Sept. 29, 1953 P. K. FULLER 2,653,428

GRINDING DISK

Filed April 10, 1952

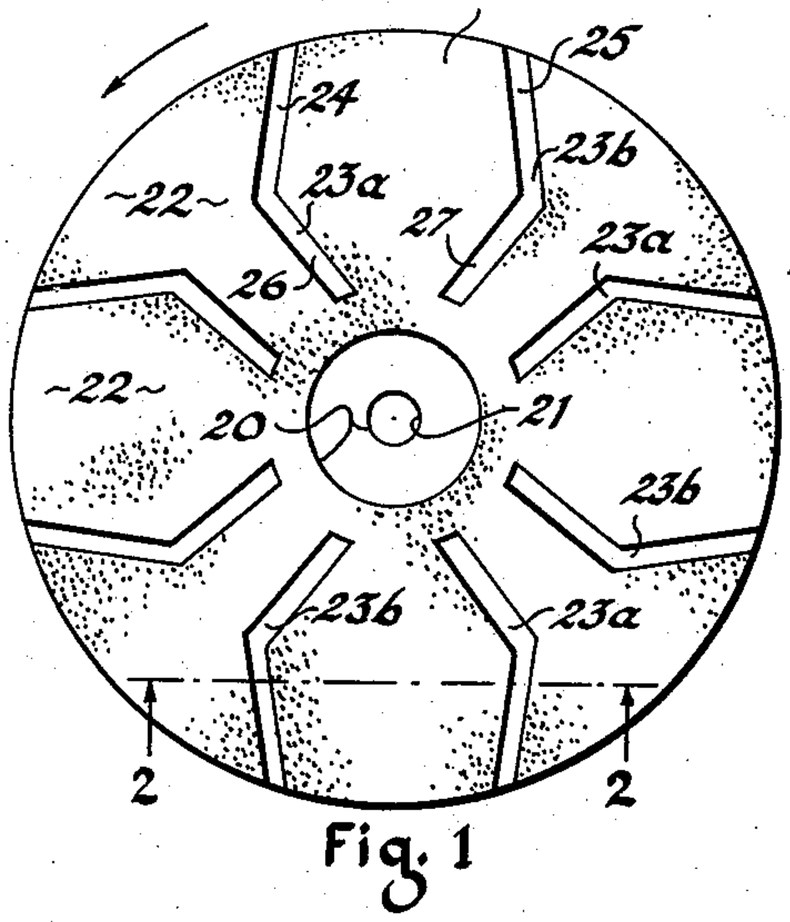

Fig. 1

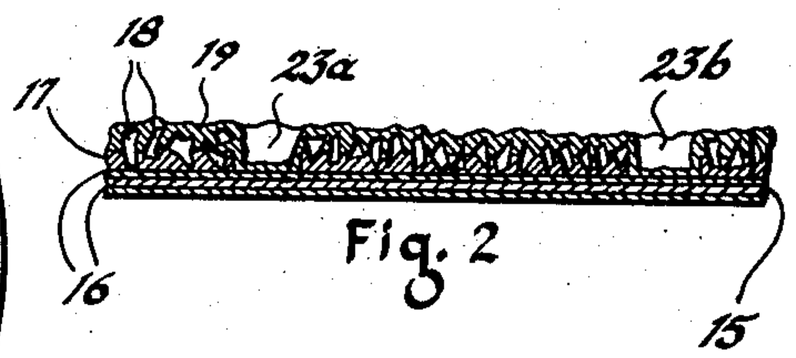

Fig. 2

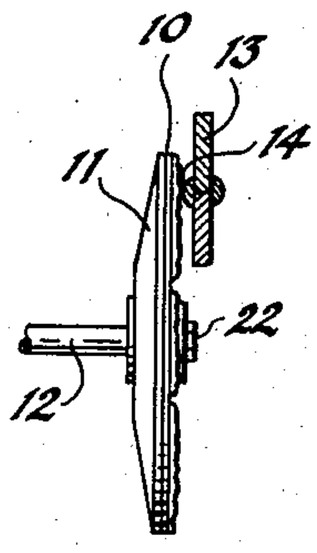

Fig. 3

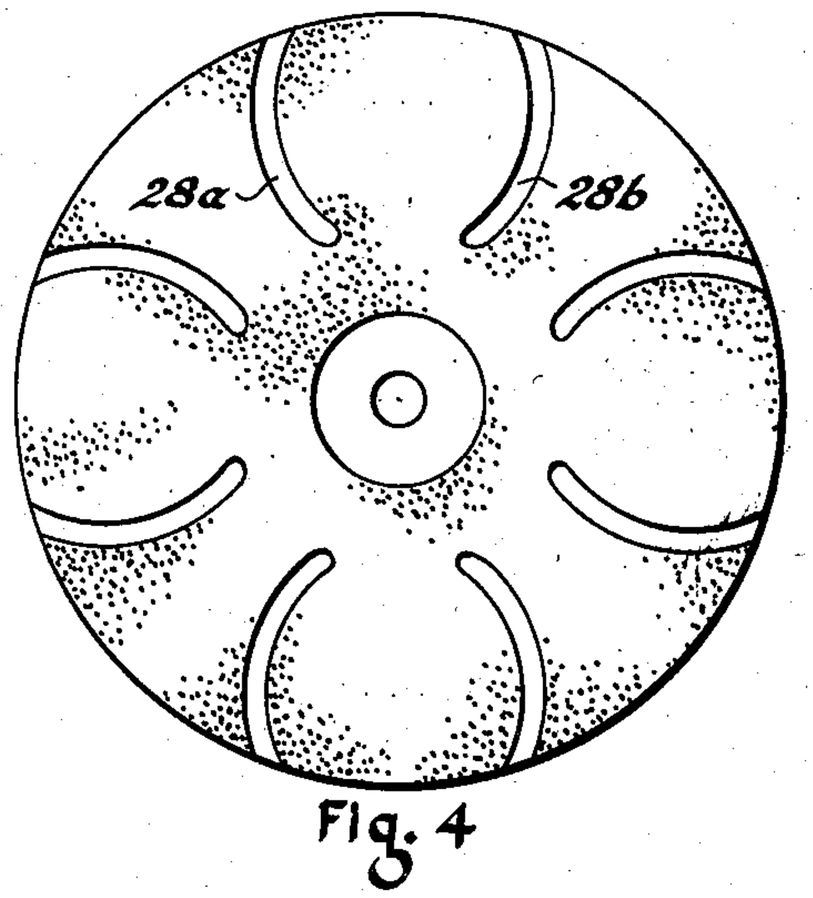

Fig. 4

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GRINDING DISK

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1 Claim. (Cl. 51—195)

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This invention relates to improvements in grinding disks and more particularly to a pattern formed in the grinding area.

One of the objects of the present invention is to provide a tough flexible grinding disk generally circular in form having a smooth central area where the disk is secured to a backing plate and having smooth non-abrasive paths extending generally radially outwardly through the grinding area of the disk, these smooth paths bending alternately clockwise and counterclockwise around the disk, so that when the disk is rotated and applied to a piece of work, the edges of said smooth paths provide draw cuts to the work alternately radially inwardly and radially outwardly.

Other objects and advantages of my invention will be apparent from the accompanying drawings and description and the essential features thereof will be set forth in the appended claim.

In the drawings,

Fig. 1 is a top plan view of a grinding disk embodying my invention;

Fig. 2 is a fragmental sectional view greatly enlarged taken along the line 2—2 of Fig. 1;

Fig. 3 is a small side elevational view of a grinding disk mounted upon a backing plate and applied to a piece of work, while

Fig. 4 is a top plan view of a grinding disk similar to Fig. 1 but showing a slightly different pattern of the smooth paths extending through the grinding area.

Grinding disks of the type here described are usually about seven or nine inches in diameter and these disks are often used on yieldable supporting pads mounted on a rigid backing member or the disks may be mounted directly upon a flexible backing plate so that the abrasive disk may yield somewhat as it is applied to the work. A common manner of mounting these disks is shown in Fig. 3 where a grinding disk 10 is mounted upon a backing plate 11 which in turn is rotatable with a shaft 12 by which the grinding disk is applied to the work, here indicated at 13 as being two plates welded together and the grinding disk is utilized to smooth away the weld 14 prior to applying a finish to the smooth surface. Other uses of grinding disks of the kind here shown are well known and require no further amplification.

