

Yaguchi

[45] Aug. 29, 1972

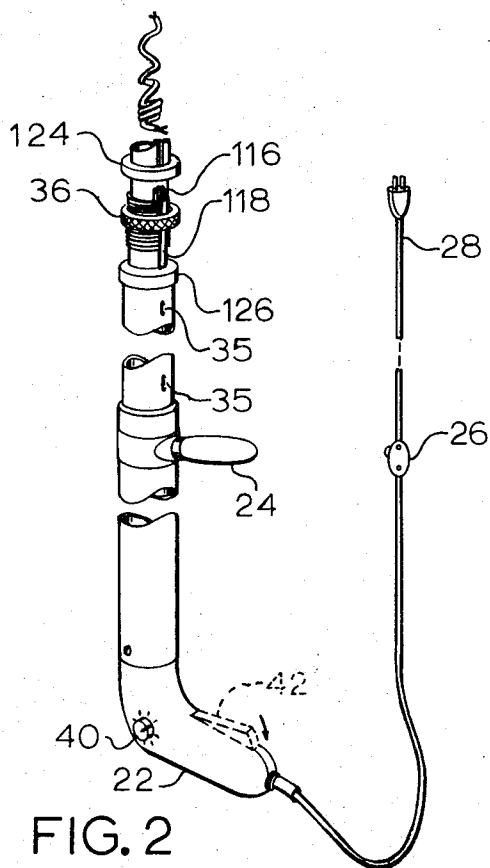
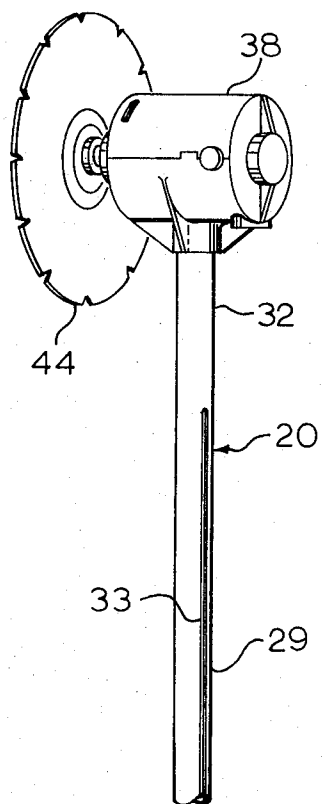


