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## SUPPORTING HEAD FOR ABRASIVE DISKS

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**FIG. 1.**

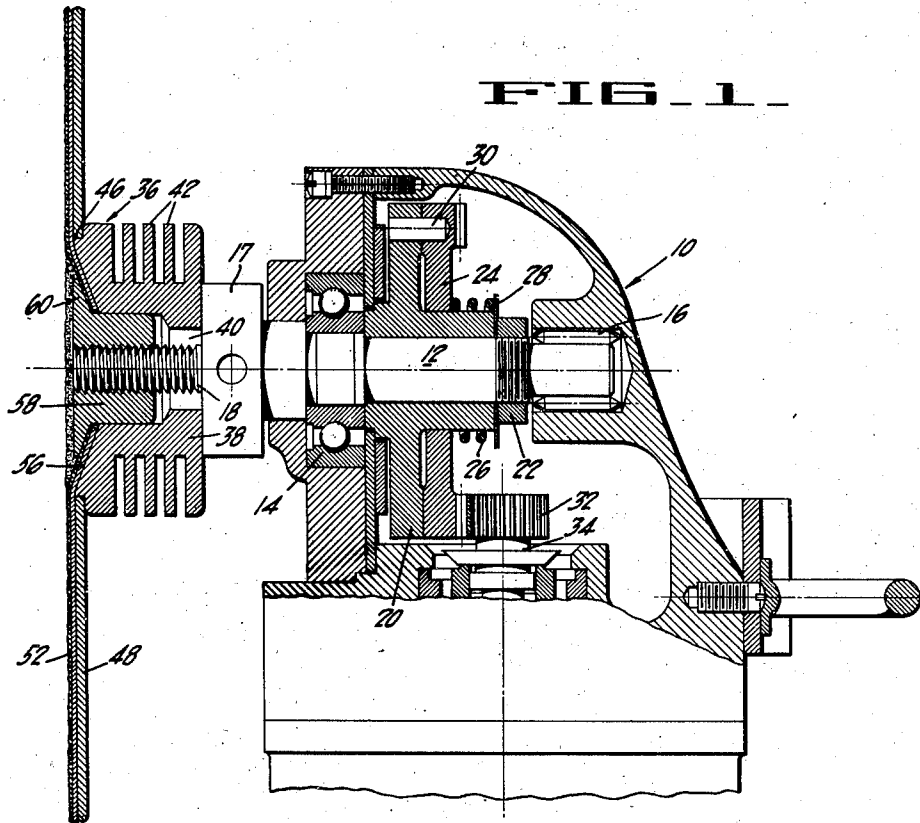
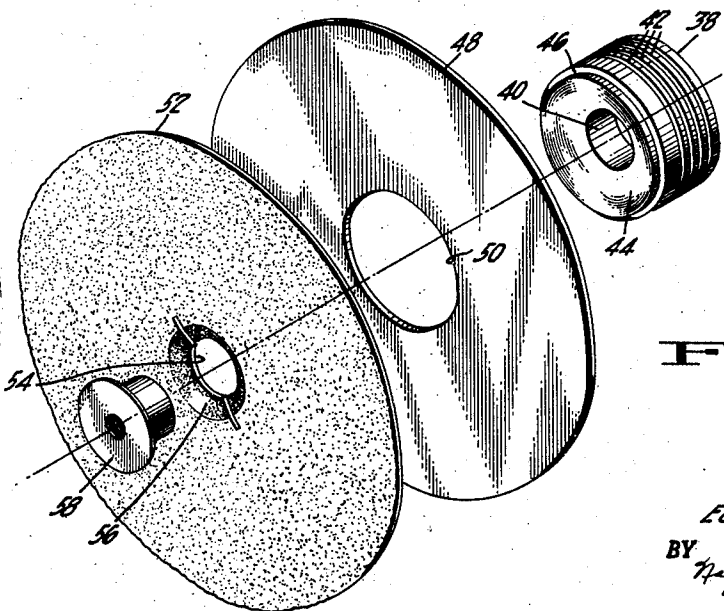


**FIG. 2.**



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## SUPPORTING HEAD FOR ABRASIVE DISKS

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10 Claims. (Cl. 51-197)

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This invention relates to abrasive disk grinders of the hand operated type, and more particularly to a supporting head for abrasive disks.

Due to their relatively high degree of flexibility, abrasive disks are associated with a separate backing plate so that the requisite support is provided for the disk. Both disk and plate are conventionally seated on a supporting head and secured for rotation therewith to prevent relative movement of the disk and plate during a grinding operation.

When the rotating disk and plate combination is snagged on the work, as frequently occurs, the abrasive disk, being rather easily tearable, may have a portion ripped therefrom, but the backing plate, secured for rotation with the disk and being of a relatively tough material, such as moulded and impregnated fiber, will not ordinarily tear when snagged. Consequently, a snagging of a backing plate often results in a wrenching of the grinder from the hands of the operator with attendant injuries to the operator in the event that he is struck by the whirling disk.

