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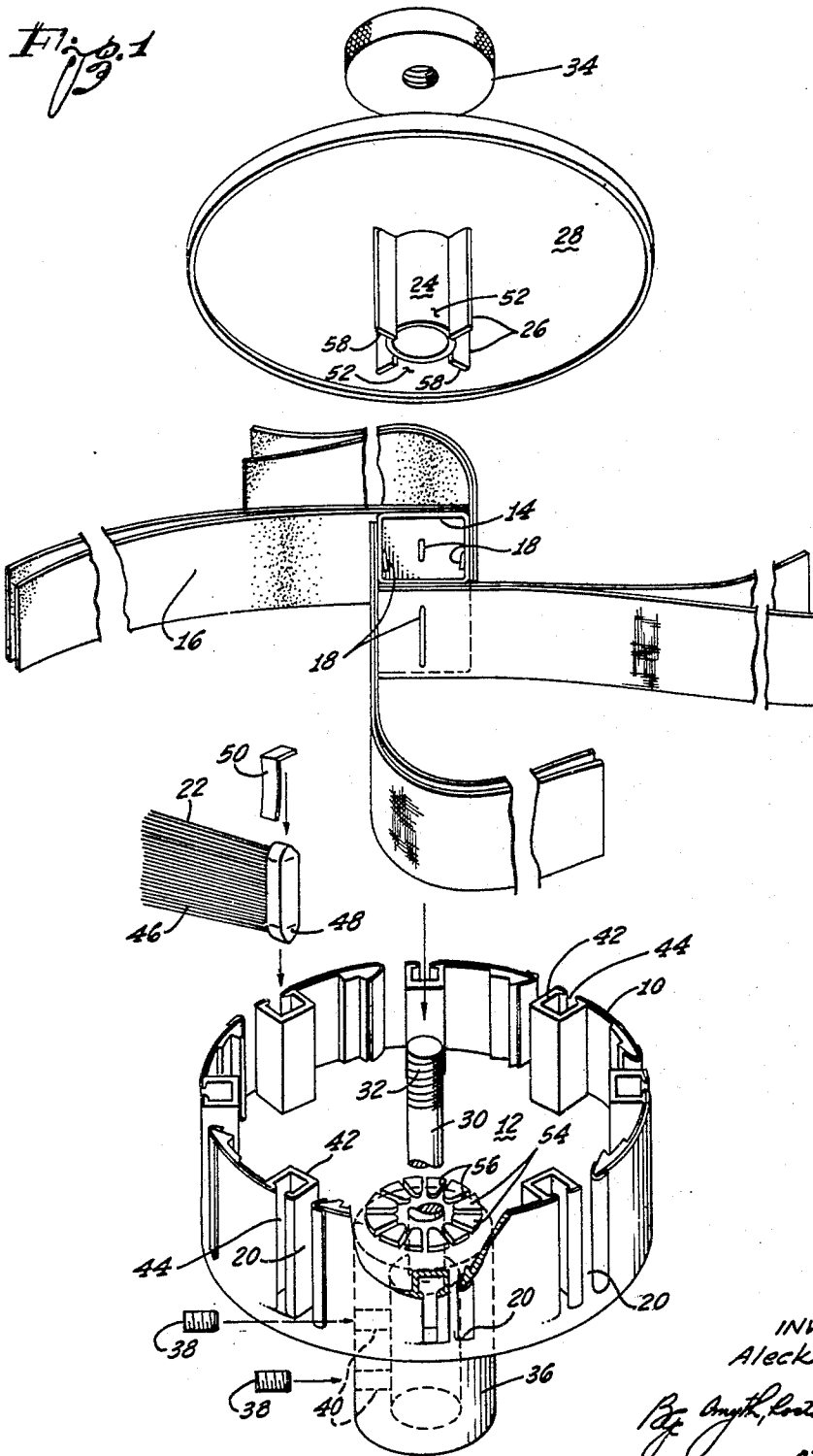
A. BLOCK

