

July 18, 1933.

E. MARX

1,918,852

INTERNAL CYLINDER GRINDING TOOL

Filed Oct. 29, 1932

2 Sheets-Sheet 1

Fig.1.

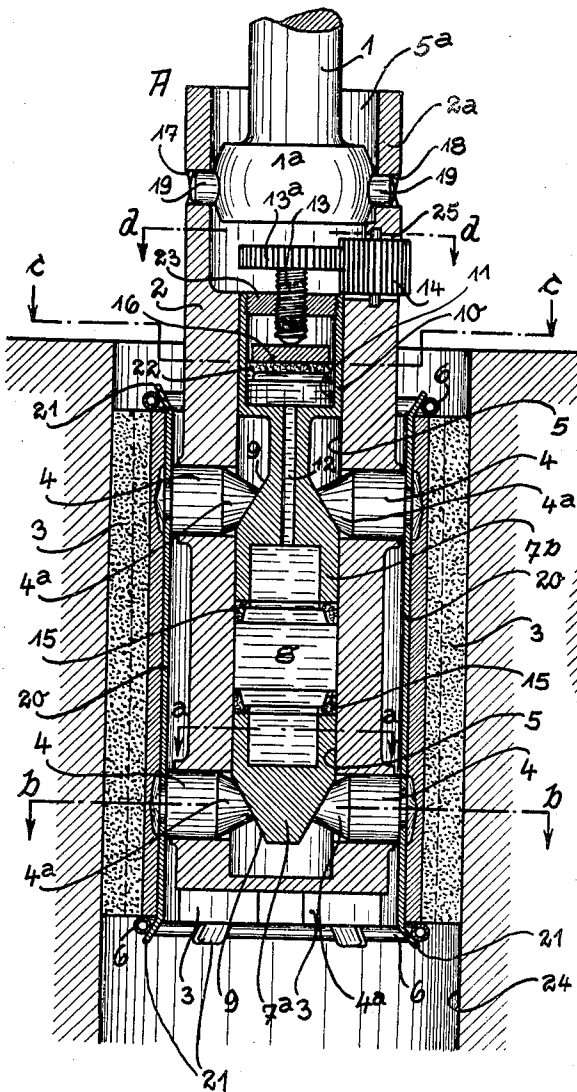


Fig.2.

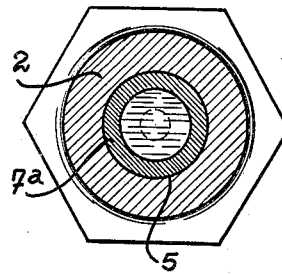
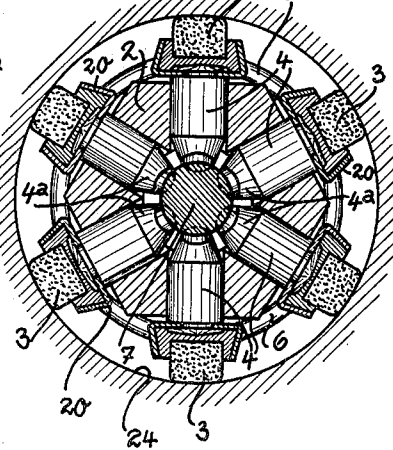


Fig.3.



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Fig. 4.

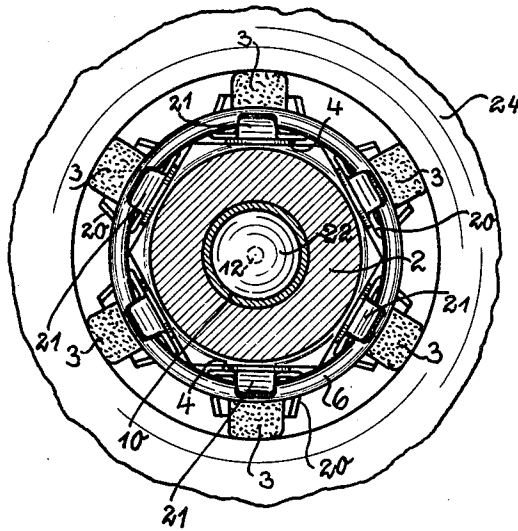


Fig. 5.

