BROOM ASSEMBLY FOR SWEEPING MACHINE AND METHOD OF OPERATION

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Patent Application No. 61/465,399, which was filed on Mar. 18, 2011.

FIELD OF THE INVENTION

The invention relates generally to a broom assembly for a sweeping machine that may be used in sweeping streets, parking lots and other large surfaces. More particularly, the invention comprises a broom assembly for a sweeping machine which employs replaceable brushes.

BACKGROUND OF THE INVENTION

Conventional sweeping machines typically employ a broom assembly comprising one or more brushes mounted for rotation about horizontal and/or vertical axes. Some conventional machines include an integral component for collecting material swept by the brush or brushes. Such collecting components may comprise vacuum systems for capturing the material swept by the brushes, or conveyors for transporting such material to a hopper or an adjacent truck. Other conventional machines may operate by pushing the swept material to one side of the machine where it may be collected by a separate collecting device.

Some conventional sweeping machines include broom assemblies which employ permanent brushes, while others employ replaceable brushes. Typically, a replaceable brush comprises a cylindrical brush core of steel or other durable material having a plurality of bristles disposed around its outer periphery. Generally, a replaceable brush is attached to a conventional broom assembly by one or more locking mechanisms that must be unbolted, unpinned or otherwise removed in order to change the replaceable brush.

One type of replaceable brush is described in U.S. Pat. No. 3,649,985 of Hunt. The broom assembly described in this patent includes a drive shaft that extends through a replaceable hollow brush core. On each end of the drive shaft is mounted a fixed metal plate that is sized so that the hollow brush core may be placed thereover. The fixed metal plate has a plurality of holes that are adapted to receive bolts. A rubber disk with a central hole to receive the drive shaft and a plurality of spaced bolt holes is placed over the drive shaft and into abutment with the fixed metal plate, and a moveable metal plate with a plurality of bolt holes is then placed adjacent to the rubber disk. The bolt holes in the fixed plate, rubber disk and moveable plate are aligned, and bolts are inserted into the holes in these components and tightened to cause the two metal plates to squeeze the rubber disk therebetween. This squeezing of the rubber disk causes it to expand radially outwardly to create a binding frictional fit with the inner surface of the brush core.

Another conventional broom assembly that is adapted to receive a replaceable brush is described in U.S. Pat. No. RE38,973 of Smith. The broom assembly described in the Smith patent comprises an L-shaped frame component to which a pivotal arm is attached so that the arm may be pivoted to form a U-shaped component to which a removable brush of a predetermined length may be attached. A cylindrical hub on the "short" arm of the L-shaped frame is a drive hub that is operatively attached to a drive motor. This drive hub is

mounted to the arm by a universal joint and includes a slot to engage a drive lug on the inside of a brush core. The cylindrical hub on the pivotal arm is an idler hub that is also mounted to the arm by a universal joint. The broom assembly that is described in the Smith patent is mounted to an associated vehicle by means of a parallelogram support structure.

Notes on Construction

The use of the terms "a", "an", "the" and similar terms in the context of describing the invention are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms "comprising", "having", "including" and "containing" are to be construed as open-ended terms (i.e., meaning "including, but not limited to,") unless otherwise noted. The terms "substantially", "generally" and other words of degree are relative modifiers intended to indicate permissible variation from the characteristic so modified. The use of such terms in describing a physical or functional characteristic of the invention is not intended to limit such characteristic to the absolute value which the term modifies, but rather to provide an approximation of the value of such physical or functional characteristic. All methods described herein can be performed in any suitable order unless otherwise specified herein or clearly indicated by context. The use of any and all examples or exemplary language (e.g., "such as") herein is intended merely to better illuminate the invention and not to place a limitation on the scope of the invention. Nothing in the specification should be construed as indicating any element as essential to the practice of the invention unless so stated with specificity.

Various terms are specifically defined herein. These terms are to be given their broadest possible construction consistent with such definitions, as follows:

The terms "upper", "top" and similar terms, when used in reference to a relative position or direction on or with respect to a broom assembly for a sweeping machine or a component or portion thereof, refer to a relative position or direction that is farther away from the ground on which the sweeping machine is placed for operation.

The terms "lower", "bottom" and similar terms, when used in reference to a relative position or direction on or with respect to a broom assembly for a sweeping machine or a component or portion thereof, refer to a relative position or direction that is nearer the ground on which the sweeping machine is placed for operation.

The term "front" and similar terms refer to a component or portion of a broom assembly for a sweeping machine that is farthest from the sweeping machine to which the broom assembly is attached, or to a direction or relative position on such a broom assembly that is away from the sweeping machine to which the broom assembly is attached.

The term "rear" and similar terms refer to a component or portion of a broom assembly for a sweeping machine that is nearest the sweeping machine to which the broom assembly is attached, or to a direction or relative position on such a broom assembly that is nearer to the sweeping machine to which the broom assembly is attached.

The term "forward sweeping direction" is the direction towards the front of the broom assembly that is perpendicular to the core axis of the brush.

The term "left", as used herein to describe a direction or relative position of a broom assembly mounted on a sweeping machine or a component of such a broom assembly, refers to a position or orientation towards the left, as viewed by an observer who is observing in the forward sweeping direction.

The term "right", as used herein to describe a direction or relative position of a broom assembly mounted on a sweeping machine or a component of such a broom assembly, refers to