

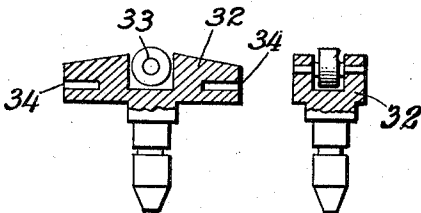
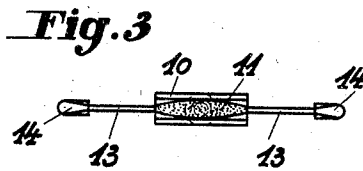
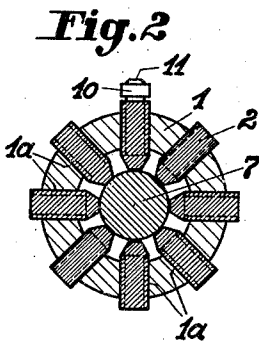
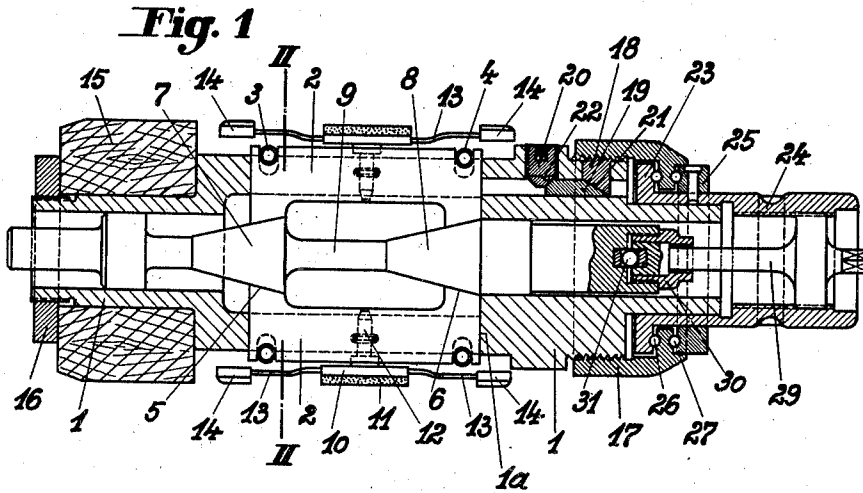
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MEANS FOR FINISHING GROOVED HOLLOW METAL BODIES

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MEANS FOR FINISHING GROOVED HOLLOW METAL BODIES

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My invention relates to the art of finishing hollow metal bodies provided in their interior with grooves and key-ways, which extend through the hollow body either parallel with its longitudinal axis, or are helically cut therein. Here-
5 tofore, such grooves or key-ways have been ground or smoothed by means of a suitably shaped block, or the like, which was moved by hand back and forth. In the case of non-uniformly
10 extending helical grooves, it has been customary also to grind or smooth the same mechanically by means of elastic strips of leather to which powdered emery is glued, but these methods suffer
15 from the drawbacks that the grooves are either only polished, without the simultaneous removal therefrom of any cracks or other flaws, or that, because of insufficient guidance within the
20 grooves, the latter are rendered uneven in width. Moreover, there was the risk of impurities being introduced into the grooves, which were treated while being in a horizontal position.

To avoid or entirely eliminate those drawbacks is the purpose of the present invention, which has
25 for its object to devise a method and means for perfectly grinding and finishing the grooves or key-ways provided in the interior of hollow metal bodies.

According to this invention, I use for the grinding of the grooves or keyways especially shaped
30 grinding elements and for smoothing the bottoms of the grooves or keyways especially constructed pressure rolls. The grinding elements are of rhomboid shape, and their widest portion is a
35 trifle narrower than the grooves to be finished so that the grinding elements as they are drawn or pushed through helically extending grooves, always bear against the base and one side of the
40 grooves. In order to make the grinding elements or pressure rollers suited to every kind of twist of the grooves and even to varying twists of the same bore, I pivotally support the holders for the grinding
45 elements or pressure rollers so as to enable the grinding elements or pressure rollers to automatically adapt themselves to each variation of the twist. Moreover, the grinding work is effected in a vertical direction.

For a fuller understanding of my invention, I refer to the appended drawing, in which, by way
50 of illustration, I have shown a device embodying this invention and in which

Fig. 1 is a longitudinal section through the device, Fig. 2 a transverse section along line II—II in Fig. 1, Fig. 3 a top plan view of a grinding-
55 stone holder, Fig. 4 a longitudinal section through

a pressure-roller holder and Fig. 5 a transverse section through the same.

At 1 in Fig. 1 is shown a casing having in its central portion a number of slots 1^a. In these slots are mounted sliding rails shown at 2, which
5 by means of resilient rings 3 and 4 are held in the casing 1. The rails 2 are provided with inclined faces 5 and 6 which bear against cones 7 and 8 provided on an adjustable mandrel 9.

At 10 are shown holders to which the grinding
10 stones 11 are cemented and which are provided with stems 12, whereby they are pivotally mounted in the sliding rails 2. At its opposite ends, the holders 10 have secured to them a resilient bar shown at 13, which bars each carry a block 14.
15 These blocks act as guides for guiding the grinding stone in the groove to be finished. At 15 is shown a guide element, mounted on the lower portion of the casing 1 and held thereon by means of
20 a nut shown at 16.