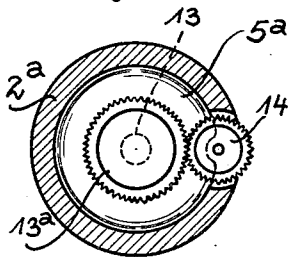
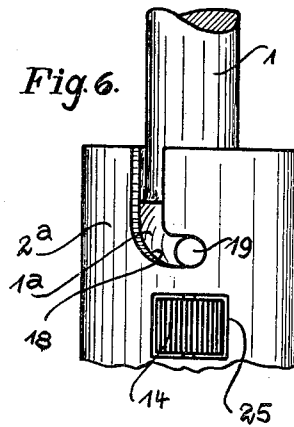


Fig. 6.



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UNITED STATES PATENT OFFICE

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INTERNAL CYLINDER GRINDING TOOL

Application filed October 29, 1932, Serial No. 640,285, and in Germany February 9, 1931.

This invention relates to a tool filling the cylinder and serving for grinding the interior of cylinders, the grinding cheeks of this tool being adjustable by means of a double cone or the like actuated by an axially shiftable piston acted upon by liquid pressure.

The problem solved by the invention consists in that two sets of pressing elements arranged in radial planes in the tool shank are independently actuated by means of controlling medium pressure, said pressing elements carrying the grinding cheeks on their end faces. The object is to enable the feeding of a worn end of the grinding cheek rim during the grinding without substantially changing the position of the less worn opposite end, a measure which effectively prevents the tool from running untrue and tilting, as a sufficiently large guide surface is maintained.

An independent control of the two sets of pressing elements is particularly attained in that the pressure cones pressing these elements in outward direction are not, as hitherto, rigidly connected the one with the other, and with the control piston, but made separate as hydraulic pistons counter-guided in a common bore, which pistons accommodate between them the pressure liquid fed through a bore in one part piston.

A further feature of the invention is the press accommodated directly in the tool shank and producing the control medium pressure, the pressure cylinder of this press being united with the upper part piston having the feed bore, and the piston of the press being shiftable guided by mechanical means adjustable by hand. These means consist for example of a toothed wheel gear mounted in the upper portion of the tool shank and acting on the piston through the intermediary of a screw spindle engaging in the cover of the press cylinder.

An embodiment of the invention is illustrated by way of example in the accompanying drawings, in which:—

Fig. 1 shows the tool in longitudinal section.

Fig. 2 is a section on line *a—*a** of Fig. 1.

Fig. 3 is a section on line *b—*b** of Fig. 1.

Fig. 4 is a section on line *c—*c** of Fig. 1.

Fig. 5 is a section on line *d—*d** of Fig. 1.

Fig. 6 shows in side elevation the upper part of the tool with the coupling point between the tool and the driving shaft.

The tool A consists of a cylinder 2 with an axial hollow space 5 widening in the upper portion 2*a* of the cylinder to form a hollow space 5*a*. Angular slots 17, 18 are provided at two opposite points in the wall of the cylinder portion 2*a*, in which slots horizontal pins 19 on a head 1*a* of a shaft 1 intended for driving the tool A can be inserted like a bayonet joint. Bolts 4 are inserted in apertures in the wall of the cylinder 2; in the example illustrated two superposed groups each comprising 6 bolts are shown. The bolts 4 have each a conical portion 4*a*, by means of which they bear against inclined surfaces 9 of two pistons 7*a*, 7*b*, shiftable in opposite directions in the space 5, and they carry grinding bars 3 cemented or otherwise fixed in mountings 20. Projecting outwardly bent tongues 21 of the mountings 20 and therefore also the grinding bars 3 are each held together by a spiral spring hose 6. The pistons 7*a*, 7*b* are provided on their adjacent end faces with packing sleeves 15. The upper piston 7*b* has a cylindrical extension 10, in the hollow space 11 of which a piston 16 provided with a packing cup 22 is shiftable. The piston 7*b* has an axial bore 12, through which driving liquid, such as oil, is forced through the hollow space 8 between the pistons into the hollow space 11 of the extension 10. The extension 10 is closed by a screw cover 23. A screw 13 with toothed head 13*a* extends through this cover 23. A toothed wheel mounted in an aperture 25 (Fig. 6) and extending outwardly through the wall of the cylinder portion 2*a* meshes with the teeth of the head 13*a*.

