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BIMETAL EXTENSIBLE NUTS CONSTRUCTION

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The technology refers to the bimetal extensible nuts construction for general-purpose milling machines for tool-room FUS 22, FUS 25, FUS 32.

These machines are intended for the performance of milling cut operations in the tool-rooms, as well as in the series production. The kinematics of the said machines assures the execution of a large range of cutting operation in optimum conditions. The speed, feed and generally, the entire machine operation is easy and accurate due to the used mechanisms.

The extensible nut is coupled with the driving spindle of the feed mechanism of moving towards the longitudinal direction of the table.

The trapezoidal thread of the nut is matched with the hardened and rectified thread of the driving spindle. During the operation, due to the frictions between the extensible nut's flanks and the driving spindle it is taking place a nut's wear in time, which leads to a clearance between the nut and the spindle. In order to eliminate this inconvenience there has been provided a system of removing the clearance between the nut and the spindle. The nut is slotted in the middle by three milled channels at 2 mm width, at 6 mm distance and a depth equal to 80% of the nut's diameter. This nut is introduced into a cylindrical box where it can be axially preloaded with the help of a special nut.

Therefore by clamping or by tensioning the extensible nut with the help of the special nut there takes place its axial deformation, removing the fitting clearance resulted from wear.

In order to assure the lubrication level, as well as the quality of the surface which has a direct influence on the wear and on the screwed fitting behavior during operation, the said nuts are made from superior bronze.

The disadvantages of this nuts are:

- reduced safety and durability in operation, due to the slotted area;
- large bronze consumption dictated by structural form;
- reduced elasticity due to section's thickness of the slotted part, which besides elasticity must also assure resistance;
- high percentage of waste due to the slotted area which directly influences the mechanical properties of the nut where any structural or casting defect leads to part's rejection.

The extensible nuts construction in accordance with the technology eliminates these disadvantages by making the nut's body out of rolled steel and the thread executing in the deposited bronze by centrifugal plating. Therefore, the nut is divided into three areas, out of which two areas are from plated bronze where the thread is cut and an area slotted between the two screwed areas which is made only from steel which assures the nut extensibility.

The steel support in the case of the nuts from the product FUS 25 and FUS 32 are made of tubes OLT 35; and in the case of the nuts from FUS 22 are made from bar because the STAS does not stipulate tubes with adequate walls' thickness. In both cases the steel support, in view of plating is processed in interior at a diameter which assures a bronze shell under the thread of equal thickness to the half of the thread pitch. The support length is chosen with 10 mm bigger, because there are necessary 3 mm on each part of

the support in order to fix and center between the driving cover, which also assures the tightness, avoiding the leaking of the molten bronze from the support. The support is processed within the interior at the 15.55 mm roughness, after processing and before plating it is performed the sandblast cleaning and it is wiped with diluent.

The bronze is used as molten bar of smelted bronze only from scrapings. The bronze bar cut at the set length, which assures the plated layer thickness, it is sandblasted and wiped with diluent before using it. As additions there shall be used calcinated borax 1% of the bronze weight.

The plating is made on the centrifugal smelting device which is adapted to CIF installation, taking place the melting by heating with high frequency currents.

After plating, the parts undergo a thermal treatment of annealing accompanied by transformations in solid phase, with improving the bronze mechanical properties.

After the plated semi-finished product was processed and after the threads were made, before making the milled channels, the bronze shall be removed by shaping from the interior of this area, so as to reduce the steel thickness in this area, therefore increasing the nut's elasticity and extensibility, maintaining a section that assures strength as well, taking into consideration the steel's mechanical properties.

Two examples of technology performance shall be presented thereafter, related to figure 1 and figure 2.

The technology application assures the following advantages:

- high mechanical properties;
- safety and reliableness in operation;
- bronze consumption reduction with 80%;
- elimination of waste resulted from casting and processing;
- possibility of generalization to all leading spindle – nut fittings where it is pursued the removal of clearance resulted from wear as well as reducing the bronze consumption.

