June 1, 1937. W. P. LESHURE 2,082,404

CUP GRINDER

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Fig. 1.

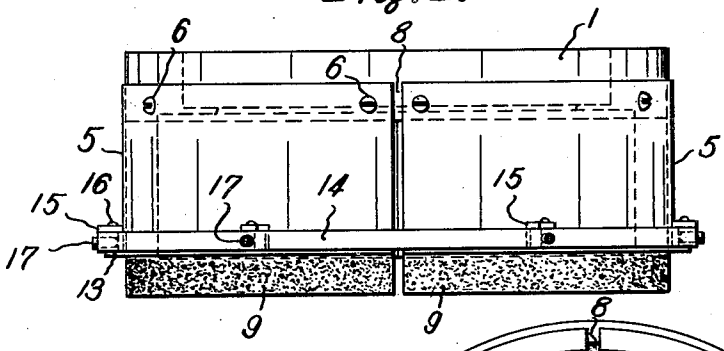


Fig. 2.

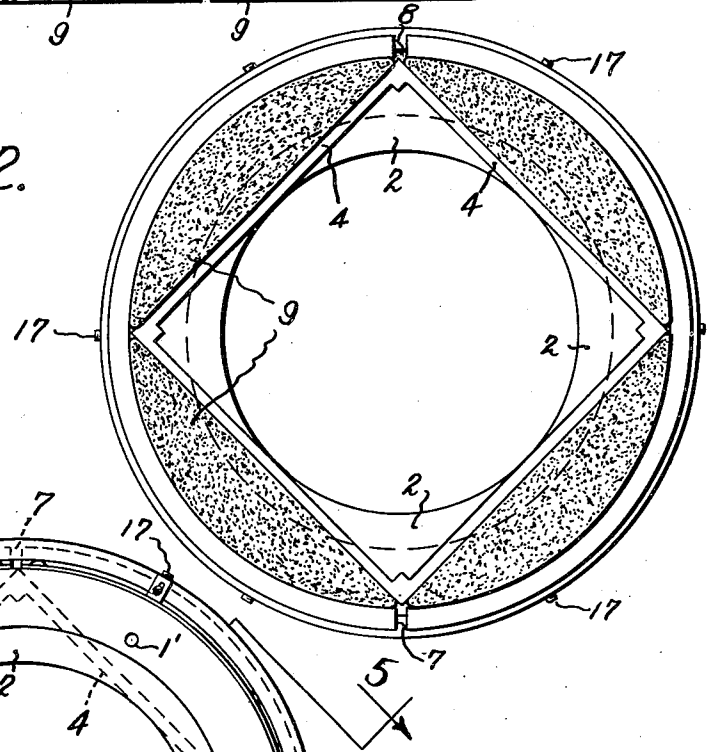
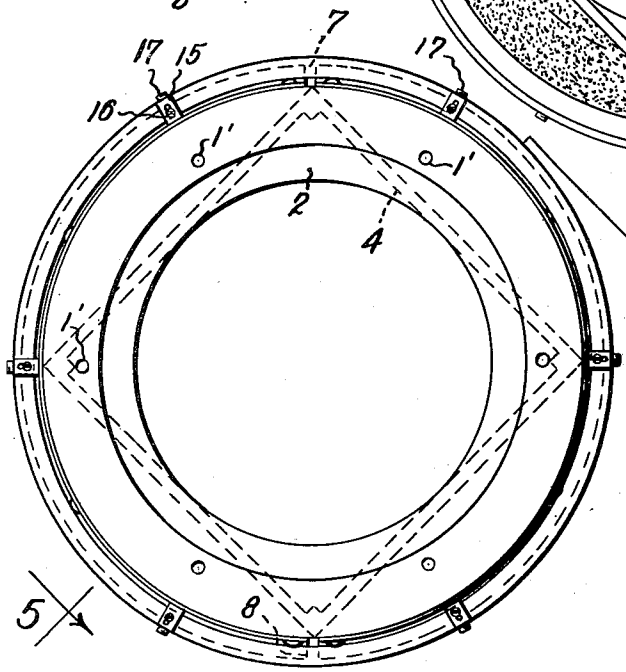


Fig. 3.



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Fig. 4.

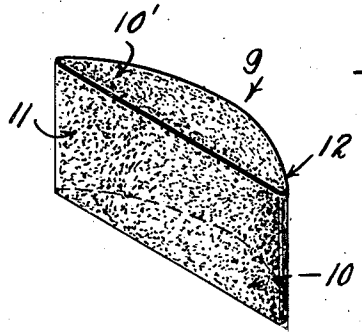


Fig. 5.

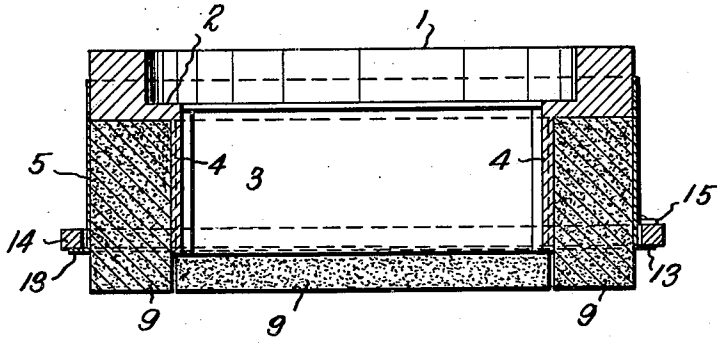


Fig. 7.