The small wheel 14 rotatable by hand adjusts the screw 13, and this screw adjusts the piston 16, so as to regulate the pressure of the liquid in the hollow space 8. The pressure of the liquid is transmitted to the pistons 7*a*, 7*b*, and these pistons press with their bevelled faces 9 on the bevelled faces of the conical parts 4*a* of the bolts 4, which

press the grinding bars 3 carried by them against the wall of the cylinder 24 to be worked. Owing to the fact that the grinding bars are carried by two sets of bolts arranged independently the one of the other at different heights in the tool shank 2, they must always adjust themselves absolutely parallelly to the inner wall of the cylinder 24 to be ground, even if this cylinder is not uniformly bored at all points.

I claim:—

1. In an axially rotatable tool serving for the internal grinding of cylinders and filling the cylinder to be worked, the combination of a tool casing having an axial hollow space and superposed rows of radial bores, counter movable pistons under liquid pressure between their adjacent ends arranged in said hollow space, sets of bolts shiftably mounted in said radial bores adapted to be independently controlled by said pistons, and grinding bars each on the outer end of each of two of said bolts.

2. In an axially rotatable tool serving for the internal grinding of cylinders and filling the cylinder to be worked, the combination of a tool casing having an axial hollow space and superposed rows of radial bores, counter movable pistons in said bores bevelled at their remote ends and acted upon by the pressure of liquid enclosed between their adjacent ends, sets of bolts shiftably mounted in said radial bores, the bolts of each set having a bevelled inner end adapted to bear against the bevelled surface of each of said pistons, and grinding bars, each on the outer end of each of two of said bolts.

3. In an axially rotatable tool serving for the internal grinding of cylinders and filling the cylinder to be worked, the combination of a tool casing having an axial hollow space, counter movable pistons in said hollow space under pressure enclosed between the adjacent

ends of said pistons, a cylindrical extension on one of said pistons and having a channel, this piston having a channel for the pressure liquid registering with the channel in said extension, and means in said extension for regulating the pressure of the liquid.

4. In an axially rotatable tool serving for the internal grinding of cylinders and filling the cylinder to be worked, the combination of a tool casing having an axial hollow space, counter movable pistons in said hollow space under pressure enclosed between the adjacent ends of said pistons, a cylindrical extension on one of said pistons and having a channel, this piston having a channel for the pressure liquid registering with the channel in said extension, a piston in said extension, a cover for said extension, a pressure screw extending through said cover and bearing against said extension piston, a toothed wheel on said pressure screw, and a hand wheel meshing with said toothed wheel adapted to adjust said screw through the intermediary of said toothed wheel.

5. In an axially rotatable tool serving for the internal grinding of cylinders and filling the cylinder to be worked, the combination of a tool casing having an axial hollow space and superposed rows of radial bores, counter movable pistons under the pressure of liquid between the adjacent ends arranged in said hollow space, sets of bolts shiftably mounted in said radial bores adapted to be independently controlled by said pistons, mountings one on the outer end of each of said bolts, grinding bars one in each of said mountings, bent tongues projecting from the ends of said mountings, and tensioned spiral spring hoses surrounding said tongues adapted to hold together said mountings and consequently said grinding bars.

ERICH MARX.

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