

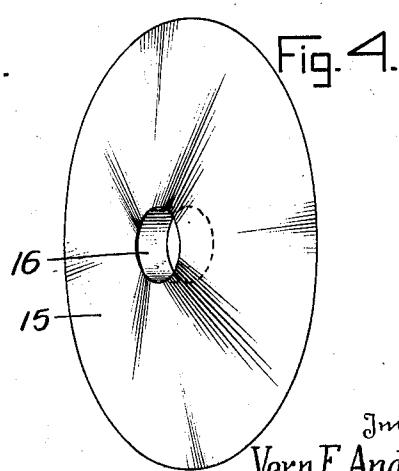
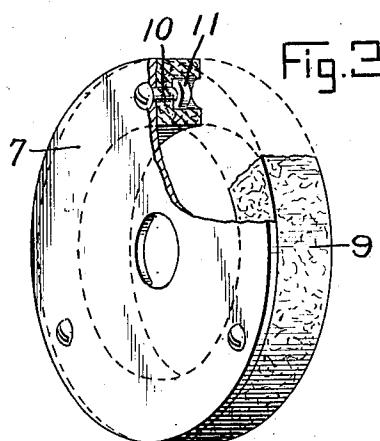
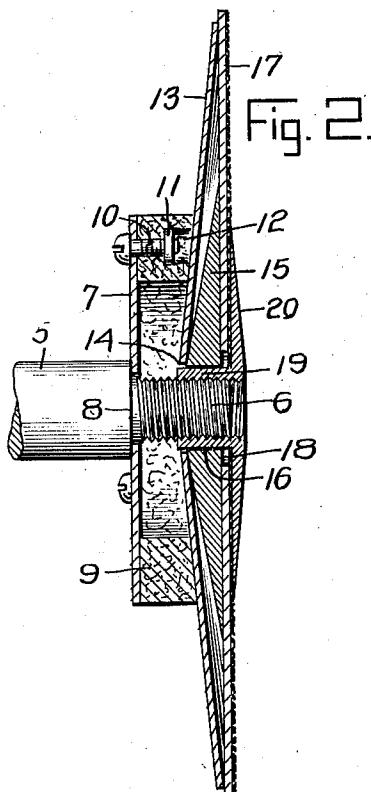
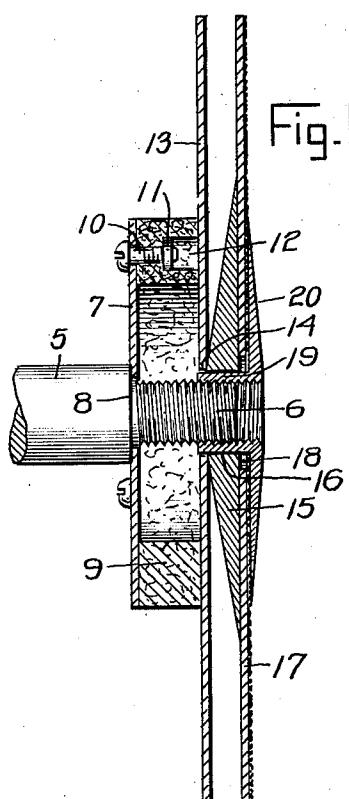
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2,104,147

## GRINDING APPARATUS

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## GRINDING APPARATUS

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8 Claims. (Cl. 51—197)

This invention relates to grinding apparatus and is particularly directed to supporting means for flexible abrasive disks now commonly employed with portable grinding or surfacing machines.

In practice, it is found that when the abrasive disks of these machines are applied to the surface of the work with any amount of pressure, the disks frequently break or their peripheral edges curl, so as to render the disks ineffective in performing their work in a comparatively short time.

It is an object of the present invention to provide supporting means for the abrasive disk which will prevent breaking or curling of the peripheral edges of the disk when the disk is pressed against the work, thus materially increasing the life of the disks.

A further object of the invention resides in providing supporting means for abrasive disks which will not interfere with the edge of the disk being flexed to grind concave surfaces or enter corners such as encountered in surfacing automobile bodies.

A still further object resides in providing a support for flexible abrasive disks and means for adjusting said support with respect to said disk upon clamping the disk on the shaft of the machine.

Another object of the invention is to provide a device of the above mentioned character which is simple and durable in construction, reliable and efficient in operation, and inexpensive to manufacture.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawing, forming a part of this specification and in which like numerals are employed to designate like parts throughout the same.

Figure 1 is a sectional view of an abrasive disk, showing the relative positions of the support and disk before clamping the disk in operative position.

Figure 2 is a similar view showing the relative positions of the support and disk when the disk is clamped in operative position.

Figure 3 is a perspective view, partly in section, of the hub plate and felt ring, and

Figure 4 is a perspective view of the spacing collar for adjusting the support into operative engagement with the disk.