3,486,276

ROTARY ABRASIVE DEVICE

Filed Oct. 16, 1967

2 Sheets-Sheet 1



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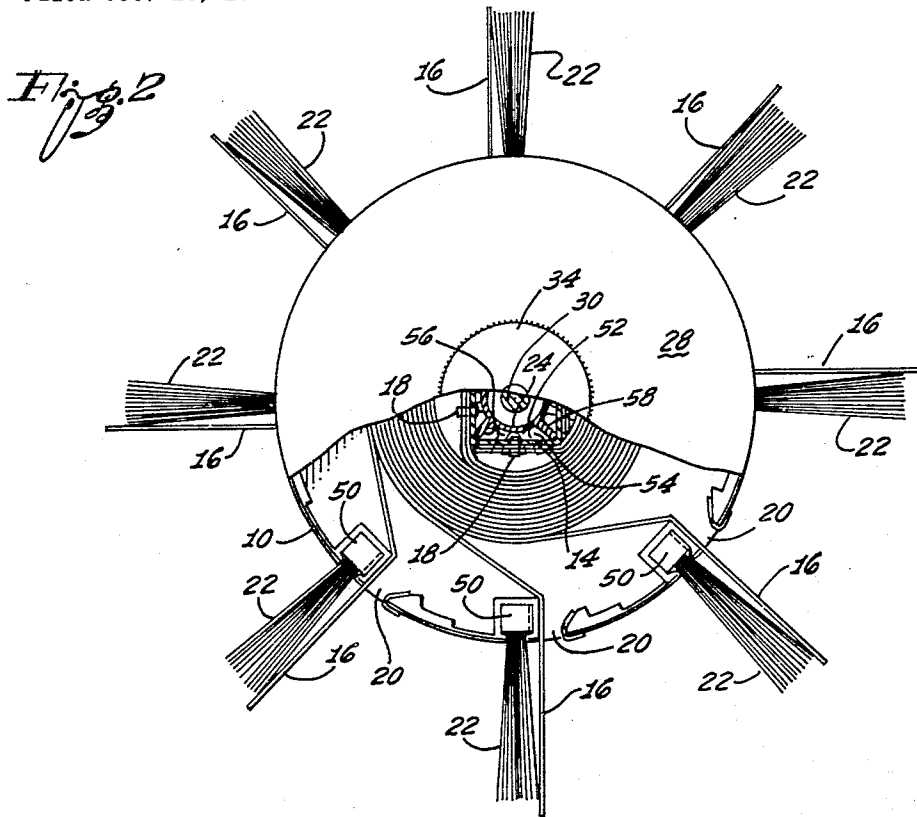
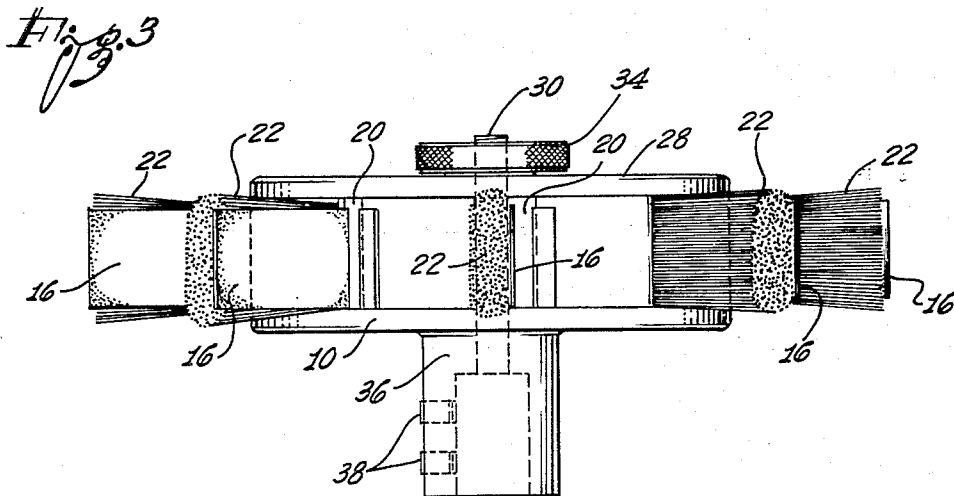
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2 Sheets-Sheet 2



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ROTARY ABRASIVE DEVICE

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8 Claims

ABSTRACT OF THE DISCLOSURE

A rotary abrasive device having a control core which has radially extending lugs which are disposed within an outer rotary housing. A replacement abrasive member includes a reel sleeve having a polygonal configuration with flat sides and having dimensions to receive the lugs extending from the control core within the corners formed by the flat sides. The invention also includes the use of recesses between adjacent lugs and wherein abrasive ribbon members are anchored to the flat sides of the reel sleeves using fastening means and with the fastening means retained within the recessed areas between the lugs. The control core may have four lug members and the reel sleeve may have a square configuration.