FIG. 2

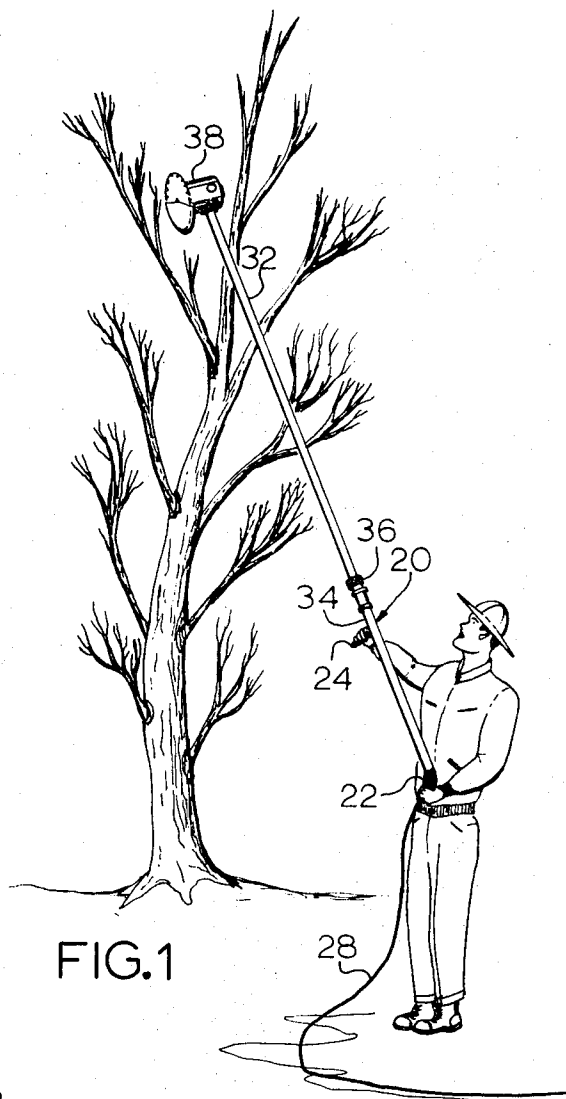


FIG. 1

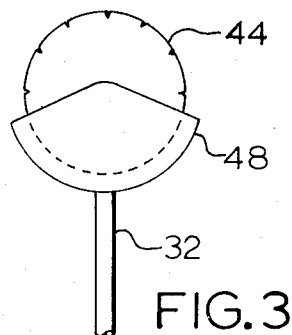


FIG. 3

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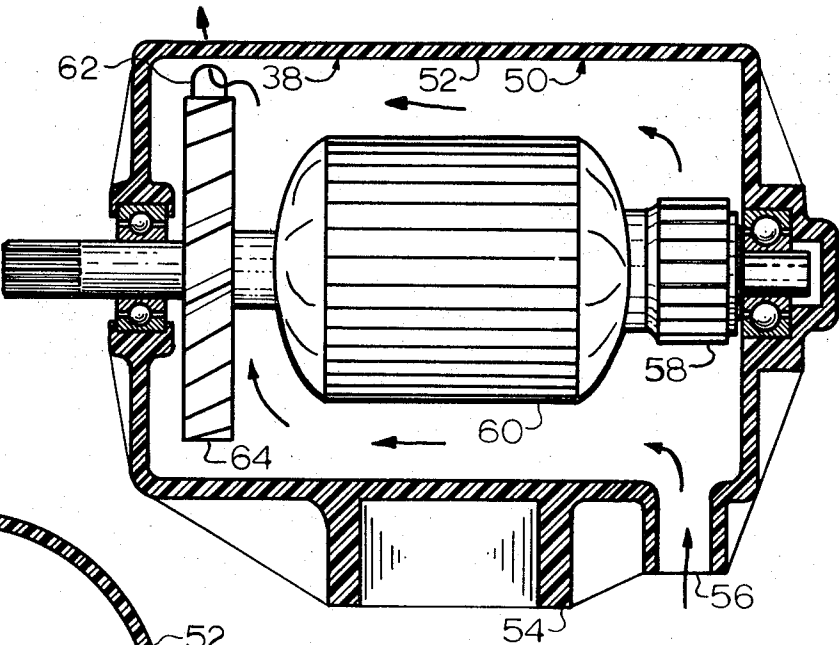


