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COMBINED GRINDING AND LAPPING DISC
HAVING FLAT WORKING SURFACES
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FIG. 2

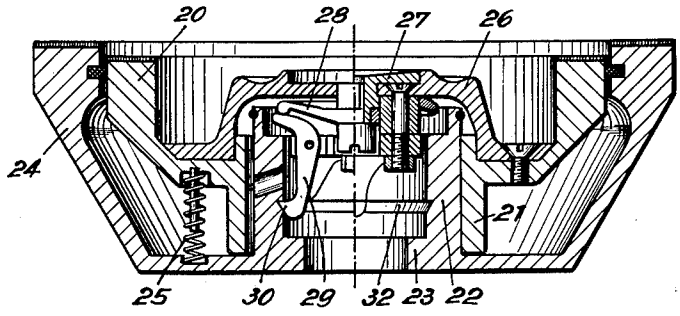


FIG. 3

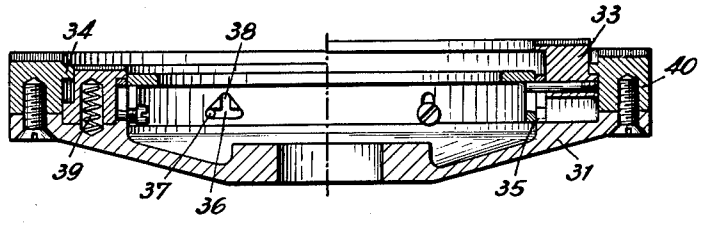
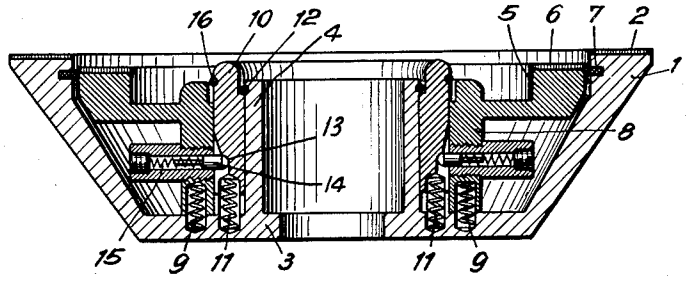


FIG. 1



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COMBINED GRINDING AND LAPPING DISC HAVING FLAT WORKING SURFACES

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10 Claims. (Cl. 51—209)

For grinding and lapping, in most cases grinding discs having different coatings are employed one after the other, Thus for instance the grinding of Widia turning tools is normally effected by means of silicon carbide grinding discs, whereas fine grinding and finishing grinding is in most cases effected by means of discs covered with diamond powder. Then, grinding tools provided with diamond dust bonded by means of a synthetic substance are used for lapping.

The object of the invention is in all such cases to enable the grinding and/or lapping work, for which two or more operations with grinding tools having suitable coatings have been necessary heretofore, to be effected in a single operation. The invention achieves this object by providing springs acting between the rings and tending to push the working surface of one ring in front of the working surface of the other ring, and a locking device which in its locking position prevents the springs from acting.

A further feature of the invention is the arrangement of a sealing means between the rings.

Several embodiments of the invention, chosen by way of example, are illustrated in the accompanying drawings, in which:

Figure 1 is an axial section through a grinding and lapping disc consisting of two concentric rings, the inner ring being pressed against the outer ring by a pressure spring.

Figure 2 is a modification of the embodiment according to Figure 1.

Figure 3 is a further modification of the embodiment according to Figure 1.

In Figure 1, the outer ring 1 is provided with the coating 2 of diamond powder or the like. This ring is made in the form of a cup and its hub 3 is provided with a tubular extension 4. The inner ring 5 carrying a diamond coating 6 suitable for lapping is also made in the form of a cup. A sealing means 7 is arranged between the rings 1 and 5. The inner ring has a hub-like part 8 which is slid over the tubular part 4. It is subjected to the action of pressure springs 9 which tend to force it into a position in front of the ring 1. Between the hub-like part 8 and the tubular part 4 is arranged an adjusting ring 10 subjected to the action of pressure springs 11. These springs press the ring 10 against a stop ring 12 which prevents it from being pushed out over the tubular extension. The adjusting ring 10 is provided with notches 13 in which round heads of locking pins or detents 14 engage, these locking pins being arranged radially displaceably on the hub-like part 8 of the inner ring 5 and subjected to the action of springs 15. The adjusting ring 10 is also provided with a stop ring 16 which prevents the inner ring 5 from falling out. Pressure on the adjusting ring 10 causes it to yield rearwardly against the action of the springs 11. The notch 13 and the head of the locking pin 14 are so shaped that the locking pin 14 is pushed back by this movement of the adjusting ring,

so that the inner ring 5 jumps forward under the action of the springs 9 until it bears against the stop ring 16. The inner ring 5 is now somewhat in front of the outer ring 1 and is in the working position.

In the embodiment of the invention according to Figure 2, the hub 21 of the inner ring 20 slides axially displaceably on the prolongation 22 of the hub 23 of the cup-shaped outer ring 24. The inner ring is subjected to the action of pressure springs 25 and is provided with a cap 26 covering the opening of the tubular extension 22. In its central part it carries a press-button 27 which through an intermediate lever 28 can act on a spring pressed catch lever 29 having a lug 30 engaging in a groove 32 of the tubular extension 22. When the catch lever 29 is disengaged by pressure on the press-button 27, the inner ring 20 jumps in front of the outer ring 24 and is thus ready for operation.

