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Larkin

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[54] **PIVOTABLE ROTARY BRUSH DRIVE ASSEMBLY**

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[52] **U.S. Cl.** ..... **15/21 D;** 15/82; 29/115

[51] **Int. Cl.** **A46b 13/02**

[58] **Field of Search** ..... 15/DIG. 2, 21 D, 21 E, 15/23, 24, 49 C, 50 C, 53, 55, 77, 79, 82, 83, 84, 88, 98, 102, 340; 29/115

[56] **References Cited**

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Attorney, Agent, or Firm—Littlepage, Quaintance, Murphy & Dobyns

[57] **ABSTRACT**

A rotatably driven brush core is slidably mounted on a core-supporting shaft, the shaft pivotally connected to a drive shaft and core engaging drive flange fixed to the drive shaft. An idle shaft removably connected to the core-supporting shaft positions the core on the supporting shaft and prevents relative rotation between the core and the core-supporting shaft.

3 Claims, 3 Drawing Figures

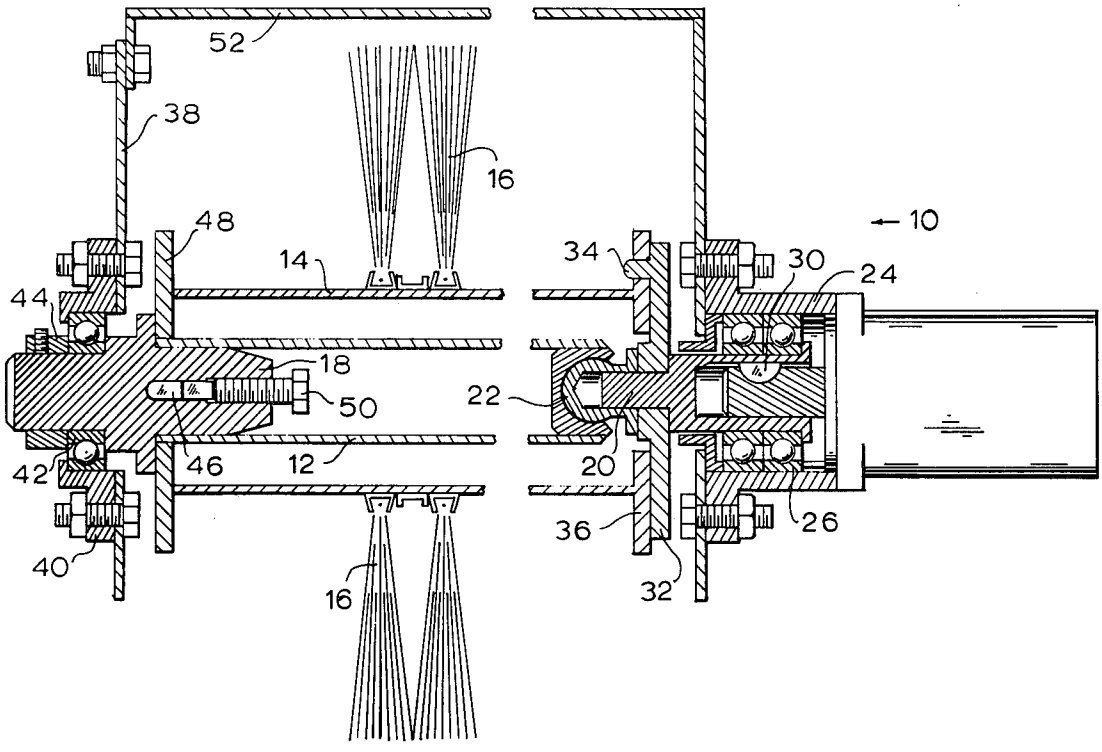


FIG. 1

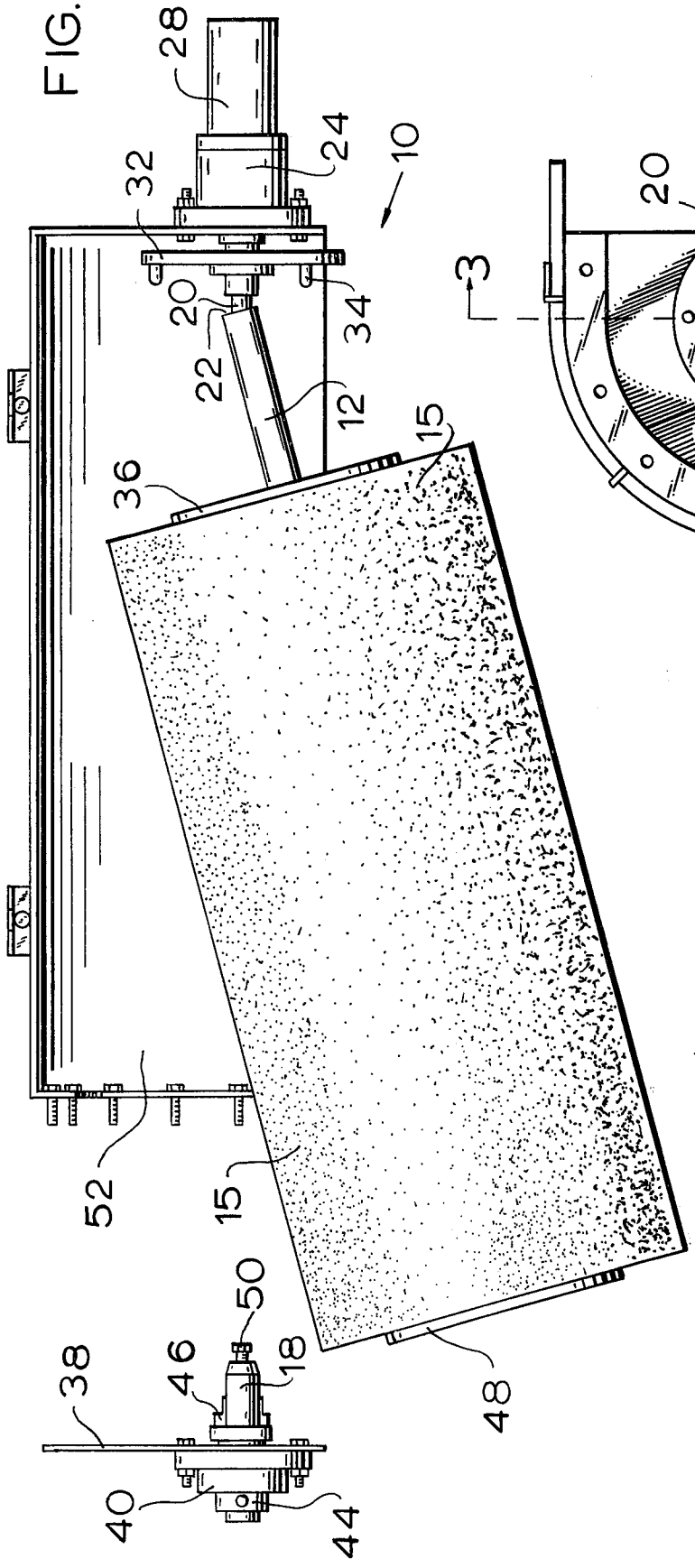


FIG. 2

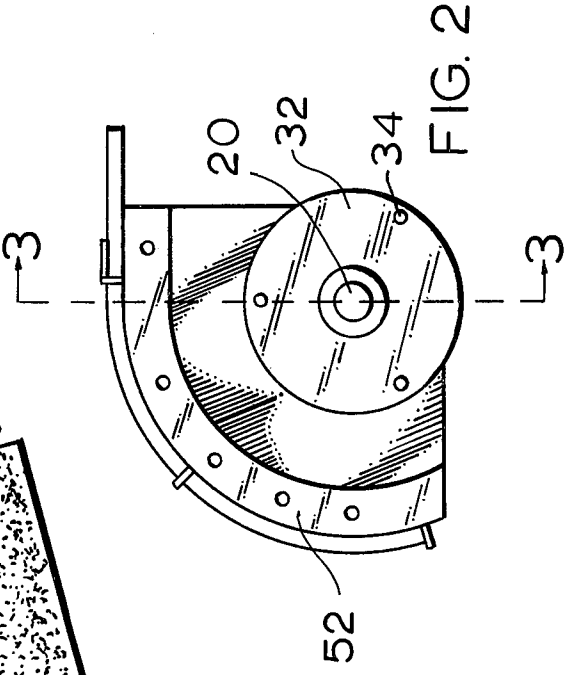
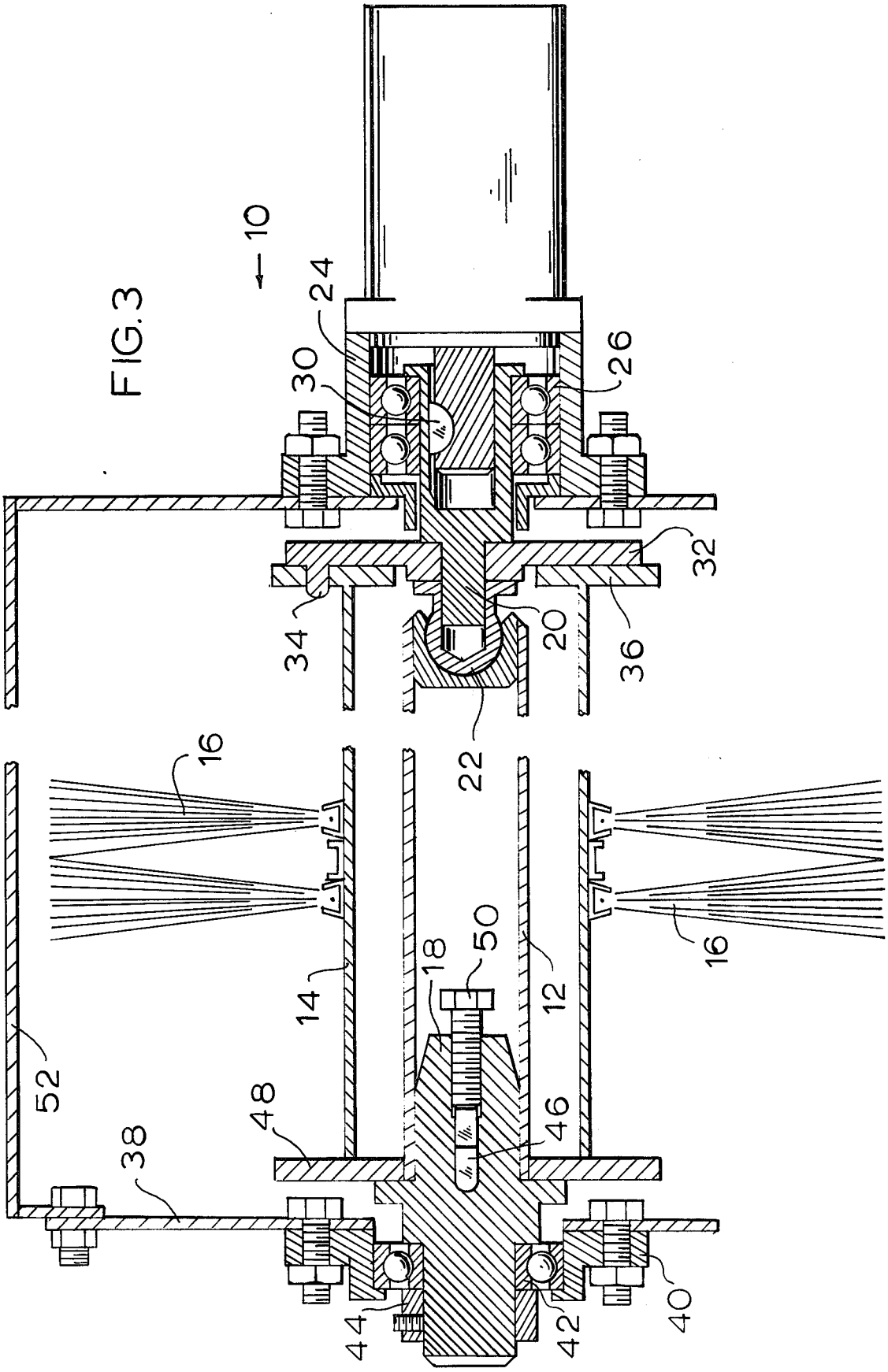