FIG. 4

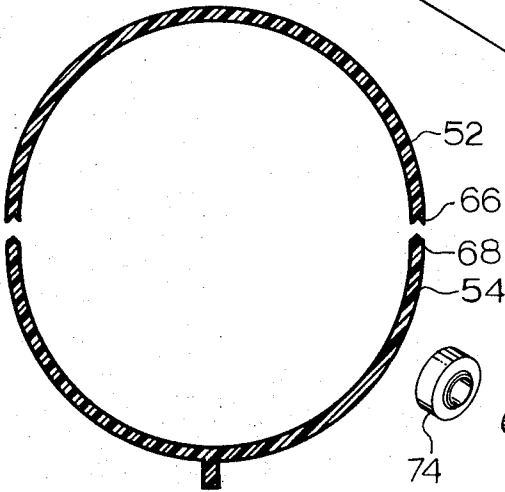


FIG. 6

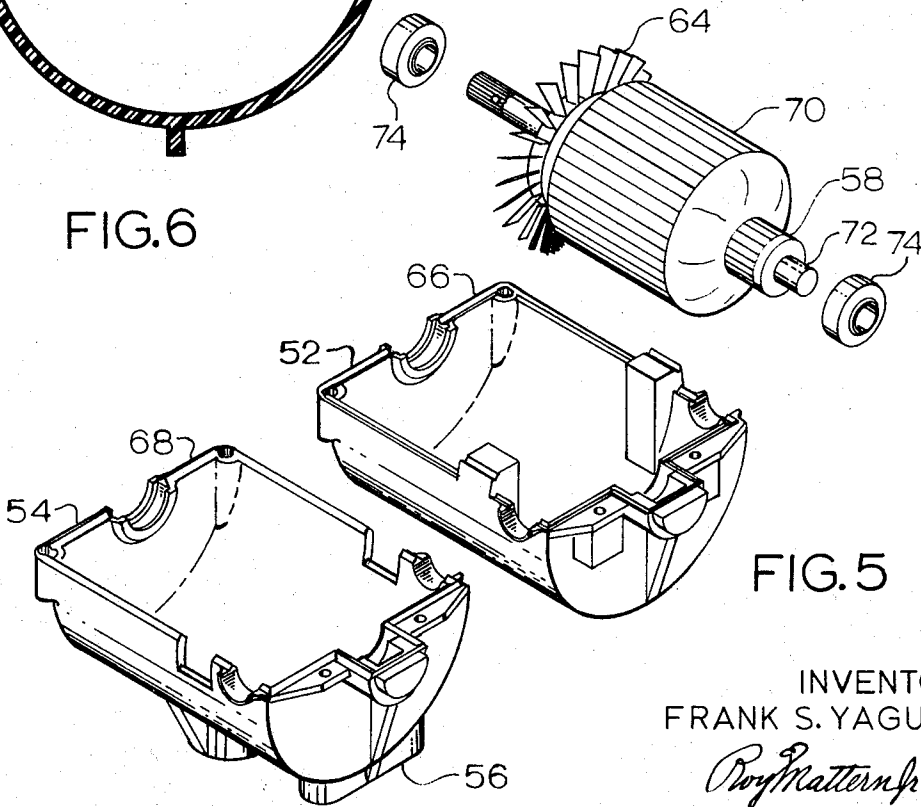


FIG. 5

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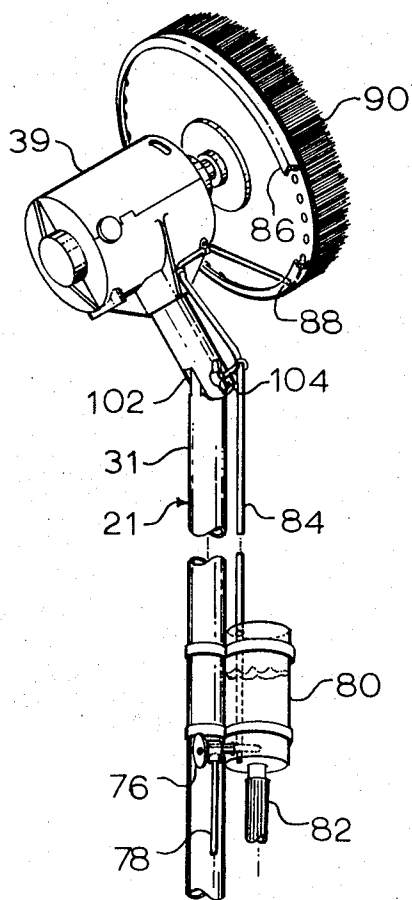


