less than the inner diameter of the first annular flange and an inner diameter which is substantially flush with the adjacent inner surface of the annular body portion.

The radial distance between the first and second annular flanges defines an annular groove extending generally axially from a terminal end surface **64** joined between the first and second annular flanges to an opposing end which receives a portion of the end plate therethrough as described in further detail below. The end surface **64** defines the inner end of the annular body portion from which the first and second annular flanges project.

The outer diameter of the end plate **38** in this instance corresponds approximately to the inner diameter of the first annular flange **60** and supports an annular tongue portion **66** thereon. The tongue **66** comprises an annular flange extending about a full circumference of the shaft and which projects in an axial direction from an interior side of the end plate to extend into the annular groove **63**.

The end plate **38** also includes a shoulder **68** located at the interior side of the end plate at a location which is radially inward from the tongue **66**. The shoulder **68** defines a surface projecting in the axial direction about a full circumference of the shaft in close proximity to the inner surface of the second annular flange **62**. The wiper seals **40** are mounted further towards the interior of the annular body portion in the axial direction relative to the shoulder **68**.

In the arrangement described above, the tongue **66** received within the annular groove **63** between the first and second annular flanges defines a generally U-shaped clearance gap. The clearance gap is continuous about the free end of the second annular flange due to the close proximity to the shoulder **68** such that the overall seam between the inner end of the annular body portion and the end plate is generally S-shaped in profile from an exterior opening which faces in the axial direction at the periphery of the end plate, about the tongue **66**, and about the second annular flange **62** to the opposing end which is open in an axial direction towards the interior of the annular body portion. The overall dimension of the gap between the annular body portion and the end plate may be generally in a range between 0.010 inches and 0.050 inches. In the illustrated embodiment, the gap ranges between 0.015 inches and 0.030 inches. The gap remains unobstructed to provide a non-contacting mating connection along a full length of the gap from the exterior to the interior of the annular body portion.

The overall gap includes a first radial gap portion **70** spanning in the axial direction between a first end at the free end of the tongue corresponding to the end surface **64** of the annular groove to an opposing second end at the exterior side of the end plate **38**. The dimension of the gap in the radial direction widens from the first end having a dimension of 0.015 inches to the second end having a dimension of 0.030 inches.

The overall gap further includes a first end gap portion **72** which is a gap in the axial direction but which spans radially across the free end of the tongue **66**. The dimension of the gap in the axial direction between the annular body portion and the end plate is 0.015 inches.

The overall gap also includes a second radial gap portion **74** which spans in an axial direction from a first end in proximity to the free end of the tongue and the end surface **64** of the annular groove to an opposing second end at the interior side of the end plate **38**. The dimension of the gap in the radial direction is similar to the first radial gap portion **70** in that it widens from a dimension of 0.015 inches at the first end to a dimension of 0.030 inches at the second end.

Furthermore, the overall gap includes a second end gap portion **76** which is a gap in the axial direction between the free end of the second annular flange **62** and the corresponding portion at the interior side of the end plate **38**. The dimension of the gap in the axial direction is 0.030 inches.

The small clearance dimension along the full length of the gap provides minimal opportunity for disturbed soil and debris to enter the gap into the interior of the annular hub portion where the bearings are located. Furthermore, by orienting the exterior opening of the gap to be directed in an axial direction rather than the radial arrangement of the prior art, disturbed soil is less likely to be forced radially inwardly through the seam to the interior of the hub portion. By further arranging the first radial gap portion **70** to become wider in radial dimension towards the exterior open end, any debris entering the gap is more likely to be encouraged to navigate to the exterior towards the widening opening and thus be restricted from further penetration by the narrowing gap dimension towards the interior of the annular body portion.

Since various modifications can be made in my invention as herein above described, and many apparently widely different embodiments of same made within the spirit and scope of the claims without department from such spirit and scope, it is intended that all matter contained in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

The invention claimed is:

1. A disc assembly for use with a vertical tillage implement having a main frame supporting a plurality of tillage units thereon in which each tillage unit includes a disc supporting arm mounted on the main frame, the disc assembly comprising:

a shaft arranged to be mounted on the disc supporting arm of a respective one of the tillage units;

a hub supported on the shaft such that the hub is rotatable about a longitudinal axis of the shaft, the hub including:

an annular body portion supported concentrically about the shaft to extend in an axial direction between an inner end and an opposing outer end;

a disc mounting portion provided externally on the annular body portion so as to be arranged to mount a ground engaging disc on the hub;

a cap portion arranged to enclose the outer end of the annular body portion;

a first annular flange portion oriented circumferentially about the shaft and protruding in the axial direction from the inner end of the annular body portion; and

a second annular flange portion oriented circumferentially about the shaft and the second annular flange portion and protruding in the axial direction from the inner end of the annular body portion;

the second annular flange portion being smaller in circumference than the first annular flange portion so as to define a groove between the first and second annular flange portions which extends circumferentially about the shaft at the inner end of the annular body portion;

an end plate mounted fixedly on the shaft so as to substantially enclose the inner end of the annular body portion, the end plate including an annular tongue portion protruding axially from an interior side of the end plate so as to be matingly received within the annular groove between the first and second annular flange portions for relative rotation therebetween;

wherein there is provided a clearance gap between the annular tongue portion and the annular flange portions, that includes a U-shaped portion about the annular tongue portion, in which the annular tongue portion and the annular flange portions remain open and unob-