FIG. 3



PIVOTABLE ROTARY BRUSH DRIVE ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to rotatable cylindrical brush mountings and drive means therefor and particularly relates to powered mobile sweeping equipment having cylindrical brush mountings adapted for simple replacement of worn brush elements.

2. Description of the Prior Art

Brushes have often been mounted upon shafts journaled at each end of the brush in appropriate bearings, such as split bearings, and driven by power means appropriately connected to the shaft by driving connections such as gears, belts, sprocket chains or the like. As the brushes became worn, they could only be removed from their mountings by completely disassembling the bearings. Considerable time is required for the disassembly, replacement and reassembly of the brush mounting and usually the services of a skilled mechanic, if optimum service is to be obtained from a given brush.

Brushes have more recently been mounted on tubular or annular cores which are supported either by end caps pressed against the ends of the core or by support arrangements fitted within the core. In either case, a drive shaft coaxial with the core and generally extending beyond the ends of the core to rotatable end structures is necessary to support the brush and correlate the rotation of the supporting end structures. The replacement of brushes on such an assembly no longer requires the disassembly of bearings, but often requires careful alignment upon reassembly.

Typical replacement procedure requires removing at least one end structure and sliding the brush, with or with a brush core, along the central shaft and off the end of the shaft. This procedure is often quite awkward as the brush remains either in contact with or close proximity to the work surface upon which the brush functions or other impeding structure such as guards and deflection shields.

Examples of prior art are to be found in U.S. Pat. Nos. 2,860,354; 3,102,018, 3,310,825 and 3,142,079.

SUMMARY OF THE INVENTION

In the present invention an idle shaft is removably connected to one end of a coaxial core-supporting shaft and to a brush core supported thereon. When connected to the core-supporting shaft, the idle shaft properly positions the brush core on the core-supporting shaft and prevents undesired relative rotation therebetween.

The other end of the core-supporting shaft is pivotally connected to a drive shaft. When the idle shaft is disconnected, the core-supporting shaft is permitted to pivot away from any impeding structure such as guards, shields and work surfaces, thereby facilitating brush replacement.

A drive flange, fixed to the drive shaft, engages a brush core to provide the brush with the necessary rotational motion. The brush core is in turn connected to the idle shaft, thus minimizing or eliminating the necessity that rotational power be transmitted by the pivotal connection and substantially reducing the wear and likelihood of failure of the pivotal connection.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevation view of a pivotal rotary brush drive according to this invention with the end plate removed and the brush partially removed.

FIG. 2 is an elevation view of the brush drive of FIG. 1 as seen from the left side with the end plate and brush removed.

FIG. 3 is a sectional illustration of the pivotal rotary brush drive of FIG. 2 cut along section line 3—3, including the brush and end plate.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A brush drive according to this invention, shown in FIG. 1 generally as **10**, consists of a core supporting shaft **12** for supporting a brush **15**, a stub or idle shaft **18** shown removed from the core supporting shaft **12**, and a drive shaft **20** pivotally connected to the shaft **12** by pivotal means **22**. The drive shaft **20** is rotatably supported within a bearing housing **24** and is rotatably driven by a motor means **28**.