FIG. 7

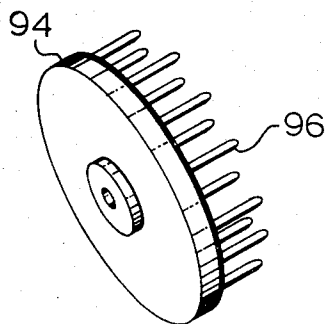


FIG. 8

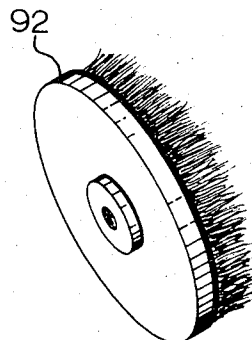


FIG. 9

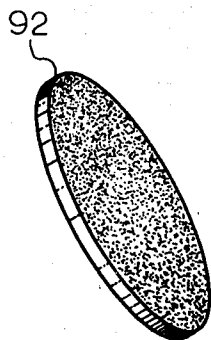


FIG. 10

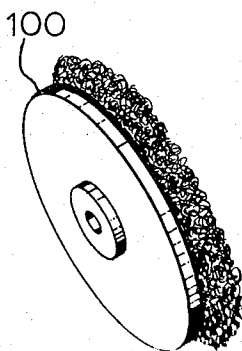
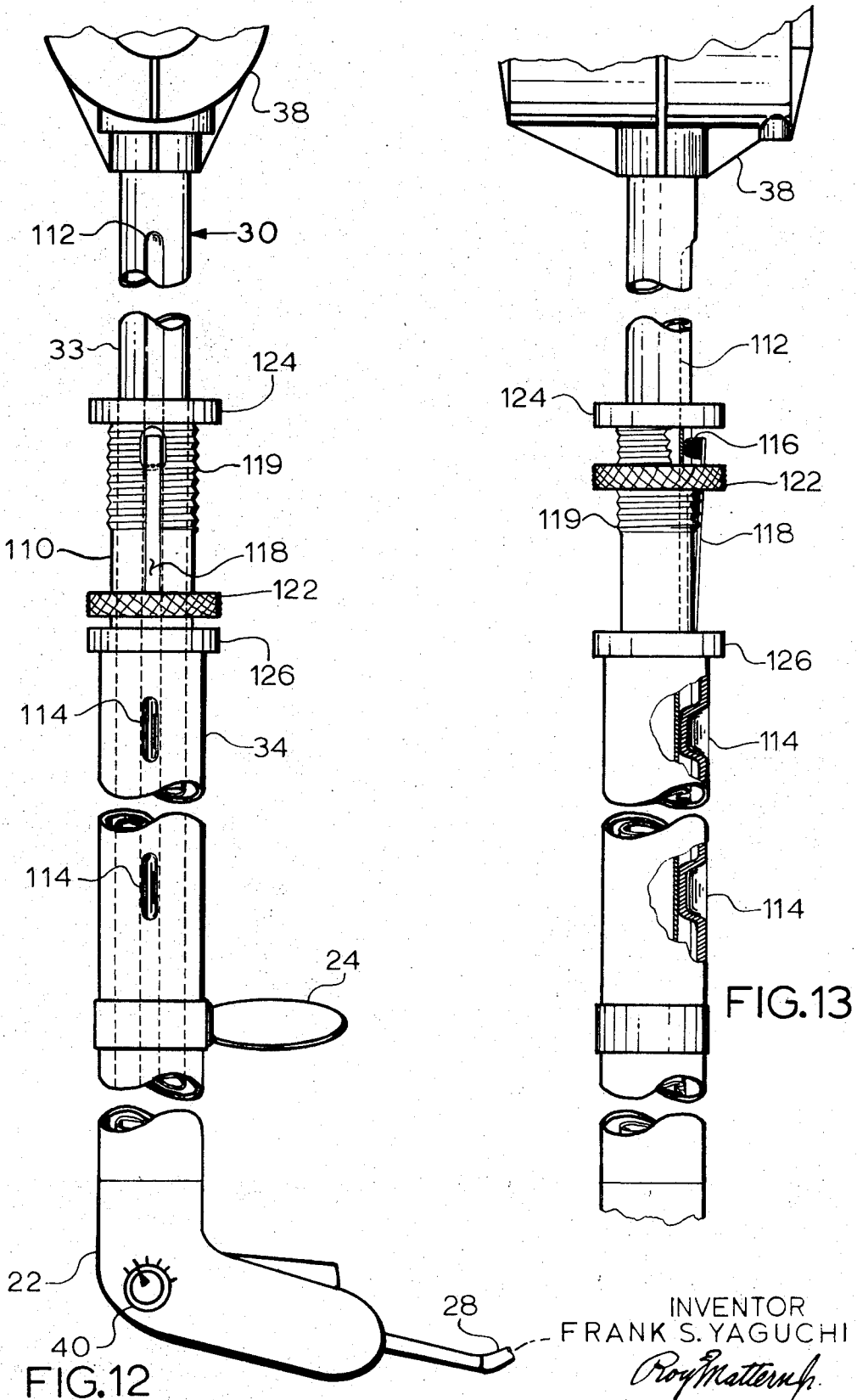


FIG. 11

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HAND-HELD MULTI-PURPOSE TOOL

BACKGROUND OF INVENTION

Powered units for undertaking these operations have been presented before and generally directed to a specific objective. Frederick B. Marvin described a tree surgery implement in his U.S. Pat. No. 1,251,554, and Woodrow J. Cooper presented his portable device for trimming trees in his U.S. Pat. No. 2,748,476. Neither one offered a cutting unit as adaptable to other applications upon substituting other rotating working members. Also the effective controlled flow of cooling air through a motor housing to clear rain and debris was not indicated.