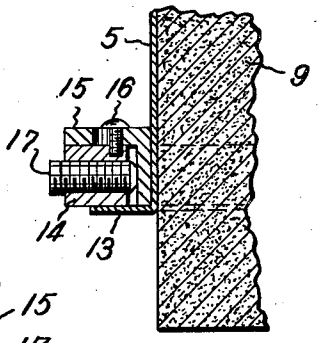
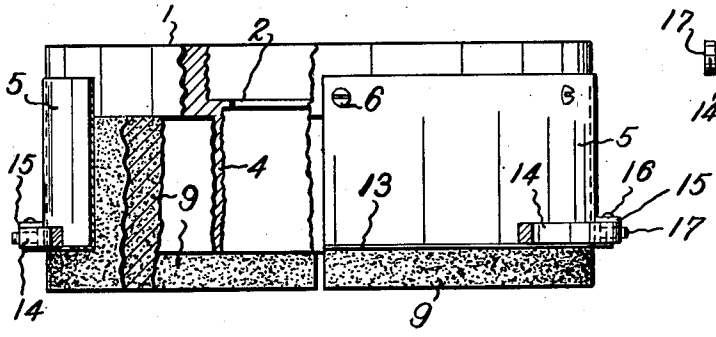


Fig. 6.



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CUP GRINDER

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Application September 1, 1936, Serial No. 98,868

7 Claims. (Cl. 51—209)

This invention relates to a cup grinder and has for its object both an improvement in the form and arrangement of the grinding elements or segments as well as in the means for clamping said segments in their assembled working relation.

A particular feature of the improvement resides in providing grinding elements of segmental shape, viz. chord segments of a cylinder whereby when mounted in end to end relation a grinding surface is provided which effectively lubricates itself and avoids scoring or burning of the work being ground.

The chuck or holding means for the grinding segments constitutes a further and important feature of the invention in that it comprises a structure of simple, inexpensive and effective character for firmly clamping the grinding segments and also is capable of easy and quick adjustments or replacements of said segments when required.

Further features and advantages of the improvement will become apparent from the following description taken in connection with the accompanying drawings in which,

Fig. 1 is a side elevation of the assembled cup grinder;

Fig. 2 is a bottom plan view thereof;

Fig. 3 is a top plan view thereof;

Fig. 4 is a perspective view of one of the grinding segments;

Fig. 5 is a vertical sectional view of the assembled grinder along line 5—5 of Fig. 3;

Fig. 6 is a side elevation of said grinder with portions thereof broken away to more clearly illustrate the assembled parts thereof; and

Fig. 7 is an enlarged detail section through the tightening ring to show the details of the clamping means thereon.

Referring more particularly to the drawings, the chuck or holding means for the grinding elements comprises an annular head portion 1 of sturdy construction formed with a countersunk inner horizontal flange 2 as shown in Figs. 5 and 6. Bolt holes 1' are provided in the thicker portion of said head 1 for fastening the same to a rotating shaft in the usual manner.

Preferably integral with said head portion 1 and projecting downwardly and coaxially therewith from its horizontal flange 2 is a hollow core portion indicated generally at 3. In the present embodiment the sides 4 of said core form a hollow square or box-like structure completely open at the bottom and substantially open at the top except for the overhanging flange portions 2 at the corners thereof shown in Fig. 2. It is to be understood however, that this hollow core 3 for the chuck may be of other prismatic shape than a square as for instance a triangle, hexagon, etc. The core 3 is of sufficiently sturdy construction to form a rigid interior support for the grinding segments which are clamped thereagainst as will be hereinafter described.

Surrounding said core 3 and depending from said head 1 is a contractible skirt 5 preferably in the form of a relatively thin flexibly walled cylinder, the upper portion of which is securely fastened to the head 1 in any suitable way as by means of screws 6. The contractible character of the skirt 5 may be obtained either by slitting the lower portions thereof, or by providing in effect a split cylinder formed of two semicircular portions spaced at their adjacent ends by splits 7 and 8 as shown in Figs. 1, 2 and 3. Since only the upper portion of said skirt is fastened rigidly to the head 1, the lower portion of said skirt is adapted for being contracted by the means hereafter described. As shown in Figs. 2 and 3, the co-relation between the primastic core 4 and the depending skirt 5 is such that the cylindrical skirt in effect circumscribes the sides of the square core and provides segmental pockets defined by the side walls of the core and the skirt for the reception of segmental grinding elements 9.

The several segmental grinding elements are preferably of the same shape and dimensions and as more clearly shown in Fig. 4 are formed as chord segments of a cylinder with a lower plane grinding surface 10 vertically bounded by an intersecting flat chord surface 11 and cylindrical surface 12. It will be convenient to make the upper plane surface 10' of the segments also flat and parallel with the lower plane surface 10 so that either of said surfaces may be used as the grinding surface.