This invention relates to a rotary abrasive device and in particular relates to improvements of a rotary abrasive device of the type shown in U.S. Patent No. 3,132,452, issued May 12, 1964, listing Aleck Block as the inventor and assigned to the same assignee as the instant case.

The rotary abrasive device of the present invention has a rotary housing adapted for mounting on a drive shaft and includes eight circumferentially-spaced longitudinal slots through which abrasive ribbons extend. Adjacent the eight slots are corresponding brushes extending radially from the housing to reinforce the abrasive ribbons during rotation of the rotary abrasive device. The brushes are located rearward of the corresponding ribbons with respect to the direction of rotation of the abrasive device.

The abrasive ribbons are wound on a reel sleeve and have the inner ends of the ribbons anchored to the reel sleeve. The extension of the abrasive ribbons from the rotary housing is controlled by an axial control core which fits within the reel sleeve. The control core advances the abrasive ribbon predetermined amounts by index means comprising a series of latch recesses in the housing which are engaged by projecting means at one end of the control core.

One of the major advantages of a rotary abrasive device described above is that the reel sleeve with the abrasive ribbons attached thereto is a replaceable unit which may be readily discarded and replaced when the ribbons are worn out. Therefore, the disposable abrasive unit must be relatively simple in construction so that it is not expensive to replace. The rotary abrasive device described in the Patent No. 3,132,452 referenced above used an octagonal-shaped reel sleeve which cooperated with an octagonal-faced control core. The use of such a combination has resulted in difficulties.

The use of an octagonal-shaped reel sleeve and control core did not completely eliminate slippage between the reel sleeve and control core. Especially with the smaller size rotary abrasive devices, the octagonal shape approximated a cylinder so that the torque exerted at the ends of the abrasive ribbons provided for slippage between the reel sleeve and the control core. In addition, the abrasive ribbons are commonly attached to the reel sleeve using staples. These staples project inwardly against the control core and do not allow for a snug fit between the control core and the reel sleeve. This tends to force the

reel sleeve into a circular configuration, again providing for slippage between the control core and the reel sleeve.

The present invention eliminates these difficulties by using a control core which includes a plurality of radially extending lugs and including a recessed area between adjacent lugs. The reel sleeve has a polygonal configuration with a number of sides corresponding to the number of lugs and wherein the dimensions of the reel sleeve are such that the lugs are received within corners formed by the adjacent sides of the reel sleeve. The fastening means for the abrasive ribbons, in particular the staples, are retained within the recessed areas of the control core. In this manner, the fastening means do not force the reel sleeve into a circular configuration, since the fastening means are retained within the recessed areas. Also, the lug members tend to retain the shape of the reel sleeve since the lug members reinforce the corners of the reel sleeve. In addition, the lug members have a tendency to dig into the corners, thereby providing for a locking of the reel sleeve on the control core during rotation of the rotary abrasive device.

In a preferred embodiment of the invention, the control core includes four equally-spaced lugs and the reel sleeve has a square configuration to fit over these lugs and retain the lugs in the corners of the square configuration. The abrasive ribbons are fastened by stapling to the flat sides of the reel sleeve and, in particular, two abrasive ribbons are stapled to each one of the four flat sides. Therefore, each flat side holds the abrasive ribbons for two of the circumferential slots in the outer rotary housing. Since the fastening means are retained within the recessed area between the lugs, it is possible to use relatively heavy staples to maintain the abrasive ribbons permanently affixed to the reel sleeve.

The present invention, therefore, eliminates the shortcomings of the prior art rotary abrasive device as shown in Patent 3,132,452 without increasing the cost of the rotary abrasive device, since the changes in structure are relatively simple. A clearer understanding of the present invention will be had with reference to the following description and drawings of a particular embodiment of the invention, wherein:

FIGURE 1 is a perspective exploded view of a particular embodiment of the rotary abrasive device of the present invention;

FIGURE 2 is a top view of the rotary abrasive device of FIGURE 1, showing portions broken away; and

FIGURE 3 is a side view of the rotary abrasive device of FIGURE 1.