SUMMARY OF THE INVENTION

Trees and shrubs are reshaped by pruning with a high speed circular saw. Windows and other finished surfaces are cleaned, with cleaning fluids being supplied, and polished. Rough and/or old surfaces are smoothed. All with a conveniently handled and adjusted electrical powered unit mounted on an extendable pole and arranged to blow moisture and debris away from the unit itself, the materials being worked on, and the operator controlling the function being undertaken.

DRAWINGS OF THE PREFERRED EMBODIMENTS

FIG. 1 is a perspective view of the adjustable height powered unit being operated to prune a tree;

FIG. 2 is a perspective view, with portions removed, of the adjustable height powered unit arranged to prune trees and shrubs;

FIG. 3 is a partial side view to indicate the positioning of a debris deflecting shield;

FIG. 4 is a side view, with portions cut away, to indicate the flow path of cooling air in, up, around, through, up, and out of the electrical motor housing keeping debris and moisture away;

FIG. 5 is an exploded view of the electrical motor, its cooling fan, bearings, and the two complementing halves of the motor housing;

FIG. 6 is a cross sectional view of the housing to show the mating edges of the top and bottom halves of the motor housing;

FIG. 7 is a perspective view, with portions removed, of the adjustable height and tiltable powered unit arranged to wash surfaces and to utilize cleaning fluids;

FIG. 8 is a perspective view of a surface tilling head;

FIG. 9 is a perspective view of a wire brush head;

FIG. 10 is a perspective view of a sanding head;

FIG. 11 is a perspective view of a buffing head;

FIG. 12 is a partial side view of an elongated body of a powered unit to show the non-rotative and adjustable height holding components, the latter being in the unlocked position; and

FIG. 13 is a partial front view with portions removed of an elongated body of a powered unit, as illustrated in FIG. 12, to show the non-rotative and adjustable height holding components, the latter being in the locked position.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Tree Pruning

The pruning of trees in a selective and non damaging way is undertaken, as illustrated in FIG. 1, using the adj-
justably positioned powered unit 20. An operator uses
a lower handle 22, and an upper handle to principally
direct unit 20 using an upper handle 24. As illustrated
in the perspective view of FIG 2, the on/off switch 26 is
positioned in the electrical power supply cord 28 a
distance away from unit 20, giving the operator an elec-
tion to operate the switch 26 with either hand as he op-
tionally positions the cord 28.

Height Changes

After pruning at a selected height, to increase the
convenience of powered unit 20, the operator adjusts
the telescoping length of the elongated body 30 moving
the top portion 32 selectively into or out of the bottom
portion 34. Rotating the tightening locking mechanism
36 maintains body 30 at the overall selected length. As
subsequently described, both a locking and a non rota-
tive embodiment may be used in an elongated body 29.

Angularity Changes

An angularity change is accomplished by hand guid-
ing the powered unit 20. When another embodiment is
adopted, an angular adjustment of the motor unit 38
relative to the elongated body 30 is undertaken.

Speed Changes and Switches

In lower handle 22, a rheostat, regulated by rotation
of control 40 is used to control the speed of motor 38.
Optionally, an on and off switch may be installed in this
lower handle and be spring loaded to switch off when
the handle is released. This optional switch 42 and lo-
cation is indicated in dotted lines. However, the op-
tional positioning of switch 26 in cord 28 also has its
advantages.

Circular Saw Cutting Blades

Depending on tree and/or shrub pruning to be un-
dertaken, a circular saw 44 having a specific cutting
tooth size and arrangement may be selected. Preferably
the circular saw cutting blade is coated with "Teflon"
to reduce friction.

Shielding

To protect an operator, shield 48 is selectively posi-
tioned to block whirling cuttings leaving the spinning
saw, as shown in FIG. 3. Other shielding may be con-
sidered, however, some clearance, preferably that illus-
trated in FIG. 3, is needed during pruning of trees.

Air Flow for Cooling and Clearing Debris and Rain

High performance electrical motor unit 38 has its
cooling fan 64 and its housing 50 of two pieces, 52, 54,
arranged to cause incoming cooling air to enter from
below through opening 56, circulate around the respec-
tive motor components, such as commutator 58, field
60, and then depart above through opening 62, as illus-
trated in FIG. 4. The velocity of the departing, cooling
air is sufficient to blow away debris and any rain that
might otherwise drop into housing 50. Also such blow-
ing away of debris also protects the operator.