The means for clamping the grinding segments in the chuck is as follows: Referring more particularly to Figs. 6 and 7, the lower end of the skirt 5 is preferably formed with an outwardly extended supporting flange 13 and resting upon this flange 13 is an endless non-expansible ring 14, the inner diameter of said ring being slightly larger than the outer diameter of the skirt 5 so as to be spaced therefrom. At suitable intervals around the circumference of said ring 14 there are mounted compressing devices which bear against the lower portion of the skirt 5 for contracting the same. In the

present embodiment these compressing devices comprise angle iron elements 15, slidably secured to the ring 14 by stud screws 16. A radially movable screw stud 17 is screw threaded through the ring 14 so that when turned inwardly it will press the angle iron 15 against the skirt 5. Since the ring 14 is non-expansible such movement of the screw stud 17 will contract the lower portion of skirt 5. When the skirt 5 is in its normal expanded position the grinding segments 9 fit snugly but removably in the segmental pockets described. It will be obvious that when the grinding segments 9 are in their pockets the contraction of the lower portion of said skirt 5 will firmly clamp said grinding segments against the sides of the prismatic core. When the working faces of the grinding segments which protrude from the lower end of the chuck are worn away, it is a very simple and easy operation with the means described to unclamp the segments for an extended adjustment thereof and also to replace the same when required.

The working of cup grinding wheels generally involves a liberal application of lubricant such as water or other composition supplied both inside and outside of the wheel for keeping the working face of the wheel cool and prevent scoring or burning of the work being ground. In the use of my cup grinder above described the thorough distribution of the lubricant thus supplied will be greatly facilitated by the segmental shape of the grinding elements and by the disposition of the same about the sides of the prismatic core as shown. The rotation of the present cup grinder tends to drive the lubricant supplied to the inside of the wheel outwardly into the corners of the square formed by the inner sides of the segments and during rotation of the wheel there occurs an alternate slushing of the work with lubricant and a broadening and narrowing action of the grinding surface thereagainst as the grinding elements pass over said work. This action contributes appreciably to a longer life of the grinding segments as well as the avoidance of any tracking of the grinding grains of the segments such as might score or burn the work.

I claim:

1. In a cup grinder, a grinding segment shaped as the segment of a cylinder with a lower plane grinding surface and vertically bounded by intersecting chord and cylindrical surfaces.

2. In a cup grinder, a plurality of separate grinding segments arranged annularly in a ring in end to end relation, each grinding segment being shaped as the segment of a cylinder with a lower plane grinding surface and vertically bounded by intersecting chord and cylindrical surfaces.

3. In a cup grinder, a plurality of separate grinding segments arranged annularly in a ring in end to end relation, each grinding segment being shaped as the segment of a cylinder with a lower plane grinding surface and vertically bounded by intersecting chord and cylindrical surfaces, said several grinding segments being of the same dimensions and symmetrically disposed about a central axis with their outer vertical surfaces defining a substantially continuous cylinder and their inner vertical surfaces defining a prismatic figure.

4. In a cup grinder, the combination with a chuck of a plurality of grinding segments, said chuck comprising a head portion having a prismatic sided core of rigid supporting character projecting downwardly and centrally from said head, a surrounding contractible skirt of cylindrical form depending from said head for circumscribing the sides of said prismatic core and forming therewith segmental pockets for the reception of said grinding segments, and means adjacent the lower edge of said skirt for contracting the same and clamping said grinding segments against the sides of said core.

5. In a cup grinder, the combination with a chuck of a plurality of grinding segments, said chuck comprising a head portion having a hollow prismatic sided core of rigid supporting character projecting downwardly and centrally from said head, a surrounding contractible skirt of cylindrical form depending from said head for circumscribing the sides of said prismatic core and forming therewith segmental pockets for the reception of said grinding segments and a tightening ring adjacent the lower edge of said skirt provided with means for contracting said skirt and clamping said grinding segments against the sides of said core.

6. In a cup grinder, the combination with a chuck of a plurality of grinding segments, said chuck comprising a head portion having a prismatic sided core of rigid supporting character projecting downwardly and centrally from said head, a surrounding contractible skirt of cylindrical form depending from said head for circumscribing the sides of said prismatic core and forming therewith segmental pockets for the reception of said grinding segments, an outer supporting flange at the lower portion of said skirt and a non-expansible ring resting on said flange provided with radially movable screw studs operable to contract said skirt and clamp the grinding segments against the sides of said core.

7. In a cup grinder, the combination with a chuck of a plurality of grinding segments, said chuck comprising a head portion having a hollow prismatic sided core of rigid supporting character projecting downwardly and centrally from said head, a surrounding contractible skirt of cylindrical form depending from said head for circumscribing the sides of said prismatic core and forming therewith segmental pockets for the reception of said grinding segments, the grinding segments in said pockets being shaped as segments of a cylinder, each with a lower plane grinding surface and vertically bounded by intersecting chord and cylindrical surfaces, and means adjacent the lower edge of said skirt for contracting the same and clamping said grinding segments against the sides of said core.

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