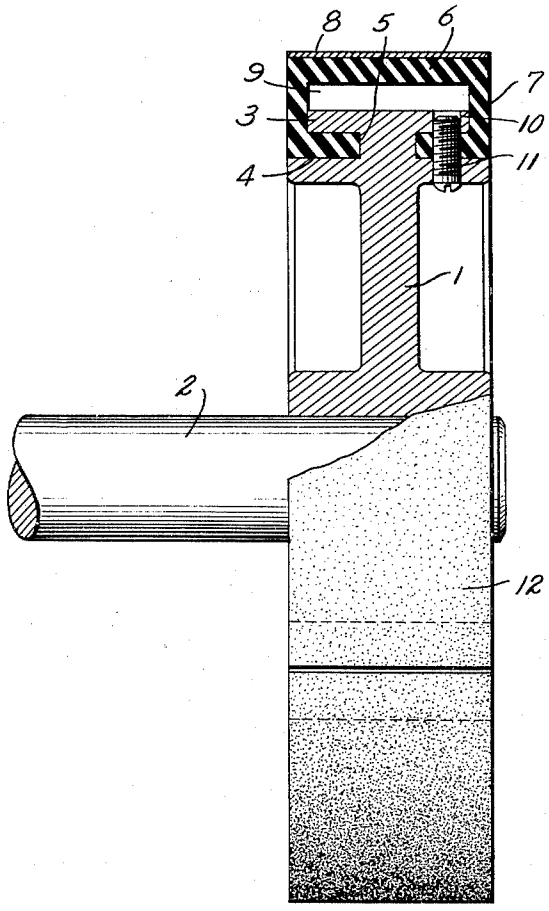
Jan. 17, 1950 E. KRISTEK 2,494,818

EXPANSIBLE RIMMED ABRADING WHEEL

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EXPANSIBLE RIMMED ABRADING WHEEL

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2 Claims. (Cl. 51—191)

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The present invention relates to rotary grinding, polishing, cleaning or similar abrasive rollers, discs and the like provided with an emery cloth or emery paper coating, and more particularly to a method and arrangement for tensioning the emery cloth or paper around the periphery of such abrasive rollers, wheels, discs and the like.

The emery coating may be fastened and tensioned on the periphery of grinding or like disc by various methods and arrangements.

The most frequently used method consists in dividing the disc into two parts adapted to be opened, and fastening the ends of the coating to the abutting faces of the two parts in the open position of the latter, the coating being tensioned by closing the said parts. In other cases a one piece disc or wheel is used provided with a groove in which the ends of the coating are retained by means of some mechanical contrivance. Both arrangements result in an uneconomical utilisation of the abrasive layer because the latter must be provided with folded over portions at both ends to permit the fastening and tensioning of the coating on the periphery of the disc, and moreover the wear is considerably greater in those portions of the periphery of the disc where such folded over portions are formed than in the remaining part of the periphery, and in addition the groove in the disc, or the abutting faces of its parts, if a separable disc is used, produce harmful shocks against the worker's hands. The exchange of the coating is time consuming and often injury may take place if the parts of a separable disc have not been sufficiently secured against accidental separation.

For a better utilisation of the abrasive material, a more uniform wear along the whole periphery and for securing a more quiet grinding operation methods have been devised for tensioning the abrasive layer by means of compressed air contained in a peripheral air chamber provided in the disc, for instance a rubber chamber. The greatest disadvantage of such methods consists in this that for exchanging the abrasive coating it is necessary to empty the chamber, and to inflate it again when the new coating has been placed in position around the disc. The same effect may be obtained by means of a device consisting of an yieldable rubber disc of lozenge section the periphery of which may be expanded by two plates exerting pressure against the said walls of the disc.

The disadvantage of this last mentioned arrangement consists in this that the exchange of the abrasive coatings is slow, since it is necessary first to relieve the pressure acting on the rubber disc and when a new coating has been placed in position, to generate pressure anew by tightening one of the side plates.

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An object of the present invention is to eliminate the disadvantages of the methods and devices referred to and to insure a very easy tensioning of the abrasive coating, a perfect utilisation of the abrasive material and the possibility of a simple replacement of the worn out coatings.

The essential feature of the new method in accordance with the present invention consists in this that the abrasive coating which is mounted loose around the periphery of the disc, when the latter is arrested, becomes tensioned by the centrifugal internal stress on the elastic periphery of the disc, when the latter is rotated. For this purpose the periphery of the disc is provided with a hollow rubber ring of a suitable profile, the side walls of the ring being subjected to tension by the centrifugal force acting on the peripheral part of the ring when the disc is rotated, whereby the abrasive coating is tensioned due to the expansion of the circumference of the ring. Preferably the tensioning effect may be enhanced by partially filling the hollow space in the ring with a suitable material in liquid condition or in the form of loose particles.

The accompanying drawing shows by way of example an abrasive disc in accordance with the present invention in part sectional view.

The device in accordance with the invention comprises a metal disc 1 mounted in the usual way on a shaft 2 to which rotary motion is imparted in a manner known per se. The crown 3 of the disc 1 is provided on either side with a groove 4 adapted to receive the corresponding flange 5 of a rubber ring 6. The side walls 7 of the ring are thinner than its peripheral part 8. A hole 10 may be bored through the crown 3 so as to open in the hollow space 9 within the ring 6. The hole 10, which is closed by a screw 11, may serve for supplying the hollow space 9 with a suitable liquid, such as oil or water or, if desired, with sand. The space 9 is filled in part only.

When the disc 1 is stationary a coating 12 of emery cloth or paper is placed loosely around the periphery 8 of the ring 6. The coating 12 is supplied to the machine either ready in the shape of a hollow disc which is threaded over the periphery of the rubber ring 6, or in the form of a straight strip of definite length which is

wound around the rubber ring and then its ends are united, for instance by means of an adhesive band placed underneath the ends of the abrasive strip.

When the shaft 2 with the disc 1 are rotated, the side walls 7 of the rubber ring 6 are extended by the effect of the centrifugal force acting on the thicker peripheral part 8 of the ring, the periphery of the said ring being expanded at the same time to an extent determined by the circumferential length of the emery coating. The centrifugal force assisted by the friction between the rubber ring and the emery coating is quite sufficient to retain the coating firmly on the disc. Under particularly severe conditions this effect may be enhanced by filling the hollow space 9 within the rubber ring 6 in part with oil, which will increase the pressure exerted on the periphery 8 of the ring. When the abrasive coating has become worn out, the disc is arrested whereby the periphery of the elastic ring is contracted and the coating may be readily removed and replaced by a fresh one.

What I claim is:

1. A rotary abrasive tool comprising a rigid wheel having a concentric annular groove in each side face adjacent the periphery thereof, a channel shaped elastic ring member concentrically mounted on said wheel and including a peripheral wall and radially inwardly extending side walls having inturned annular flanges thereon engaged in the annular grooves in the sides of said wheel, the distance from said flanges to the peripheral wall of said ring being greater than the distance from said grooves to the periphery of said wheel whereby the peripheral wall of said ring is spaced from the periphery of said wheel, said peripheral wall of said ring constituting a seat and support for an inelastic band of abrasive material and adapted to retain the same thereon during operation by expansion of said ring due to centrifugal force.

2. An abrasive wheel according to claim 1 in which the space between the periphery of the wheel and peripheral wall of the ring is partially filled with a heavy fluent material.

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