The instant invention has for its primary object the provision of a supporting head for a grinder whereby the abrasive disk and backing plate are relatively rotatable.

This and other objects of the invention are preferably achieved by providing a supporting head having a backing plate seated thereon so as to be in slight frictional engagement with the abrasive disk and the supporting head, said engagement being sufficient to cause the backing plate to rotate with the disk during normal operation of the grinder. The snagging of the backing plate is, however, effective to stop the rotation of said plate while allowing the normal rotation of the abrasive disk and supporting head. Thus, the aforescribed wrenching of the grinder from the operator's hands due to the snagging of the backing plate is obviated.

Other objects and advantages of the invention will be apparent from the following description when taken in conjunction with the drawing forming part of this specification, and in which:

Figure 1 is a view in section through the gear case of a hand grinder embodying the supporting head of the invention; and

Figure 2 is an exploded view in perspective of the supporting head and an abrasive disk and backing plate.

Referring to the drawing for more specific details of the invention, 10 indicates generally a gear case of a hand grinder, said case having a tool spindle 12 journaled for rotation in bearings

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14 and 16. The spindle 12 is provided exteriorly of the gear case with a boss 17 and a threaded end portion 18, and interiorly of the gear case there is keyed to the spindle a gear carrier 20 held against the bearing 14 by a lock nut 22. A face gear 24 is held against the gear carrier 22 by a spring 26 abutting a spring retainer 28, and said gear is locked for rotation with the gear carrier 22 by a drive pin 30. The face gear 24 is in mesh with a pinion gear 32 keyed to a shaft 34 adapted to be driven by a motor armature, not shown. It is apparent that the rotation of the motor armature is effective to drive the spindle 12 through the medium of shaft 34, pinion gear 32, face gear 24, and gear carrier 20 secured to the spindle 12.

The above described grinder structure is conventional, and is included for the purpose of illustrating the relative proximity of the grinder gear system to the supporting head, hereinafter described.

A supporting head, indicated generally at 36, is comprised of a cylindrical hub 38 having a double diametral bore 40 therethrough, said hub being provided with a plurality of fins 42, a concave face 44, and a peripheral shoulder 46 adjacent said face. A backing plate 48 having a central opening 50 is supported on the shoulder 46, and an abrasive disk 52 having a central opening 54 and an annular inclined portion 56 overlies the backing plate with the portion 56 of the disk in abutting relation to the concave face 44 of the hub 38. The hub 38 is secured on the spindle 12 in engagement with the boss 17 by a centering plug 58 fitting into the larger diametral portion of the bore 40 and threadably engaged with the end portion 19 of the spindle. The plug 58 has a flange 60 having an angularly inclined underside in pressing engagement with the portion 56 of the disk 52 to secure the disk against relative movement with respect to the head 36.

When the spindle 12 is driven to rotate the supporting head 36 and the abrasive disk secured thereto, the backing plate is normally rotated by a slight frictional engagement between the plate and the disk 52 and hub 38. However, the rotation of the backing plate may be prevented by the application of a slight holding force to the plate without affecting the rotation of the disk 52 and head 36. The plate 48 may, therefore, be snagged with no danger of causing a wrenching of the grinder from the hands of the operator.

During the operation of the grinder, the pinion gear 32, face gear 24 and gear carrier 20 become heated, and the proximity of these driving ele-

ments in the gear case 10 to the supporting head 36 allows for a ready transfer of heat to the spindle 12 and a consequent rise in the temperature of the supporting head. An appreciable rise in temperature of the head 36, which would occur after extended operation of the grinder, would normally be sufficient to enhance the frictional engagement between the backing plate 48 and the head 36 and disk 52, due to a slight expansion of the head 36 and that portion of the backing plate in engagement with the head 36 and disk 52, to a point where a holding force applied to the plate would not be effective to stop the rotation of the plate.

In order to insure that slippage between the backing plate and the abrasive disk will obtain in the event that a holding force is applied to the plate, the fins 42 are provided in the head 36 to dissipate heat therefrom. Thus, the fins 42 coact with the shoulder 46 of the head 36 to provide for relative rotation between the abrasive disk and the backing plate.

The supporting head 36 is preferably made of aluminum for lightness, and it is to be pointed out that the provision of the fins 42 materially reduces the weight of the head, thereby decreasing the effort on the part of the operator in manipulating the grinder.

While the preferred embodiment of the invention has been shown and described, it is understood that the embodiment is subject to modification within the spirit of the invention and the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a grinder device having a spindle, power means to rotate said spindle, a hub secured to the spindle for rotation therewith, an abrasive disk secured to the hub for rotation therewith, and a backing plate mounted on said hub in juxtaposition to said disk, the improvement comprising means embodied in the hub adapted to seat said backing plate for free slippage with respect to said hub.

