THE CONTRIBUTIONS TO A CONSTRUCTION OF BORING-BAR CUTTER WITH REMOVABLE INSERTS AND MECHANICAL CLAMPED

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Abstract. In this paper is presented a new and simple construction of the boring-bar cutter with inserted carbide inserts, located on active frontal face of body cutter, in bevel grooves with shoulder and mechanical clamped by each one clamping screw with tapering head and acting by a nut and Grover washer. This cutter is used for cutting of plain surfaces which are a perpendicular position that the axe of central holes.

KEYWORDS: Boring-bar cutter, Mechanical clamped, Removable inserts.

1. INTRODUCTION

The boring process is executed with special tools, named boring-bar cutters that could be used on reaming machines, lathes and in many situation drilling machine with column or jig boring machine. The choosing of machine tool on which would boring is taken in function of shape and dimensions workpiece and capability. The boring tool is choused in function of quality finish surface and durability. At machining of cast iron workpieces, the boring-bar cutters with cemented carbide inserts ensured a high capability in boring process and the cutting edges ensured a double tool life that tools of high-speed steel.

This paper presents the new construction of boring-bar cutter with removable square inserted carbide inserts and mechanical clamped, used for machining the plain surfaces that are a perpendicular position on the axis of hole, which were a previous cutting and have a sliding pin.

2. THE STATE OF THE ART

At machining of cylindrical parts and plain surface of holes is required to use the boring-bar cutters with lead pin (fig.1).

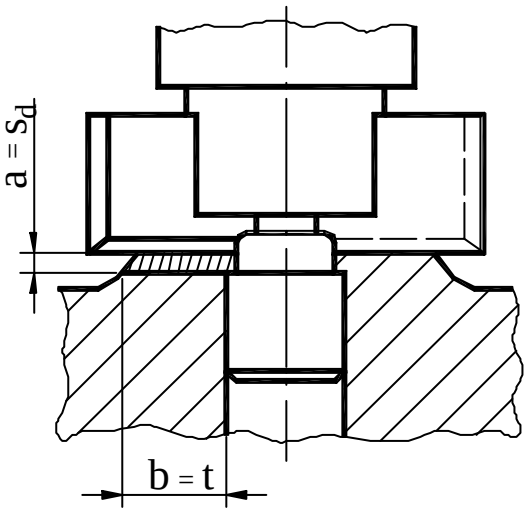

Fig.1. The cutter for boring process.

The lead pin could be make in the body of cutter or unattached with cutter (fig.2)

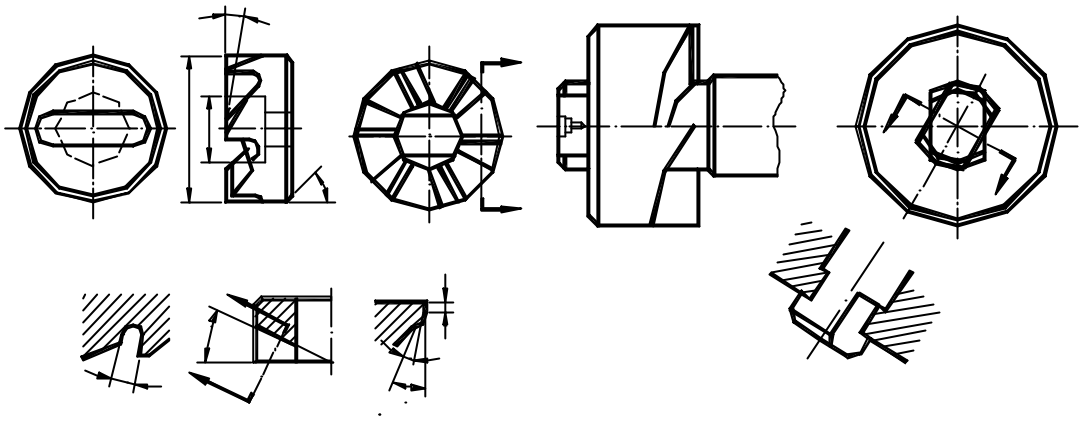

Fig.2. The boring-bar cutter.

The rake angle on the frontal face is equal with the lead angle ($g = w = 8^0 - 10^0$). The lead angle $w = 10^0$ ensures a good usage of cutting edges. Until at diameter of 20 mm the boring-bar is made with shoulder, and after this diameter the teeth are milling until the end of active part. The shank is made on carbon tool steel, being weld at the cutting face of high speed steel. The cutter is pierced by a cylindrical leveled seat for sliding pin, which could be altering after dimensional requirements of workpiece. The relief angle α of frontal edges is 7^0, while the peripheral edges have the cylindrical faces of 1.5 mm. The shanks of boring-bar cutters are enable for chucks with fast locked by a lack with a pin. The shank of cutter is get inside the chuck and than clamped with jaws, by a rotating motion of jaws to grip the tool and entering the pin inside the slot of shank.

These boring-bar cutters have some disadvantages that at wear they must be change. By resharpening the front face of teeth could lose the high due the end of active face of cutter and inefficient using of coated cemented metals and cutting times.

The purpose of paper is to enhance the life tool of active part of cutter, reduce the cutting time and an efficient using of tool materials. So the problem is to realize a simple boring-bar cutter for boring process, used cemented inserts that are mechanical clamped, being a symmetrical disposition on the body of cutter, located in bevel slots, which could ensure a tangential cut off in workpiece by the same value of $8\text{-}10^0$ for relief angle α and rake angle γ.