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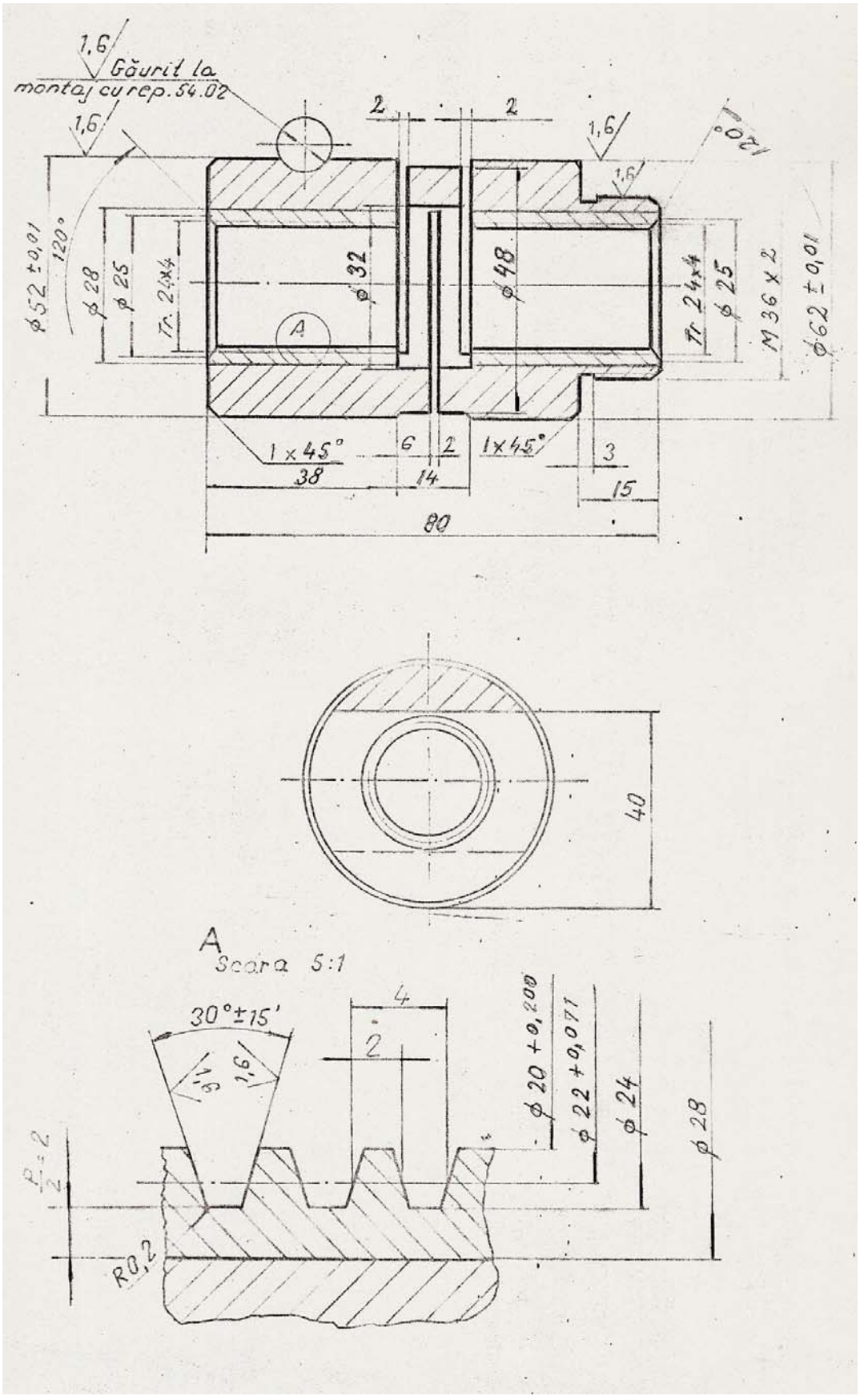