2. In a grinder device having a spindle, power means to rotate said spindle, a hub secured to the spindle for rotation therewith, an abrasive disk secured to the hub for rotation therewith, and a backing plate mounted on said hub in juxtaposition to said disk, the improvement comprising means formed in the face of said hub adapted to seat said backing plate in engagement with said abrasive disk for free rotary slippage with respect to said hub and the disk upon the application of a holding force to said plate.

3. In a grinder device having a spindle, power means to rotate said spindle, a hub secured to the spindle for rotation therewith, an abrasive disk secured to the hub for rotation therewith, and a backing plate mounted on said hub in juxtaposition to said disk, the improvement comprising means forming an annular seat in the face of said hub for mounting the backing plate thereon in juxtaposition to said disk for free rotation with said disk and for non-rotation therewith upon the application of a holding force to said plate, and heat dissipating means formed in said hub to dissipate heat received from the spindle and prevent plate-gripping expansion of said hub.

4. In a grinder device having a spindle, power means to rotate said spindle, a hub secured to the spindle for rotation therewith, an abrasive disk secured to the hub for rotation therewith, and a backing plate mounted on said hub in juxtaposition to said disk, the improvement comprising an

annular seat formed in the face of said hub outwardly of that portion of the abrasive disk secured to the hub adapted to receive the backing plate and maintain said plate in juxtaposition to said disk for free rotation therewith and for non-rotation therewith upon the application of a holding force to said plate, and a plurality of cooling fins in said hub to dissipate heat received from the spindle and prevent plate-gripping expansion of said hub.

5. A grinder device supporting head comprising a cylindrical hub having a centrally disposed passage therein, a centering plug receivable within said passage and securable to the grinder spindle, a flange on said plug to secure an abrasive disk to the end surface of the hub, and an annular shoulder inset from said end surface of the hub to freely mount a backing plate thereon.

6. A grinder device supporting head comprising a cylindrical hub having a centrally disposed passage therein, a centering plug receivable within said passage and securable to the grinder spindle, a flange on said plug to secure an abrasive disk to the end surface of the hub, an annular shoulder inset from said end surface of the hub to freely mount a backing plate thereon, and a plurality of cooling fins carried by said head to cool the said head to prevent plate-gripping expansion thereof due to heat received from said spindle, whereby the free mounting of the backing plate may be maintained.

7. A grinder device supporting head comprising a cylindrical hub having a concave end surface and a centrally disposed passage there-through, a centering plug receivable within said passage and securable to the grinder spindle, a flange on said plug having an under surface complementary to the concave end surface of the hub, said flange being adapted to secure an abrasive disk to said end surface of the hub, and an annular shoulder on said hub inset from the outer edge of said end surface, said shoulder being adapted to freely mount a backing plate thereon in non-gripping engagement with said hub whereby said plate may be turned or rotated while the hub is stationary.

8. A grinder device supporting head comprising a cylindrical hub having a concave end surface and a centrally disposed passage there-through, a centering plug receivable within said passage and securable to the grinder spindle, a flange on said plug having an under surface complementary to the concave end surface of the hub, said flange being adapted to secure an abrasive disk to said end surface of the hub, an annular shoulder on said hub inset from the outer edge of said end surface, said shoulder being adapted to freely mount a backing plate thereon, in non-gripping engagement with said hub whereby said plate is capable of relative rotation with respect to said hub and a plurality of spaced cooling fins on said hub to dissipate heat therefrom received from said spindle to maintain the backing plate relatively rotatable with respect to the hub and disk by preventing plate-gripping expansion of said hub.

9. A grinder device supporting head comprising a hub having an axially disposed passage there-through, a centering plug receivable within said passage and securable to a grinder spindle, a flange on said plug to secure an abrasive disk to the end surface of the hub, and an annular shoulder inset from said end surface and located fully outwardly of said plug flange for the free

mounting of a backing plate thereon in juxtaposition to said disk.

10. A grinder device supporting head comprising a hub having an axially disposed passage therethrough, a centering plug receivable within said passage and securable to the reduced diametrical end portion of a rotatable grinder spindle, said plug having a peripheral flange adapted to clamp an abrasive disk to the forward end surface of the hub and to clamp the rearward end surface of the hub in pressing engagement with a shoulder on said spindle upon the securing of said plug to said spindle to prevent relative movement between the hub, disk and spindle elements, and an annular shoulder inset from the forward end surface of said hub and located outwardly of said plug flange, said shoulder being adapted to freely seat a backing plate thereon in juxtaposition to the disk so

that said backing plate may be stopped against rotation during rotation of said hub and disk.

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