In the drawing, wherein for the purpose of illustration I have shown a preferred embodiment of my invention, the numeral 5 denotes the shaft of a portable grinding machine which is driven

by a suitable electric motor, not shown. The end of the shaft 5 is provided with a reduced threaded extension 6 and loosely mounted on the extension is a circular metal hub plate 7 which rests against the shoulder 8 between the shaft 5 and its extension 6. A backing ring preferably formed of felt 9 is attached to the outer face of the hub plate 7 by means of bolts 10 which pass through the plate and ring, the nuts 11 of the bolts being disposed in the recesses 12 formed in the ring. A supporting disk 13, constructed of fibre or other suitable flexible material is provided with a central opening 14 to permit the disk to be fitted on the extension 6, against the outer face of the ring 9. The diameter of the disk 13 is relatively greater than the diameter of the felt ring, and the inner diameter of the ring is relatively greater than the diameter of the opening 14, so that when pressure is applied to the center of the disk 13, by the conical-shaped fibre spacing disk 15, which has a central opening 16 to fit over the extension 6, the disk 13 becomes cupped and assumes the shape of a truncated cone, so that its peripheral edge engages and supports the extreme outer marginal edge of the flexible abrasive disk 17 which has a diameter corresponding to that of the supporting disk. The abrasive disk 17 is clamped against the flat face of the spacing disk 15 and has a central opening 18 to receive the tubular extension 19 of the clamping plate 20 which is threaded on the extension 6 and passes through the openings 16 and 14 of the spacing disk and supporting disk. Upon tightening of the clamping plate, the disks 17, 15, and 13 are moved inwardly, until the disk 13 contacts with the felt ring 9, whereupon the conical face of the disk 15 depresses the central portion of the disk 13 within the center of the ring 9 which causes the outer periphery of the disk 13 to engage and support the disk 17 adjacent its marginal edge.

In operation, it will be seen that the supporting disk 13 while reinforcing the outer edge of the abrasive disk to prevent curling or breaking of the edges, does not materially interfere with the flexibility of the abrasive disk. As the edge of the abrasive disk wears away, the edge of the supporting disk will also wear away but will remain in contact with and support the edge of the abrasive disk due to the pressure exerted by the spacing disk 15 on the center of the supporting disk. It is found that the supporting disks not only prevent breaking or curling of the edges of the abrasive disk, but also permit the abrasive disk to be used for a longer period of time before

it is necessary to replace the disk with a new one. When the abrasive disk is replaced, a new supporting disk is also applied, but the spacing disk 15 may be used for a considerable length of time.

5 It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that certain changes in the shape, size, and arrangement of the parts may be made without 10 parting from the spirit of the invention or scope of the appended claims.

What is claimed is:

15 1. An article of the class described comprising an abrasive disk, a flexible supporting disk and means for flexing said supporting disk whereby its peripheral edge only is held in contacting relation with the marginal edge portion of the abrasive disk.

20 2. An article of the class described comprising a revolvable shaft, a hub plate disposed on said shaft, a ring carried by said plate, a supporting disk mounted on said shaft and bearing against said ring, a spacing disk mounted on said shaft having a conical face in engagement with said 25 supporting disk, an abrasive disk mounted on said shaft and means for clamping said disks on said shaft.

30 3. An article of the class described comprising a revolvable shaft, a pair of flexible disks mounted on said shaft, the outer disk having an abrasive surface, a spacing disk disposed between said flexible disks having a conical face confronting the inner disk, a ring in engagement with the outer face of said inner disk, and means for 35 clamping said disks on said shaft and against said ring whereby the peripheral edge of the inner disk is caused to engage and support said outer disk.

40 4. An article of the class described comprising a revolvable shaft, an abrasive disk disposed on said shaft, a supporting disk adjacent said abrasive disk, a spacing disk disposed between said abrasive and supporting disks having a conical face in engagement with one face of the supporting disk, and a ring in engagement with the 45 opposite face of said supporting disk for flexing the supporting disk when pressed tightly against the ring by the spacing disk whereby the periph-

eral edge of the supporting disk is moved into contact with the marginal edge of said abrasive disk.

5 5. An article of the class described comprising a revolvable shaft, a hub plate disposed against a shoulder on said shaft, a felt ring attached to said plate adjacent its marginal edge, an abrasive disk, a flexible supporting disk for said abrasive disk adapted to bear against said ring, a spacing disk disposed between said abrasive and supporting disks having a conical face bearing against the center of said supporting disk and within the inner circumference of said ring, and means for clamping said disks on said shaft whereby the supporting disk is flexed to cause its 10 peripheral edge to engage and support the marginal edge of said abrasive disk.

6. A support for flexible disks comprising a flexible supporting disk, a backing ring engaged with the outer face of said supporting disk, a 20 spacing disk disposed intermediate the supporting disk and abrasive disk, said spacing disk having a conical face engaged with the inner face of said supporting disk and adapted to flex said supporting disk to cause its peripheral edge to 25 engage and support the marginal edge of the abrasive disk.

7. A grinding device comprising a rotatable shaft, an abrasive disk connected to the shaft, a supporting disk spaced from the abrasive disk 30 and connected to the shaft, a backing ring connected to the shaft and engaging the supporting disk, and means between said disks adapted to co-operate with said backing ring whereby to cup the supporting disk and bring its marginal edge 35 into engagement with the marginal edge of the abrasive disk.

8. An article of the class described comprising a rotatable shaft, an abrasive disk, a flexible supporting disk, means including parts disposed 40 at opposite sides of the supporting disk for cupping said supporting disk to cause its peripheral edge to engage the marginal edge portion of the abrasive disk, and means for securing said disks and cupping means to the shaft and for operating said cupping means.

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