3. THE CONSTRUCTION OF BORING-BAR CUTTER WITH REMOVABLE INSERTS

The model that is started at the construction of boring-bar cutter with removable inserts and mechanical clamped was the side milling cutter type T-MAX by SANWIK COROMANT, depicted in fig.3.

The side milling cutter with removable inserts is formatted by the body with disk form, inside of flutes are made radial grooves for located the inserts. In this seat is executed a central tapped hole, the seat having the aim to position the Widia square insert, that is lacking by clamping screw .

The boring-bar cutter realized in “INFRATIREA” Oradea is depicted in fig.4.

The boring-bar cutter with removable inserts and mechanical inserts, which have the purpose to enhance the life of active part of tool, is build up by a cylindrical body-***1***, located in the top of frontal face with slots-***a***, that are bevel milling to the axis body,

having a passing cylindrical hole for a lack screw, in groove acting a nut-***2***, with a Grover washer -***3***, on the screw-***4*** with conic head.

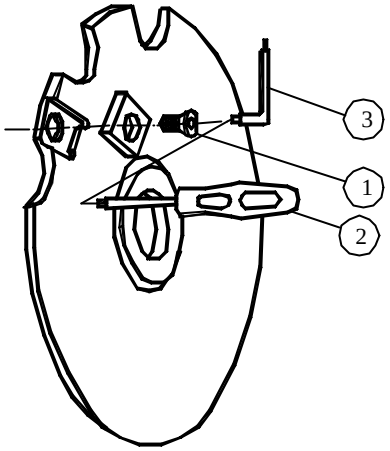

Fig. 3.The side milling cutter type T-MAX SANDWIK with removable inserts.

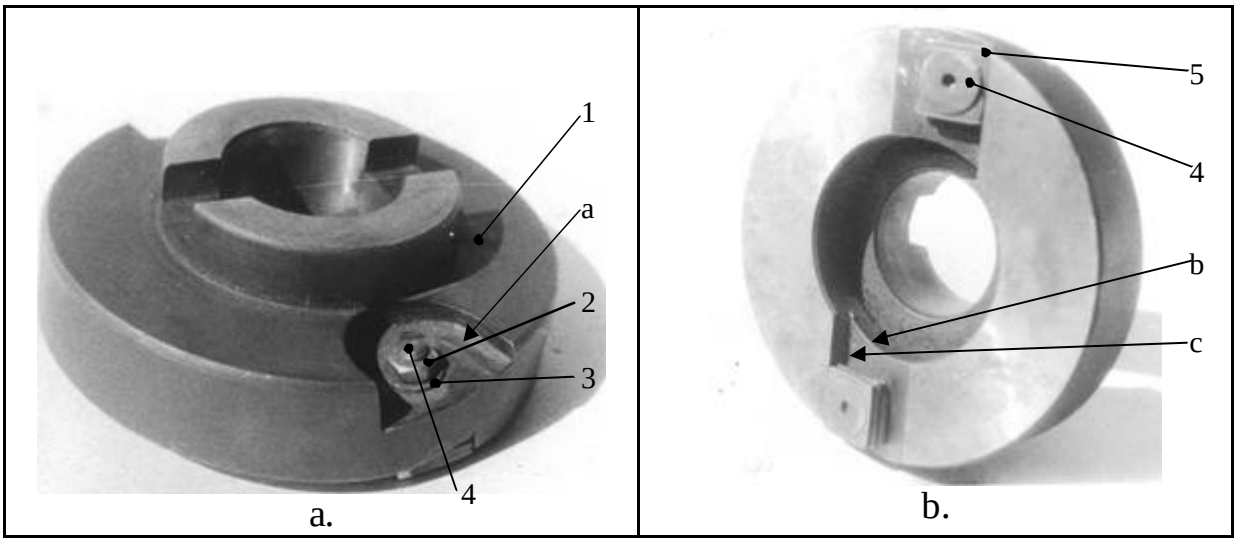

Fig. 4. The boring-bar cutter type "INFRATIREA" ORADEA.

On the versus frontal active face of cutter are made some groove-***b***, which are positioned in correspondence with the grooves on the superior frontal face of cutter, that are milling in bevel, inside of them are located the square cemented inserts-***5***, fixed by the clamping screws-***4***. The form and the lend angle is presented into tool inserts, so in the body of tool are made grooves-***b***, which are milling with a shoulder.

The cutting tests are executed to workpieces of pearlite gray cast iron with hardness 200-250 HB, and diameters between 80-100 mm.

The parameters of cutting process, without cutting fluid had been:

- Cutting speed v = 60-65m/min;
- Feed s = 0.4mm/rev;
- Roughness Ra = 0.8μm.

The parameters of cutting process obtained with boring-bar cutter with cemented inserts and mechanical clamped are superior that the boring-bar of high speed steel.

4. CONCLUSIONS

At the end of this paper could be taken the following conclusions:

- The boring-bar cutter used for boring process with cemented inserts and mechanical clamped could ensure the growth of tool life.
- The boring-bar with mechanical clamped inserts for boring of plain surfaces, which has been made and tested at “INFRATIREA” Oradea is simple, robustness and easy to multiply, having the advantage of simplification the technological process.

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