

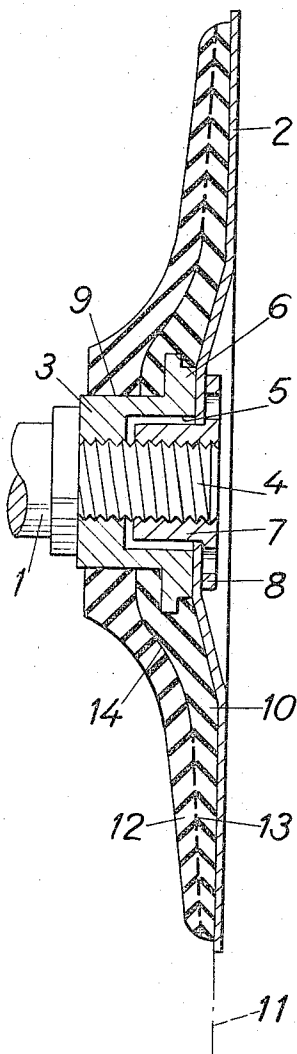
April 25, 1967

K. ÅKE MOBERG

3,315,420

HOLDER FOR ABRASIVE DISKS

Filed Nov. 17, 1964



INVENTOR
Karl Åke Moberg
BY
Eric J. Drunson
Attorney

1

3,315,420

HOLDER FOR ABRASIVE DISKS

Karl Åke Moberg, Trollbacken, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden, a corporation of Sweden

Filed Nov. 17, 1964, Ser. No. 411,841
7 Claims. (Cl. 51—378)

This invention relates generally to holders for abrasive and polishing disks used in surfacing machines and more specifically to the type of such holders in which a resilient annular backing pad incorporates a central recess for a usually metallic locking member by which the abrasive disk is fastened to the holder while supported by the backing pad. Because of the frusto-conical or bell shaped central portion forming the recess in the holder, the rapidly rotating pad tends to straighten out under centrifugal action whereby the locking member is exposed and can damage the surface during the work.

It is an object of the invention to provide a novel holder for abrasive disks in which the tendency of the resilient backing pad to straighten out under centrifugal action is effectively suppressed. A further object of the invention is to provide a holder for abrasive disk with a resilient backing pad having a plane outer rim and a recessed intermediate portion in which the tendency of the disk locking nut to loosen during work is eliminated.

For these and other purposes there is provided a holder for an abrasive disk comprising a rotatable drive shaft, a first layer of resilient material having an annular rim portion coaxial with said shaft and disposed in a plane perpendicular thereto, said first layer having a central recess therein facing said plane, a second resilient layer fixed to the surface of the first layer opposite said plane, means for non-rotatably connecting the central portions of said layers to said shaft, a locking nut cooperating with the outer end of said shaft and disposed within said recess, said locking nut having means thereon for fixedly locking an abrasive disk against rotation relative to said shaft while said disk is supported by said first layer, and said second layer being formed of a material having greater capacity to stretch under centrifugal action than said first layer so that centrifugal displacement of said first layer tending to diminish said recess thereof is counteracted by centrifugal stretching of said second layer.

The above and other purposes of the invention will become obvious from the following description and from the accompanying drawing in which a preferred embodiment of the holder according to the invention is illustrated by way of example. It should be understood that this embodiment is only illustrative of the invention and that various modifications may be made within the scope of the claims without departing from the scope of the invention.

The drawing is a cross sectional view taken through the axis of rotation of the holder with an abrasive disk locked thereto.

In the drawing, 1 indicates the drive shaft of a surfacing machine and 2 is the abrasive disk.

The shaft 1 has connected thereto a hub 3, said hub in the drawing being chosen as being screw threaded to the shaft, the end 4 of the shaft projecting beyond the hub 3. At the outer end of the hub 3 is provided a counter-bore 5 and a laterally projecting flange 6. The inner rim of the abrasive disk 2 rests against the flange 6 and is pressed firmly thereagainst by an outer flange 8 on a locking nut 7 threadedly connected to the end 4. The flange 8 is as usual provided with suitable openings by which torque can be applied to the locking nut 7.

A first resilient annular layer 10 of wide open bell shape and preferably consisting of natural rubber, is vul-

2

canized at its inner central portion to the outer surface of the flange 6 and also to a portion of the outer surface 9 of the hub 3. The outer annular portion of the first layer 10 is disposed in a plane, indicated at 11, perpendicular to the shaft 1. This first layer 10 forms the direct support for the abrasive disk 2 extending laterally from the flange 6 to the plane 11 which is spaced axially from the flange 6. Because of the bell shape of the layer 10 the flange 8 of the nut 7 and the end 4 of the shaft 1 are both disposed in the recess between on the one hand the plane 11 and on the other hand the flange 6 and the portions of the layer 10 therearound.