Fig. 1 Extensible nut in longitudinal section

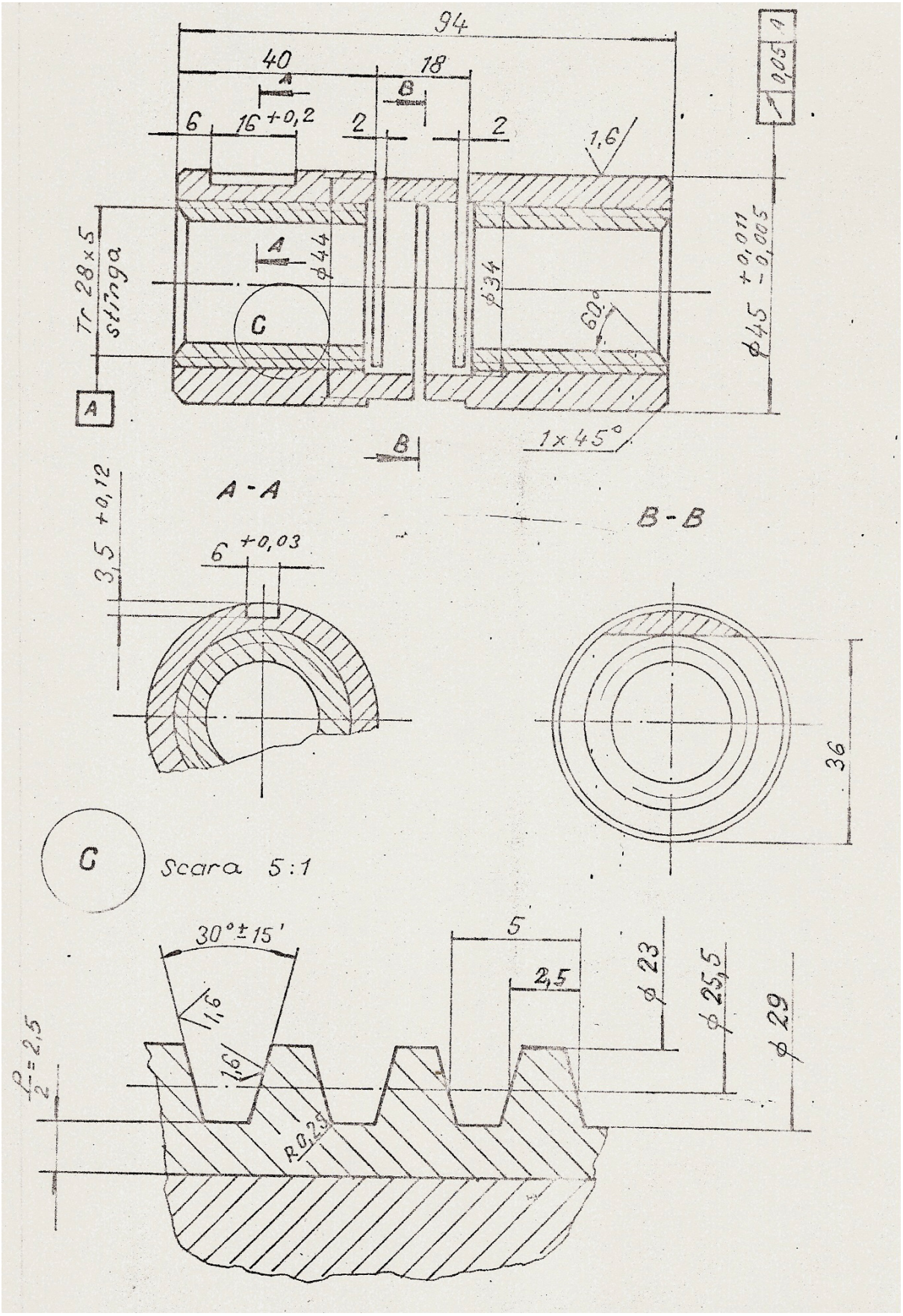

Fig.2 Extensible nut in longitudinal section