The structure of the disk itself may vary greatly within the scope of my invention. I have chosen to illustrate here a grinding disk like that disclosed and claimed in the copending application of Aaron J. Teller, Serial No. 270,163, filed

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February 6, 1952, for Grinding Disk Construction. Referring to Fig. 2, the above-mentioned patent application describes a tough flexible backing sheet 15 of fiber board or the like approximately $\frac{1}{32}$ inch thick. To this backing sheet is applied a base coat 16 by dipping or the like. On top of this base coat there is provided a making coat 17 of polymerized furan processed according to the above-mentioned Teller patent application so as to give a tough but yielding base in which the abrasive particles 18 are held. The abrasive particles may be any suitable material but I prefer aluminum oxide or silicon carbide or sharp particles of steel. A No. 24 grit of aluminum oxide gives very good results. Over the making coat 17 and the abrasive particles 18 there is formed a cover coat 19 which may also be of polymerized furan so treated that it is slightly more brittle than the coat 17 but is highly resistive to the temperatures generated during a grinding operation.

My invention does not consist in the particular nature of the abrasive coating applied to the backing sheet but rather to the pattern formed by the abrasive material thereon.

Referring to Fig. 1, the abrasive disk 10 has a smooth central area 20, in the center of which there may be provided an opening 21 for securing the disk to the backing plate as by means of the bolt 22′ as shown in Fig. 3. Outside of the central area 20 is the grinding area 22. Through this grinding area I provide smooth non-abrasive paths 23*a* and 23*b* extending generally radially outwardly through the grinding area but bending somewhat out of the radial path as shown in Fig. 1. The path 23*a* bends clockwise, then the path 23*b* bends counterclockwise and so on alternately around the disk. A simple way of providing these paths is to form the making coat 17 in the pattern of Fig. 1 on top of the base coat 16 leaving the paths 23*a* and 23*b* free of the making coat 17. Then when the abrasive particles 18 are sprinkled upon the disk, they adhere only to the areas between the smooth paths 23*a* and 23*b*.

It results from the construction shown in Figs. 1 and 2 that when the disk 10 is rotated and applied to a piece of work, the generally parallel edges of the path 23*a* apply draw cuts to the work. The outer portion of the path 23*a* indicated at 24, will provide a draw cut generally radially outwardly when the disk 10 is rotating in the direction of the arrow shown in Fig. 1. The next following edges 25 of the outermost portion of the path 23*b* will provide draw cuts radially inwardly. This is repeated alternately

around the periphery of the disk. On the other hand, the inner portion **26** of the path **23***a* will have edges providing draw cuts radially inwardly while the following edges in the portion **27** of the path **23***b* will provide draw cuts extending radially outwardly. I find that this application of draw cuts alternately radially inwardly and radially outwardly around the entire disk gives a pattern of crisscrossing scratches of very fine character which results in a very smooth piece of work.

In the modification of Fig. 4 everything is exactly like that described in connection with Fig. 1 except that here the paths **28***a* and **28***b* are smooth curves rather than angularly related as in Fig. 1. It will be noted that draw cuts alternately radially inwardly and radially outwardly around the disk will be provided as the disk is applied to the work.

It will be noted that in both forms of my invention as shown in Fig. 1 and Fig. 4, the smooth paths **23***a*, **23***b* and **28***a*, **28***b* provide channels through which air is thrown centrifugally outwardly during the rotation of the disk **10**. This results in a cooling action upon the abrasive disk and at the same time keeps the smooth paths **23***a*, **23***b*, **28***a* and **28***b* clear of abrasive particles or portions freed from the work by the abrasive particles. Since the smooth paths are open at the periphery of the disk, the air has free escape from the edges of the disk and any particles collecting

in the smooth paths are easily thrown outwardly and cleared from the disk at the peripheral edge thereof.

What I claim is:

An abrasive disk comprising a tough flexible backing sheet of circular form, there being a smooth central area surrounded by a grinding area, said grinding area comprising abrasive particles bonded to said backing sheet, there being smooth non-abrasive paths extending outwardly through said grinding area from a zone within said grinding area spaced outwardly from said smooth central area to the periphery of said disk, said smooth paths bending alternately clockwise and counterclockwise around said disk, whereby, when said disk is rotated and applied to a piece of work, the edges of said smooth paths provide draw cuts to the work alternately radially inwardly and radially outwardly.

PAUL K. FULLER.

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