A second annular resilient layer 12 also having a wide open bell shape and preferably consisting of natural rubber is vulcanized to the remaining portion of the outer surface 9 of the hub 3 and to the rear surface of the first layer opposite to the plane 11. A woven reinforcing annulus 13 is vulcanized into the boundary between the layers 10, 12 rearwardly of the flat portion of the layer 10.

The rubber chosen for layer 10 has a Shore durometer hardness 10–20% higher than the rubber forming the second layer 12. Preferably the Shore durometer hardness is 90–95 for the first layer 10 and 80–85 for the second layer 12.

In practice the backing pad formed by the layers 10, 12 during rotation with a speed of say 6000 r.p.m. preserves its bell shape practically unchanged and this is explained by the fact that straightening out of the layer 10 due to centrifugal action is counteracted by centrifugal stretching of the more resilient second layer 12. Furthermore it has been discovered in practice that the reaction of the composite backing pad 10, 12 to deformation during work is active to tighten the nut via the inner rim of the disk 2 which adds to the security in handling the holder. This tightening action is also due to the frictional surface characteristics resulting from choosing a hard rubber quality for the layer 10. It has also been observed that when one uses a rubber layer 10 of low Shore hardness for the backing pad, the disk in contrast hereto tends to loosen the nut. Thanks to the stability of the bell shape during work the nut 8 within the recess inside the bell is hindered from denting the work.

What I claim is:

1. A holder for an abrasive disk comprising a rotatable drive shaft, a hub connected to said shaft for rotation therewith, a first annular layer of rubber vulcanized to said hub and extending laterally therefrom to form an annular backing surface with the outer portion thereof coaxial with said shaft and disposed in a plane perpendicular thereto but spaced axially from one end of said hub, a second annular layer of rubber vulcanized to said hub and to the surface of the first layer opposite said plane, said first layer having a Shore hardness substantially higher than the said second layer whereby centrifugal displacement of said first layer in a direction to decrease the space between said plane and said hub is counteracted by centrifugal stretching of said second layer, and locking means disposed in the space between said plane and said hub for locking an abrasive disk against said hub while said disk is supported by said backing surface.

2. A holder as set forth in claim 1 in which the portions of said layers intermediate said hub and said outer portions are substantially bell-shaped.

3. A holder as set forth in claim 1 in which said first layer has a Shore durometer hardness 10–20 percent higher than said second layer.

4. A holder as set forth in claim 1 in which a reinforcing annulus is vulcanized in the boundary between said layers in the portion thereof rearwardly of said backing surface.

3

5. A holder as set forth in claim 1 in which the Shore durometer hardness is 90-95 for said first layer and 80-85 for said second layer.

6. A holder for an abrasive disk comprising a rotatable drive shaft, a first bell-shaped layer of rubber having an annular rim portion coaxial with said shaft and disposed in a plane perpendicular thereto, a second bell-shaped layer of rubber vulcanized to the surface of the first layer opposite said plane, means for non-rotatably connecting the central portions of said bell-shaped layers to said shaft, a locking nut cooperating with the outer end of said shaft and disposed within the space defined by said plane and the inner recess of said first layer, said locking nut having means thereon for fixedly locking an abrasive disk against rotation relative to said shaft while said disk is supported by said first layer, and said first layer having a Shore hardness substantially higher than second layer whereby centrifugal displacement of said first layer tending to diminish said recess thereof is counteracted by centrifugal stretching of said second layer.

7. A holder for an abrasive disk comprising a rotatable drive shaft, a first layer of resilient material having an annular rim portion coaxial with said shaft and disposed

4

in a plane perpendicular thereto, said first layer having a central recess therein facing said plane, a second resilient layer fixed to the surface of the first layer opposite said plane, means for non-rotatably connecting the central portions of said layers to said shaft, a locking nut cooperating with the outer end of said shaft and disposed within said recess, said locking nut having means thereon for fixedly locking an abrasive disk against rotation relative to said shaft while said disk is supported by said first layer, and said second layer being formed of a material having greater capacity to stretch under centrifugal action than said first layer so that centrifugal displacement of said first layer tending to diminish said recess thereof is counteracted by centrifugal stretching of said second layer.

References Cited by the Examiner

UNITED STATES PATENTS

2,800,751	7/1957	Brucker	51-377
2,800,752	7/1957	Short	51-376

ROBERT C. RIORDON, *Primary Examiner.*

DONALD G. KELLY, *Examiner.*