re-
movability of the cutter from the boring bar.

From the above it will be understood that by my invention ready means are provided for accurately grinding a fly cutter of the type described to size, and furthermore that by my construction all of the parts may be used repeatedly by moving the cutters outwardly prior to each grinding operation, and that when the cutters are worn out all that is necessary is to replace them with new cutters instead of throwing away the entire shell as must be done where a tubular cutter has its cutting portion formed integrally with its shell.

While I have shown my invention in the particular embodiment above described, I do not however limit myself to this exact construction in carrying out my invention, as I may employ equivalents thereof known to the art at the time of the filing of this application without departing from the scope of the appended claims.

What I claim is:

1. A fly cutter comprising a cylindrical shell, a pair of longitudinally extending bars adjustably secured at diametrically opposite sides of said shell, a cutting blade carried by and extending radially from one of said bars, and a gauging projection carried by and extending radially from the other of said bars, said gauging projection, when the cutter is ready for use, being reduced to slightly less radius than said cutting blade, whereby said projection clears the finished portion of the bore.

2. The hereindescribed method of accurately gauging the cutting radius of a rotary cutter having but a single cutting blade projecting from its periphery, which comprises providing a radial projection on said cutter at a point diametrically opposite said blade, grinding the ends of said blade and projection to an equal radius and until their overall diameter is equal to that of the bore desired, and then further grinding off the end of said projection until its radius is slightly less than that of the blade, whereby, in operation, when the cutter is mounted on a rigid arbor, the projection does not engage the work.

In witness whereof, I hereunto subscribe my name this 2nd day of February, A. D. 1920.

JAMES P. MILLS.