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Kasper

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[54] **POWERED ROTARY BRUSH**

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[73] Assignee: **Tennant Company, Minneapolis, Minn.**

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Related U.S. Patent Documents

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[51] **Int. Cl.**[2] **E01H 1/04**
[52] **U.S. Cl.** **15/83**
[58] **Field of Search** ..... 15/78, 82–87, 15/340, 377, 375, 387, 389; 60/DIG. 10; 180/66 F

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[57] **ABSTRACT**

A sweeping machine having a frame, a pair of support members, and means for mounting the support members on the frame. A brush is rotatably mounted between the support members. A drive mechanism for the brush includes a source of power in a form capable of being transmitted by conduit means and a motor attached to one of the support members and being located substantially within an interior chamber defined by the brush and with the motor being capable of utilizing power from the source to rotate the brush.

12 Claims, 10 Drawing Figures

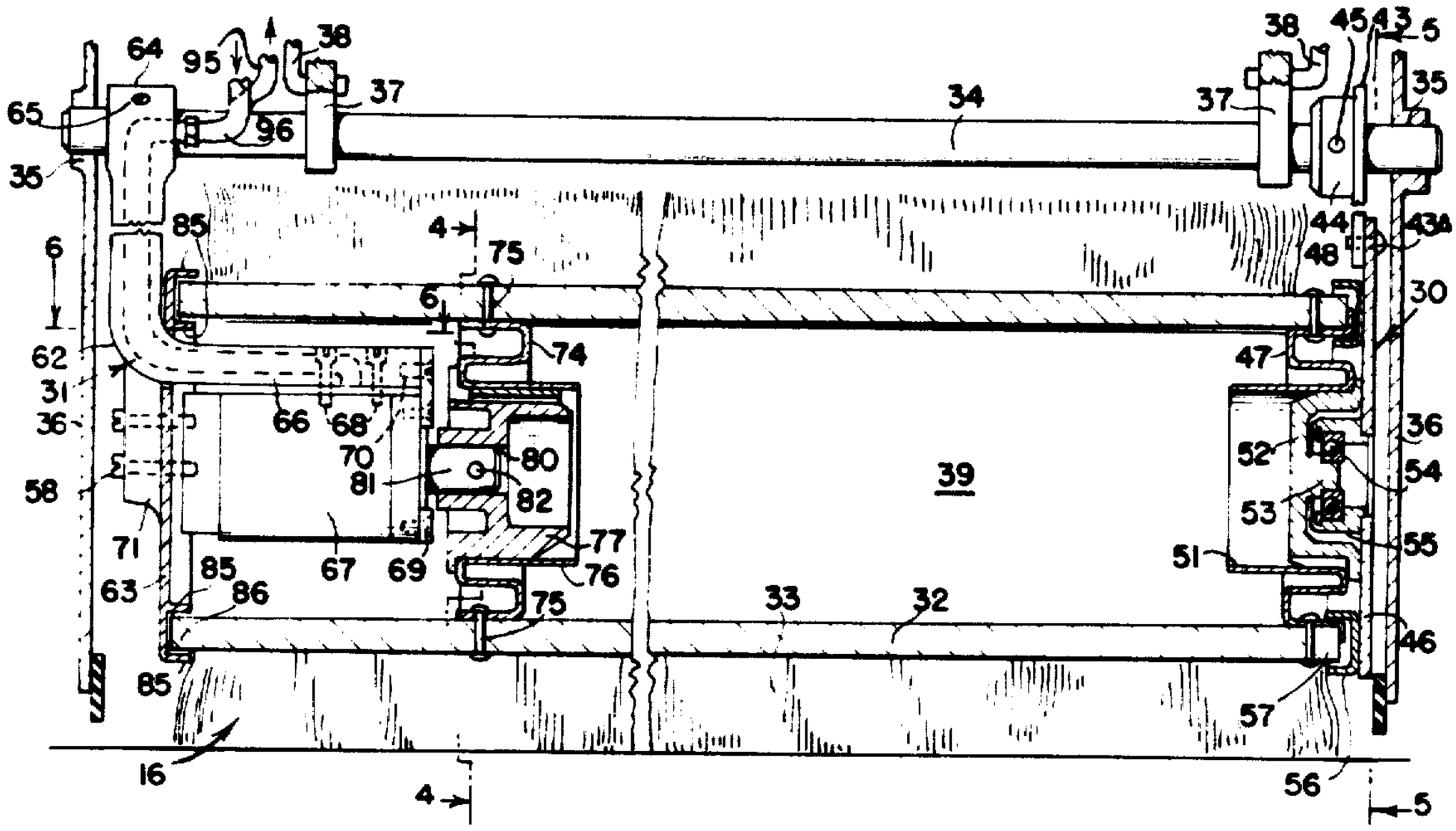

FIG. 1

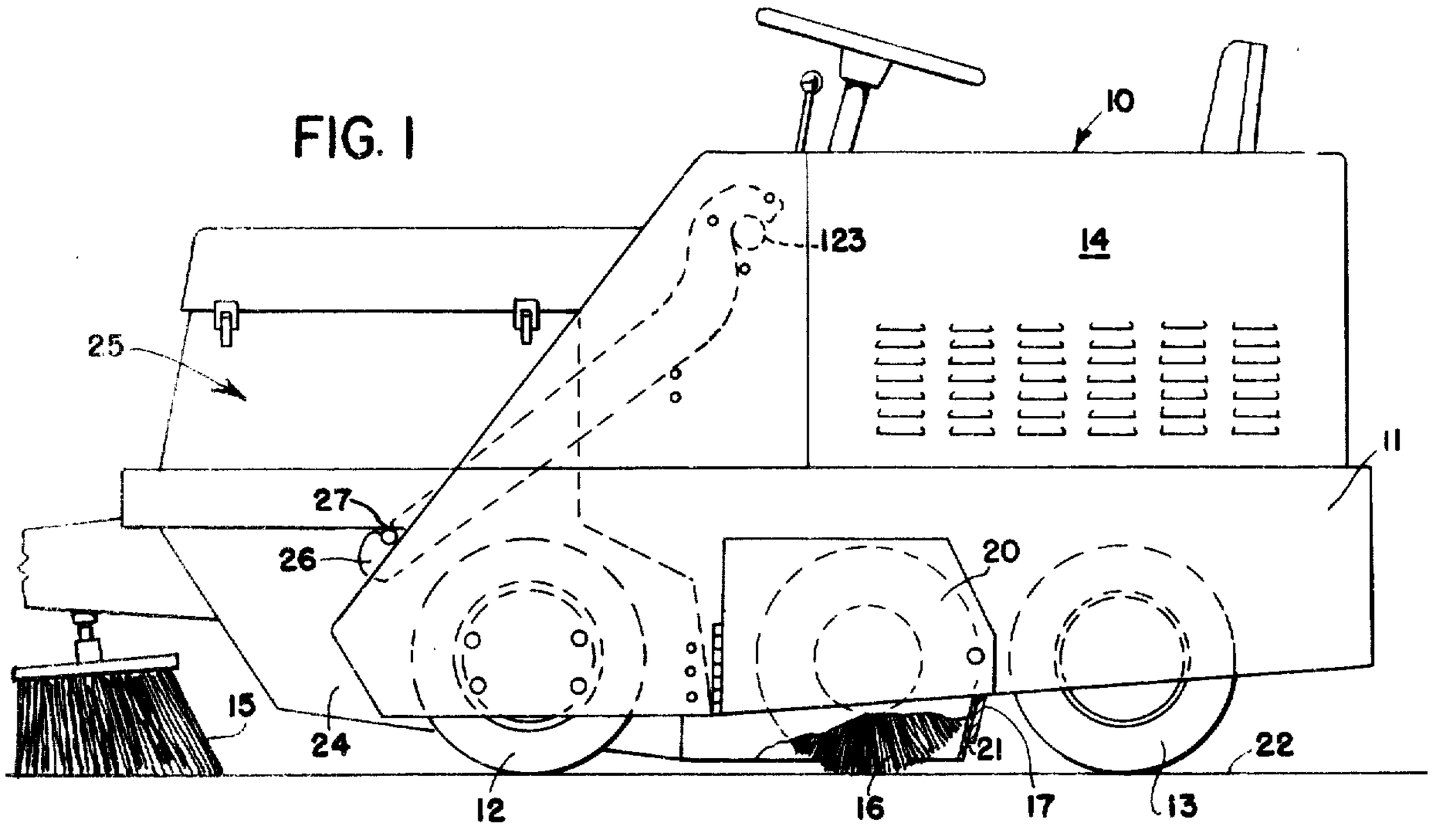