In FIGURES 1 through 3, the various parts of a particular embodiment of the invention are shown and include a rotary drum or housing having a cylindrical wall 10 which is closed at one end by an end wall 12. A reel sleeve 14 is positioned axially within the housing. Attached to the reel sleeve 14 are a plurality of abrasive ribbons made of a material such as emery paper, sandpaper or the like, and having their inner ends anchored to the reel sleeve through the use of fastening means such as staples 18. As shown in the drawings, a pair of such abrasive ribbons 16 are fastened to each face of the reel sleeve 14. As illustrated in FIGURE 2, the abrasive ribbons are wound on the reel sleeve with their outer ends extending through a plurality of longitudinal slots 20 located circumferentially around the cylindrical wall 10. A corresponding plurality of brushes 22 extend radially from the cylindrical wall 10 and the brushes 22 reinforce the exposed outer ends of the abrasive ribbons 16 during rotary movement of the abrasive device.

A control core 24 is designed to be received within the reel sleeve 14. The control core includes a plurality of lugs 26 extending radially from the control core. The

lugs 26 fit within the corners formed by the adjacent sides of the reel sleeve 16 so as to lock the reel sleeve 14 on the control core 24. The control core 24 controls the rotary position of the reel sleeve in a manner to be explained.

A disk 28 having a knurled peripheral edge closes the open end of the rotary housing. A spindle 30, having a threaded end 32, is mounted within the housing and extends through the reel sleeve 14 and control core 24 to a position exterior of the disk 28. A knurled nut 34 engages the threaded end 32 to lock the disk 28 in position. The disk 28 supports the control core 24 within the rotary housing.

The rotary housing is formed with a hub 36 to permit the rotary abrasive device to be mounted on the end of a drive shaft (not shown) and to be secured to the drive shaft through the use of a pair of set screws 38. The set screws fit within threaded openings 40 in the hub 36.

The cylindrical wall 10 supports longitudinal channels 42 mounted interiorly of the cylindrical wall. The channels 42 are used to mount the brushes 22. In particular, the channels 42 include entrance slots 44. Each of the brushes 22 is composed of a plurality of bristles 46 bonded to a base member 48. The base member is slid into the channel 42 and the bristles 46 protrude from the slot 44. A spring member 50 may be slid in the channel 42 and against the base 48 to lock the brushes in position.

The reel sleeve 14 has a square cross-sectional configuration and may be composed of a suitable material such as cardboard. The square configuration for the reel sleeve 14 forms four flat sides with each side receiving the pair of abrasive ribbons 16 as indicated above. When the reel sleeve 16 is slid over the control core 24, the lugs 26 fit into the corners of the reel sleeve 14. In between each pair of lugs 26 is formed a recessed area 52. The staples 18 fit within this recessed area 52 so that the staples are retained in the recessed area without engagement against the control core 24.

After a portion of the abrasive ribbon 16 is worn out, it is desirable to feed out additional abrasive material from the interior of the rotary abrasive device. The feeding out of the additional abrasive material is indexed using index means including a plurality of projections 54 which extend from the wall 12 and which projections 54 include a corresponding plurality of index recesses 56. End portions 58 of the lugs 26 cooperate with the recess so as to fit within the recesses 56. Therefore, the control core 24 may be indexed to feed out additional material by loosening the nut 34 to release the control core and then rotate the control core so that the end portion 58 is indexed to fit within a new one of the recesses 56.

In the operation of the rotary abrasive device, a reel sleeve 14 containing abrasive ribbons 16 is slipped over the control core 24 and the outer ends of the ribbons are brought out through the slots 20. The nut 34 is then screwed down to position the cover disk 28 over the open end of the rotary abrasive device. The nut, however, is not completely tightened, so that control core 24 does not have its outer ends 58 engaging the recesses 26. The cover 28 may, therefore, be rotated in a clockwise direction so as to wind the strips into the interior of the rotary housing; however, leaving a sufficient amount of material extending from the slots 20. The nut 34 may now be completely tightened, making sure that the ends 58 fit within recesses 56. When the abrasive material is worn out, new material may be fed out by loosening the nut 34 and rotating the cover 26 for one or two index positions, and then tightening up the nut 34. During operation of the rotary abrasive device, the additional abrasive material will be fed out automatically upon the rotation of the wheel.