Joining of Housing Sections

Preferably, as illustrated in FIG. 6, housing sections
52, 54 are formed so top section 52 has inverted V
edges 66 and bottom section 54 has pointed V edges 68
to complement them, creating sealable edge structures
that keep water from entering the housing interior dur-
ing pruning operations being undertaken in rainy
weather. Also such joining structures 66, 68 aid in the

fitting and assembly of housing 50 and the continuance of the proper relative positioning of top and bottom sections 52, 54. Preferably the housing is made of a polycarbonate material.

Convenience of Assembly, Inspection, Repair, and Replacement

The exploded view of components in FIG. 5, indicates the convenient accessibility of the major components of the motor unit 38 with respect to utilizing two piece housing 50. Top section 52 and bottom section 54 are spaced apart for inspection. The combined assembly 70, of shaft 72, commutator 58, fan 64, field 60 and the armature it surrounds, is easily lifted out. Shaft roller bearings 74 are quickly removed from shaft 72. Other components, not shown, such as brushes, and electrical leads are likewise very accessible and easily observed and handled as necessary for inspection, repair and/or replacement.

Convenience of Conversion to Other Purposes

The powered unit 20 equipped with saw 44 and used for pruning, as illustrated throughout FIGS. 1 through 6, is easily converted to be used in accomplishing other jobs. For example, as illustrated in FIG. 7, it may be used to wash windows and other surfaces. In so doing, cleaning fluids from a tank 80 are drawn into the water supply from line 82 and distributed through line 84, guard 86, nozzle 88 and revolving brush 90. The intermittent use of cleaning fluid is controlled by using valve 76 in the cleaning fluid supply line 78.

Also as indicated in FIG. 8, in lieu of a saw 44, or brush 90, a tilling head 94 with spikes or projections 96 may be installed as used for tilling the surface soil around plants, shrubs and other areas requiring surface tilling. Cleaning of metal surfaces is commenced by using a wire brush head 92, shown in FIG. 9, in lieu of a saw 44, brush 90, or tilling head 94. Smoothing of wood and metal surfaces in undertaken by rotating the sanding abrasive head, 98, shown in FIG. 10, in lieu of saw 44. Polishing of wood and metal surfaces is conveniently done by powering a buffing head 100 in lieu of saw 44, as shown in FIG. 11.

Convenience of Angular Adjustments

As noted previously, although during the pruning of a tree, as illustrated in FIG. 1, the top hand, using handle 24, guides the saw, there are times when an angular adjustment of the powered unit 20 itself is in order. This angular adjustment is particularly desirable when windows are being washed, when tilling of soil occurs and when other operations are undertaken where the rotating unit must be parallel to the surface being prepared. The embodiment, in FIG. 7, of the window washing powered unit 21, is adjusted by rotating the motor unit 39 relative to the elongated body 31 about the pivotal mounting 102 and then turning the frictional locking bolt 104 to tighten the assembly. Non Rotative and Friction Lock Sub Assembly Used in Making Height Changes

In FIG. 12, portions of an elongated body 29 are shown to illustrate how either powered unit 20 or 21 is equipped in some embodiments with a non rotative and frictional lock sub-assembly 110. The top 33 of elongated body 29 is formed with a near continuous groove 112. The bottom 35 of elongated body 29 is formed with spaced detents 114 which slide within groove 112 to keep the top and bottom always in line and to prevent any relative rotation between them.

Once a selected height is decided upon, it is maintained, as a circular pawl 116 on a spring arm 118, secured to bottom 35, is moved through hole 120 in bottom 35 and beyond to frictionally contact groove 112. To keep the pawl 116 in this frictional locking position, covering ring 122 is slidably passed over spring arm 118 for a short distance and then it is threaded into position on threads 124, on bottom 35 of elongated body 29, until pawl 116 and the otherwise free end of spring arm 118 are covered. The travel of covering ring 122 is further limited by restrictive top and bottom rings 124, 126 secured to bottom 35 of elongated body 29.