A drive flange **32** is fixed to rotate with the drive shaft **20**. When the brush **15** is properly in position, as in FIG. **3**, drive pins **34** extend from the drive flange **32** into a fixed end flange **36** of brush **15** for rotatably driving the brush and in this manner reducing or eliminating the necessity of transmitting torque from the drive shaft **20** to the core supporting shaft **12** across the pivotal means **22**. As shown in FIG. **2**, the drive flange **32** should preferably have at least three drive pins **34** for engaging the brush end flange to prevent vibration and wear of the core supporting shaft, drive shaft and pivotal means as well as reduce the force load exerted on the drive pins. Where no torque is to be transmitted, the pivotal means **22** can be a ball joint, as shown in FIG. **3**. If some torque needs to be transmitted or other design considerations demanded, the pivotal means **22** could be a universal joint or other equivalent means.

The stub shaft **18** is rotatably supported in a removable end plate **38** by a bearing block assembly **40** containing a bearing secured to the shaft **18** by lock collar **44**. As shown in FIG. **3**, when the end plate **38** is properly positioned, a key **46** secured in the idle shaft **18** by key retaining screw **50** engages the core supporting shaft **12** and brush core end flange **48** to position the brush core on the core supporting shaft and transfer torque from the brush core to the stub shaft **18**.

The removable end plate **38** is removably secured to the broom housing or guard **52** to permit easy removal and replacement of the brush **15**. To remove or replace the brush elements, the end plate **38** is detached from the broom housing **52**, thereby permitting the core supporting shaft **12** to pivot about pivot means **22** and permitting the idle shaft to be withdrawn from the core supporting shaft as shown in FIG. **1**. With the end plate **38** and idle shaft **18** removed, the brush **15** can be easily slidably removed from the core supporting shaft **12**. No special tools or skills are needed to remove or replace the brush. As shown in FIG. **3**, the brush **15** can consist of a brush core **14** having a fixed end flange **36** adapted to receive motive power from the drive flange **32** and a removable end flange **48** which is fixed to rotate with the brush core **14** and adapted to engage key **46** in stub shaft **18**. The brush further consists of brush elements **16** which may be in any convenient design, including cylindrical rings, spiral strip or longitudinal

strip elements. In some instances the brush element may also be removed or replaced by detaching the end plate **38** from the broom housing **52** and removing the end plate **38** together with the idle shaft **18.** The removable end flange **48** can then be removed from the brush core **14** and the brush elements **16** removed from the brush core **14** while it remains substantially in place on the core supporting shaft **12.** Again, no special tools or skills are needed to remove or replace the brush elements.

As shown in FIG. **3,** the stub shaft or idle shaft **18,** when properly in position is coaxial with and removably connected to the core supporting shaft **12.** The stub shaft **18** is rotatably supported in the bearing block assembly **40** by bearings **42** secured to the shaft **18** by lock collar **44.**

The drive shaft **20** is likewise rotatably supported within bearings **26** housed within a bearing housing **24** and is rotatably driven by a motor means **28** keyed to the shaft **20** by a woodruff key **30,** or other equivalent means.

The support for the drive shaft housing **24,** the idle shaft housing **40** and other associated elements when assembled is the guard **52.** The guard **52** can in turn be attached by support means **54** to the apparatus with

which this brush assembly and brush is to be used, such as a powered, mobile or non-mobile, sweeping apparatus.

What is claimed is:

1. A rotatable brush mounting adapted to receive a brush core comprising a drive shaft for transmitting to the brush core power for driving the brush core in rotation, a core-supporting shaft pivotally connected to the drive shaft for supporting the brush core, an idle shaft removably connected to the core-supporting shaft for positioning the brush core on the core-supporting shaft, and pivotal means interconnecting the drive shaft and the core-supporting shaft for permitting the core-supporting shaft to pivot relative to the drive shaft when the idle shaft is removed.

2. The rotatable brush mounting of claim **1** wherein the idle shaft further comprises means interconnecting the brush core and the core supporting shaft for preventing relative rotation motion therebetween.

3. The rotatable brush mounting of claim **1** further comprising a drive flange fixed to the drive shaft and engaging the brush core for rotatably driving the brush core.

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