The present invention, therefore, is directed to an improvement in rotary abrasive devices using a reel sleeve

having a square configuration and cooperating with a control core, including lug members which fit within the corners of the reel sleeve. This provides for a locking of the reel sleeve on the control core, thereby preventing slippage between the reel sleeve and the control core. The lugs tend to dig into the corners, thereby providing for a good rigid connection between the reel sleeve and control core. In addition, recessed areas are provided between the lugs on the control core so as to receive a fastening means which fastens the abrasive ribbons to the reel sleeve. In particular, the reel sleeve may have a square configuration and the control core may include four lugs. A pair of abrasive ribbons are attached to each face of the reel sleeve and individual ones of the abrasive ribbons are fed out through slots in the outer circumferential shell.

It is to be appreciated that the invention has been described with reference to a particular embodiment but that adaptations and modifications may be made and that the invention is only to be limited by the appended claims.

I claim:

1. In an abrasive device comprising a rotary housing having a cylindrical outer wall and with the cylindrical outer wall having a plurality of circumferentially spaced longitudinal slots, a corresponding plurality of brushes extending radially from the housing and adjacent the slots and a control core member having a plurality of lugs extending radially from the core member and having a recessed area between each adjacent pair of lugs, the combination of

a reel sleeve member having a polygonal configuration with a plurality of flat sides corresponding in number to the plurality of lugs extending from the core member and with the reel sleeve having dimensions to receive the lugs extending from the core member in the corners formed between the adjacent flat sides to lock the reel sleeve on the control core member, and

a plurality of abrasive ribbons each anchored at its inner end by fastening means to the reel sleeve along the flat sides and extending at its outer end through the longitudinal slot for reinforcement by the radial brushes when the housing rotates and with each of the fastening means retained within one of the recessed areas between the lugs.

2. In the abrasive device of claim 1 wherein the control core member has four legs radiating at equally spaced positions around the control core and wherein the reel sleeve has a square configuration to receive the individual ones of the lugs in the corners to lock the reel sleeve on the control core.

3. In the abrasive device of claim 1 wherein at least two abrasive ribbons are anchored by the fastening means to each one of the flat sides and wherein there are at least twice as many longitudinal slots as flat sides so that each abrasive ribbon extends through one longitudinal slot.

4. In an abrasive device comprising a rotary housing having a cylindrical outer wall and with the cylindrical outer wall having a plurality of circumferentially spaced longitudinal slots, a corresponding plurality of brushes extending radially from the housing and adjacent the slots, the combination of

a control core member disposed within the rotary housing and with the control core member having a plurality of radially extending lugs.

a reel sleeve member having a polygonal configuration composed of a plurality of flat sides and with the reel sleeve having dimension of receive the radially extending lugs in corners formed between adjacent ones of the flat sides to lock the reel sleeve on the control core member during rotation of the abrasive device, and

a plurality of abrasive ribbons each anchored at its inner end to the flat sides of the reel sleeve and ex-

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tending at its outer end through the longitudinal slot for reinforcement by the radial brushes.

5. In the abrasive device of claim 4 wherein the control core includes four equally spaced lugs and wherein the reel sleeve has a square configuration.

6. In the abrasive device of claim 4 wherein the control core includes recessed areas between adjacent lugs and wherein the abrasive ribbons are anchored by fastening means and wherein the fastening means are retained within the recessed areas.

7. In the abrasive device of claim 4 wherein at least two abrasive ribbons are anchored at each flat side and wherein there are at least twice as many longitudinal slots at flat sides so that each abrasive ribbon extends through one longitudinal slot.

8. In an abrasive device comprising a rotary housing having a cylindrical outer wall and with the cylindrical outer wall having a plurality of circumferentially-spaced longitudinal slots, a corresponding plurality of brushes extending radially from the housing and adjacent the slots, the combination of

a control core member disposed within the rotary housing and having four equally spaced lugs extending radially from the core member and having recessed areas between adjacent ones of the lugs,

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a reel sleeve member having a square configuration and flat sides and with the reel sleeve having dimensions to receive the lugs extending radially from the core member in the corners formed between adjacent flat sides to lock the reel sleeve on the control core during rotation of the abrasive device, and

a plurality of abrasive ribbons and having at least two ribbons anchored at their inner ends to each one of the flat sides of the reel sleeve by fastening means and extending at their outer ends through individual ones of the longitudinal slots for reinforcement by the radial brushes when the housing rotates and with each of the fastening means retained within one of the recessed areas between the lugs.

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OTHELL M. SIMPSON, Primary Examiner

U.S. Cl. X.R.

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