SUMMARY OF ADVANTAGES

The adjustable length power unit 20 and the adjustable length and angle power unit 21, ready to be equipped with one of several rotating heads, are potentially available to be operated during the undertaking of: pruning trees and shrubs, tilling soil, washing surfaces, rough cleaning of parts, sanding of components and buffing of surfaces and other related functions.

The user generally remains at floor or ground level and works more quickly and safely directing the powered unit 20 or 21 operating above him. Many injuries caused upon landing after falls from ladders and other raised structures could have been avoided if the jobs had been undertaken using an embodiment of this adjustably positioned powered unit 20 or 21.

I claim:

1. An adjustably positioned powered tree and shrub pruner unit, also adaptable to performing other operations, comprising:

- a. an elongated telescoping body having an upwardly movable telescoping section formed with an elongated outer groove and a hollow center to accommodate electrical wires, and a lower hollow larger diameter telescoping section to receive substantially the full length of the upwardly movable telescoping section formed with aligned detents to slidably fit the elongated outer groove of the upwardly movable telescoping section to prevent their relative rotation and equipped with a friction locking means adjustable to frictionally hold the telescoping sections together at a selected overall body length, relative rotatable threaded hand adjustment means being incorporated into the friction locking means to adjust the frictional holding power;
- b. an electric motor unit secured to the top of the upwardly movable telescoping section receiving electrical power from wires directly passing up through the elongated telescoping body into the motor unit, having a motor housing with cooling air intake passages on the bottom and cooling air exit passages on the top to guide air in from below and eject air out above thereby preventing during operations the direct down draft of possible moisture, debris, and sawdust into the motor housing and beyond into the eyes and face of the operator and having a saw powered by the electric motor;
- c. hand gripping means secured to the lower hollow larger diameter telescoping section having a pistol hand grip portion at the lower end and a hand lateral bar grip portion secured a spaced distance

above, and also including a safety power on and automatic off switch in the pistol hand grip portion; and

- d. electrical wires extending directly from the electric motor down through the elongated telescoping body and beyond to a plug, being interrupted only for connections to the safety power on and automatic off switch located in the pistol hand grip portion.

2. An adjustable position power unit, as claimed in claim 1, comprising, in addition, an angular adjustment means secured between the elongated body and the motor unit.

3. An adjustable position power unit, as claimed in claim 1, comprising, in addition, a tilling head.

4. An adjustable position power unit, as claimed in claim 1, comprising, in addition, a wire brush head.

5. An adjustable position power unit, as claimed in claim 1, comprising, in addition, a sanding head.

6. An adjustable position power unit, as claimed in claim 1, comprising, in addition, a buffing head.

7. An adjustable position power unit, as claimed in claim 1, comprising, in addition, a brushing head.

8. An adjustable position power unit, as claimed in claim 7, comprising in addition, a water supply means secured in part to the elongated body to deliver water from a supply hose to the brushing head.

9. An adjustable position power unit, as claimed in claim 8, comprising in addition a cleaning fluid supply means secured in part to the elongated body and the water supply means to deliver cleaning fluid to the water supply means.

10. An adjustable position power unit, as claimed in

claim 8, comprising in addition, a control valve to stop and start the flow of cleaning fluid during the continuing flow of the water supply.

11. An adjustable position power unit, as claimed in claim 7, comprising in addition, a connecting means between the motor unit and the elongated body permitting angular adjustments of the brushing head to the surface being cleaned.

12. An adjustable position power unit, as claimed in claim 11, comprising, in addition, a connecting means between the brushing head and the motor unit also permitting angular adjustments of the brushing head to the surface being cleaned.

13. An adjustable position power unit, as claimed in claim 1, wherein the motor unit is an electric motor controlled in speed by operating a rheostat located at the handle means.

14. An adjustable position power unit, as claimed in claim 1, wherein the motor unit is an electric motor started and stopped by operating an on and off switch located in a power supply electrical cord secured to the handle means, the switch being away from the handle means along the cord so the cord may be looped to bring the switch to a selected position to be operated by a selected hand of the operator.

15. An adjustable position powered unit, as claimed in claim 1, wherein the housing is two pieced, having upper and lower portions joined together using sealable V joints.

16. An adjustable positioned powered unit, as claimed in claim 1, wherein the electric motor unit is pivotally secured to the elongated body.

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