At the other end of casing 1 is provided a cap-nut 17 which extends over the end of the casing that is formed with screw-threads to receive the
25 nut. The nut 17 is prevented from rotation by a clamping member 18 which by means of a wedge 19 and a pressure screw 20 is pressed against the female threads of nut 17. By reason of the pressure exerted by a screw shown at 20 against a
30 slanting face 22 provided on the wedge 19, the latter is moved towards the right in Fig. 1, thus forcing with its wedge-face 21 the clamping member 18 outwardly. Between the cap-nut 17 and a
35 flange 23 on the hollow shank 24 of a chuck (not shown), on the one hand, and a ring 25 secured to the shank 24, on the other hand, there is provided a pressure-ball-bearing shown at 26 and 27
40 respectively, permitting a rotation of the casing 1 relative to the shank 24 of the chuck. Within the hollow shank 24 is secured by screw-threads a spindle 28, which by means of a divided collar-nut shown at 29 is connected with the adjustable
45 mandrel 9 holding the latter in its adjusted position. Intermediate the mandrel 9 and the spindle 28 is provided a ball shown at 31, facilitating rotation of the parts relative to each other.

By means of a chuck not shown the casing 1 is connected with a drawing spindle (not shown) whereby the device, after the guide blocks 14 have
50 first been introduced into the grooves to be finished, is repeatedly drawn or pushed back and forth through the hollow metal body.

The positioning of the grinding stones 11 may be easily accomplished as follows:

First, the screw 20 is loosened, whereby the
55 tension between the wedge 19 and the clamping

member 18, on the one hand, and between the latter and the cap-nut 17, on the other hand, is sufficiently relaxed to enable the cap-nut to be screwed along the screw threads of casing 1, whereby the cap-nut becomes displaced, resulting in a corresponding displacement of the hollow shank 24, of the spindle 29 secured therein and of the adjustable mandrel 9. Depending on the direction of movement of the mandrel 9, its conical portions 7 and 8 will cause the sliding rails 2 carrying the grinding stones 11 to move inwards or outwards in the slots of the casing. In this manner the grinding stones 11 held by the holders 10 pivotally carried by the rails 2 can be positioned to any desired outer diameter.

If the device is to be used for pressing the bottoms of the grooves for smoothing the same, pressure rollers as shown at 33 in Figs. 4 and 5 are substituted for the grinding stones 11. But instead of the holders shown at 10 in Figs. 1 and 2, especially designed holders shown at 32 in Figs. 4 and 5 may be used, which in a similar way as the holders 10 are pivotally mounted in the sliding rails 2. To these holders 32 also guide-blocks, like the guide-blocks 14 shown in Fig. 1, are secured by means of resilient bars, such as the bars 13 in Fig. 1, which bars are secured in slots 34 provided in the holders 32 (Fig. 4).

While I have shown and described an embodiment of my invention, I do not, of course, intend to limit myself thereto, since my invention is capable of various embodiments and modifications falling within the scope of this invention.

I claim:

1. In a device of the kind described, in combination a casing, a plurality of tools of rhomboid shape movably mounted at the periphery of said casing, the greatest width of said tools in their center being smaller than the width of the grooves to be finished, and guiding means for said tools.

2. In a device of the kind described, in combination a casing, holders pivotally mounted at the periphery of said casing, tools carried by said holders, and guiding means on said holders for said tools.

3. In a device of the kind described, in combination a casing provided in its periphery with slots, sliding rails mounted in said slots, holders pivotally carried by said sliding rails, tools secured to said holders, and resilient guiding means on said holders for said tools.

4. In a device of the kind described, in combination a casing provided with slots, sliding rails mounted in said slots, holders pivotally carried by said sliding rails, tools secured to said holders, resilient guiding means on said holders for said tools, a mandrel in said casing axially movable therein in cooperative relation to said sliding rails for positioning them circumferentially relative to said casing, and means for axially displacing said mandrel.

5. In a device of the kind described, in combination a casing provided with slots, sliding rails mounted in said slots, holders pivotally carried by said sliding rails, tools secured to said holders, resilient guiding means on said holders for said tools, a mandrel axially movable in said casing and having conical portions bearing against corresponding faces on said rails for circumferentially displacing said rails in said slots relative to said casing, and means for axially displacing said mandrel.

6. In a device of the kind described, in combination a hollow shank adapted to be operatively connected with a chuck, a spindle secured within said hollow shank, a casing connected with said shank and provided with slots, sliding rails mounted in said slots, holders pivotally carried by said rails, tools secured to said holders, resilient guiding means on said holders for said tools, a mandrel axially movable in said casing in cooperative relationship to said sliding rails for circumferentially displacing the same relative to said casing, and means operatively connecting said mandrel with said spindle, said connecting means including a ball permitting a relative rotary movement between said mandrel and said spindle.

7. In a device of the kind described, in combination a hollow shank adapted to be operatively connected with a chuck, a spindle secured within said hollow shank, a casing provided with slots, sliding rails mounted in said slots, holders pivotally carried by said rails, tools secured to said holders, guiding means on said holders for said tools, a mandrel axially movable in said casing in cooperative relationship to said sliding rails for circumferentially displacing the same relative to said casing, means operatively connecting said mandrel with said spindle, and means connecting said casing with said shank, said means including ball-bearings so as to permit a relative twist between said casing and said shank.

8. In a device of the kind described, in combination a hollow shank adapted to be operatively connected with a chuck, a spindle secured within said hollow shank, a casing provided with slots, sliding rails mounted in said slots, holders pivotally carried by said rails, tools secured to said holders, guiding means on said holders for said tools, a mandrel axially movable in said casing in cooperative relationship to said sliding rails for circumferentially displacing the same relative to said casing, means operatively connecting said mandrel with said spindle, a cap-nut engaging a flange on said shank and screw-threads on said casing thereby connecting these parts, and ball-bearings in said connection so as to permit a relative twist between these parts.

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