In the embodiment of the invention according to Figure 3, the outer ring 40 is screwed on to a disc 31 by means of screws. The inner ring 33, subjected to the action of pressure springs 39, is axially displaceable in the outer ring. The axial displacement of the inner ring is limited by an abutment 34. The disc 31 carries a ring 35 in which there is a cruciform slot 36. A pin 37 attached to the ring 33 engages in this slot. Figure 3 is so drawn as to show the inner ring 33 in its rearmost position on the left hand side and in its foremost position on the right hand side. If the inner ring (see left hand half of Figure 3) is turned through a few degrees relatively to the outer ring, then the upper part 38 of the cruciform recess 36 comes into a position above the pin 37, so that the ring 33 now jumps in front of the outer ring 40 (see righthand half of Figure 3). This bayonet-like closure enables the inner ring to be returned to the rearward position by being pressed back and turned slightly.

It is believed that in view of the foregoing that a further detailed description of the operation of the invention is unnecessary. Likewise, it is believed that the advantages of the invention will be readily apparent.

Having thus fully described the invention, what is claimed to be new and desired to be secured by Letters Patent is:

1. In a device of the class described, two concentrically arranged grinding rings, the one for coarse grinding, the other for fine grinding and lapping, the inner grinding ring being axially displaceable from a position with its grinding face behind the outer grinding ring to a position in front of the outer grinding ring, springs for effecting said axial displacement, and spring pressed detent means for preventing said axial displacement at will.

2. In a device of the class described, two concentrically arranged grinding rings, the one for coarse grinding, the other for fine grinding and lapping, one of the grinding rings being axially movable from a position with its grinding surface behind the grinding surface of the other grinding ring to a position with its grinding surface in front of the other grinding rings, springs for effecting said axial displacement, one of the rings having an annular recess therein, and a spring loaded and radially movable locking piece carried by the other grinding ring engaging with said annular recess when, against the action of said springs, the one grinding ring is pushed back behind the grinding surface of the other grinding ring.

3. In a device of the class described, two concentrically arranged grinding rings, the one for coarse grinding, the other for fine grinding and lapping, one of the grinding rings being axially movable from a position with its grinding surface behind the grinding surface of the other grinding ring to a position with its grinding surface in front of the other grinding ring, springs for effecting said

axial displacement, one grinding ring being provided with an annular recess, and a spring loaded and radially movable locking piece carried by the other grinding ring engaging said said annular recess when, against the action of said springs, the one grinding ring is pushed back behind the grinding surface of the other grinding ring, and a concentrically located piece for disengaging said locking piece from said recess.

4. In a device of the class described, two concentrically arranged grinding rings, the first for coarse grinding, the second for fine grinding and lapping, said second grinding ring being axially movable in front of the other grinding ring, springs for effecting said axial displacement, said first grinding ring having an annular recess therein, and a spring loaded and radially movable locking piece on the second grinding ring engaging with said annular recess when, against the action of said springs, the second grinding ring is pushed back behind the grinding surface of the first grinding ring, and a concentrically located and axially movable piece for disengaging said locking piece from said recess.

5. In a device of the class described, two concentrically arranged grinding rings, the one for coarse grinding, the other for fine grinding and lapping, the outer grinding ring having a hub on the outside of which slides axially the hub of the inner grinding ring, springs between the inner and the outer grinding ring forcing the inner grinding ring in front of the outer grinding ring, the inside of the hub of the outer grinding ring being provided with an annular recess, a cap centrically fastened on the hub of the inner grinding ring, catch levers pivoted on the inside of said cap, springs forcing said catch levers to engage with said annular recess, and a button in the middle of said cap to disengage said catch levers from said recess by pressing it inward.

6. In a device of the class described, two concentric grinding rings for successive use in a grinding operation, the inner of the two rings being movable relatively to the outer ring, springs between said rings to normally hold the inner ring in a position with its face forward of the face of the outer ring, said inner ring being movable against spring pressure to a position with its face behind the face of the outer ring, and detent means to hold the inner ring in such position.

7. In a device of the class described, two concentric grinding rings for successive use in a grinding operation,

the inner of said rings being movable axially from a position with its face retracted within the outer ring to a position with its face presented beyond the face of the outer ring, detent means acting between said inner and outer rings and operable to hold the inner ring in retracted position and manually means operable to release said inner ring from said detent.

8. The device of claim 7, in which an annular sealing element is provided between the outer periphery of the inner ring and the inner periphery of the outer ring to exclude abrasive material from the space between said rings.

9. In a device of the class described, an inner abrasive ring and an outer abrasive ring concentrically mounted for successive use in a grinding operation, and manual means by which relative axial movement between the two rings may be effected to selectively present either the abrading surface of the inner ring or the abrading surface of the outer ring to a work piece, said manual means comprising spring means to normally force said inner abrasive ring axially forward with respect to said outer abrasive ring and bayonet slot latch means to secure the inner ring in position with its face axially inward of the face of the outer ring.

10. In a device of the class described, an inner abrasive ring and an outer abrasive ring, concentrically mounted for successive use in a grinding operation, and manual means by which relative axial movement between the two rings may be effected to selectively present either the abrading surface of the inner ring or the abrading surface of the outer ring to a work piece, said manual means comprising spring means to normally force said inner abrasive ring axially forward with respect to said outer abrasive ring, radial spring pressed detent means to hold said inner abrasive ring against said spring means in position with its face axially behind said outer abrasive ring and means to release said detent means.

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