FIG. 2

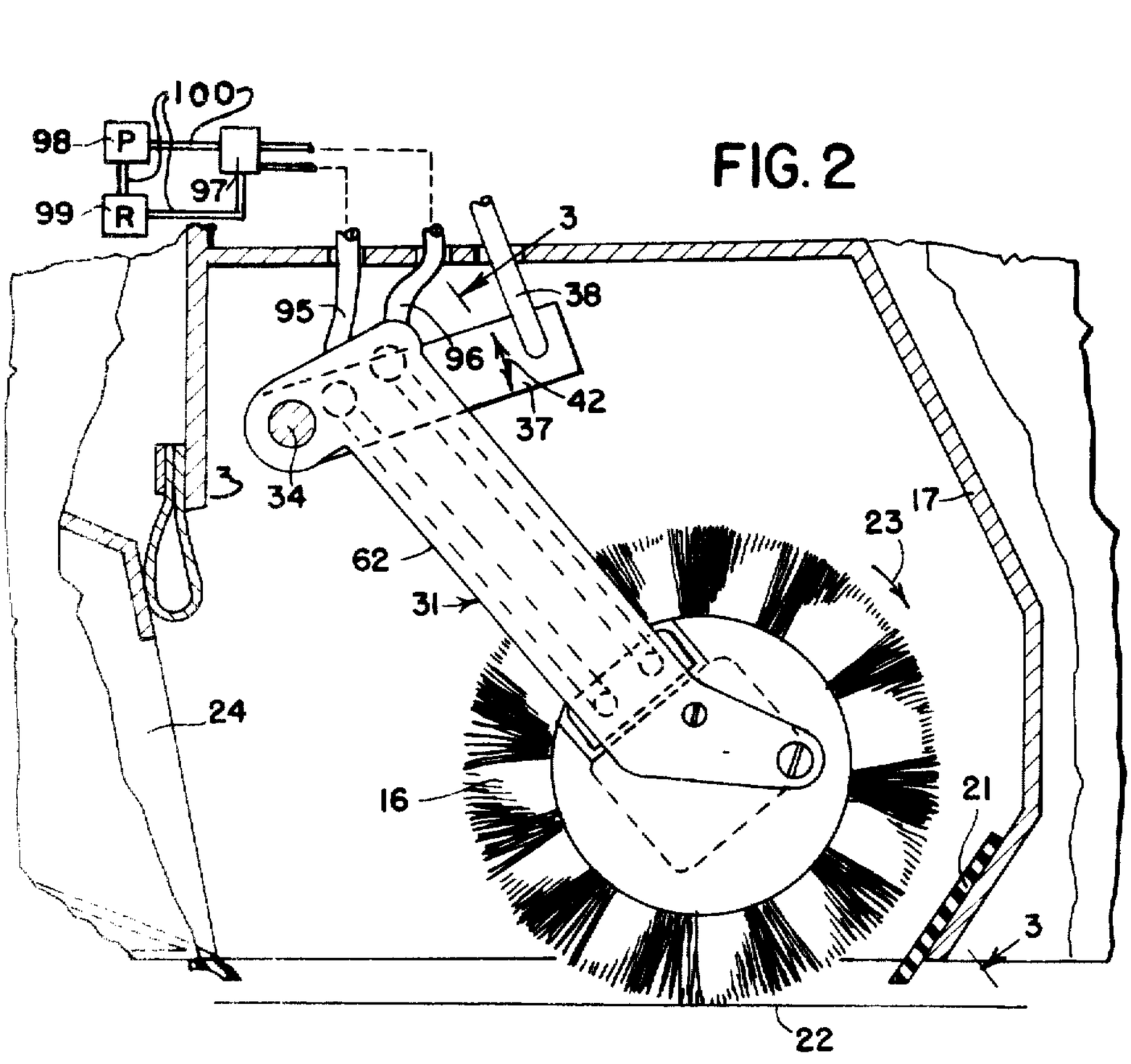

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FIG. 3

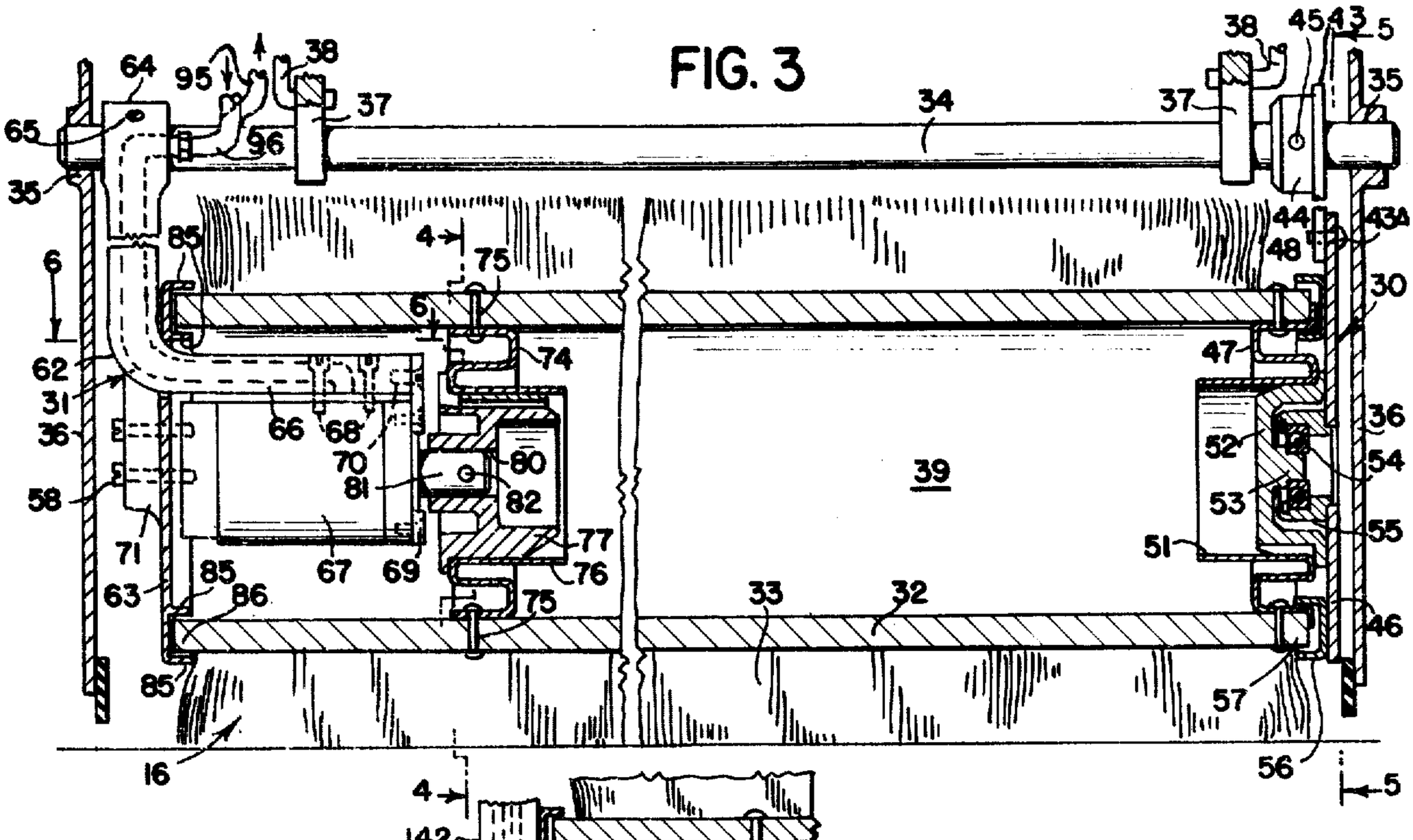


FIG. 10

FIG. 5

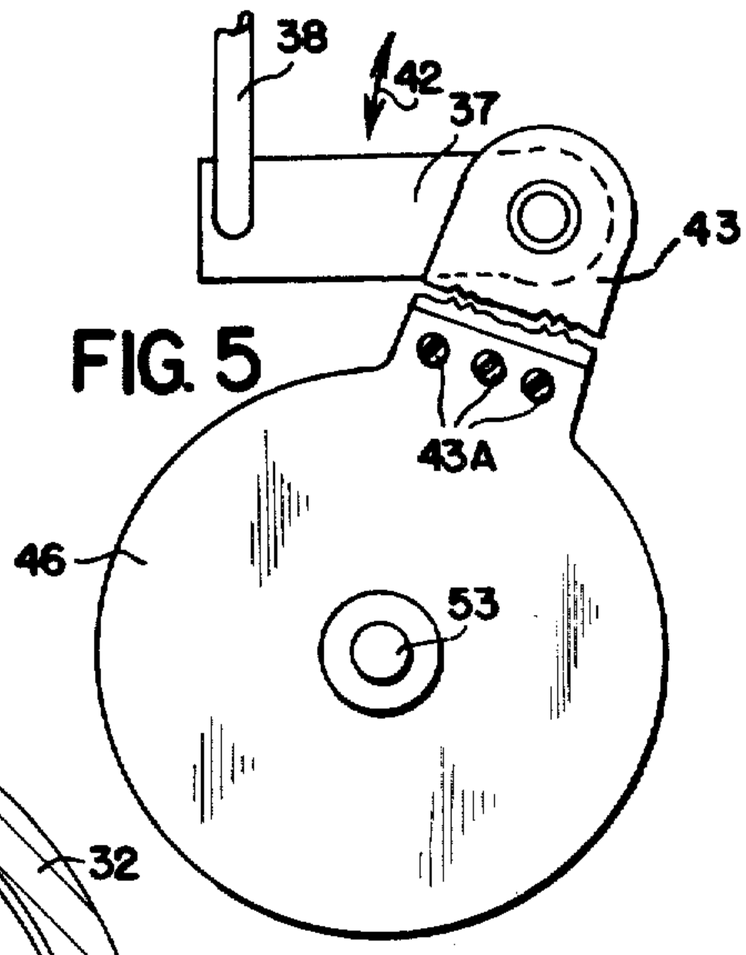
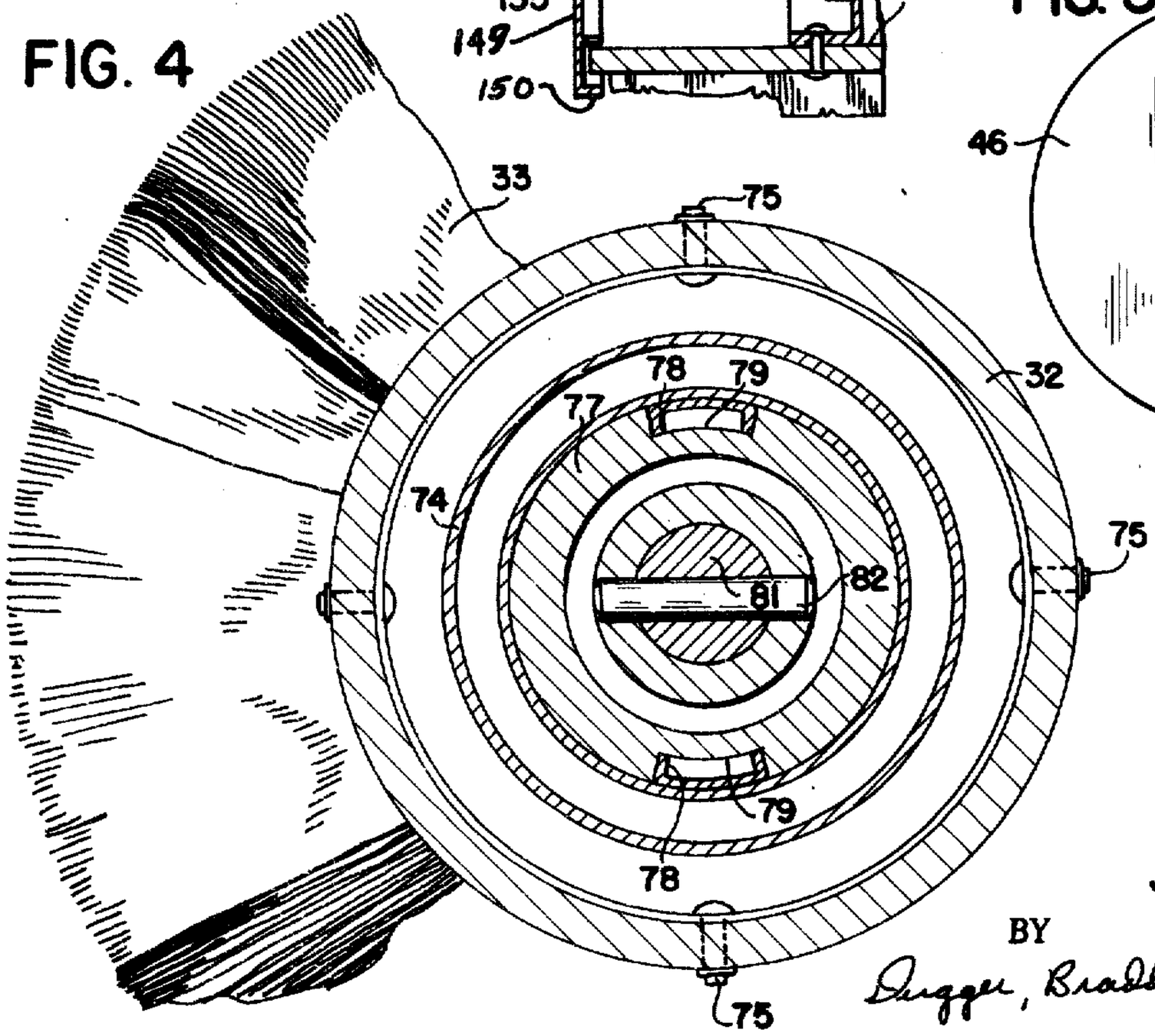


FIG. 4



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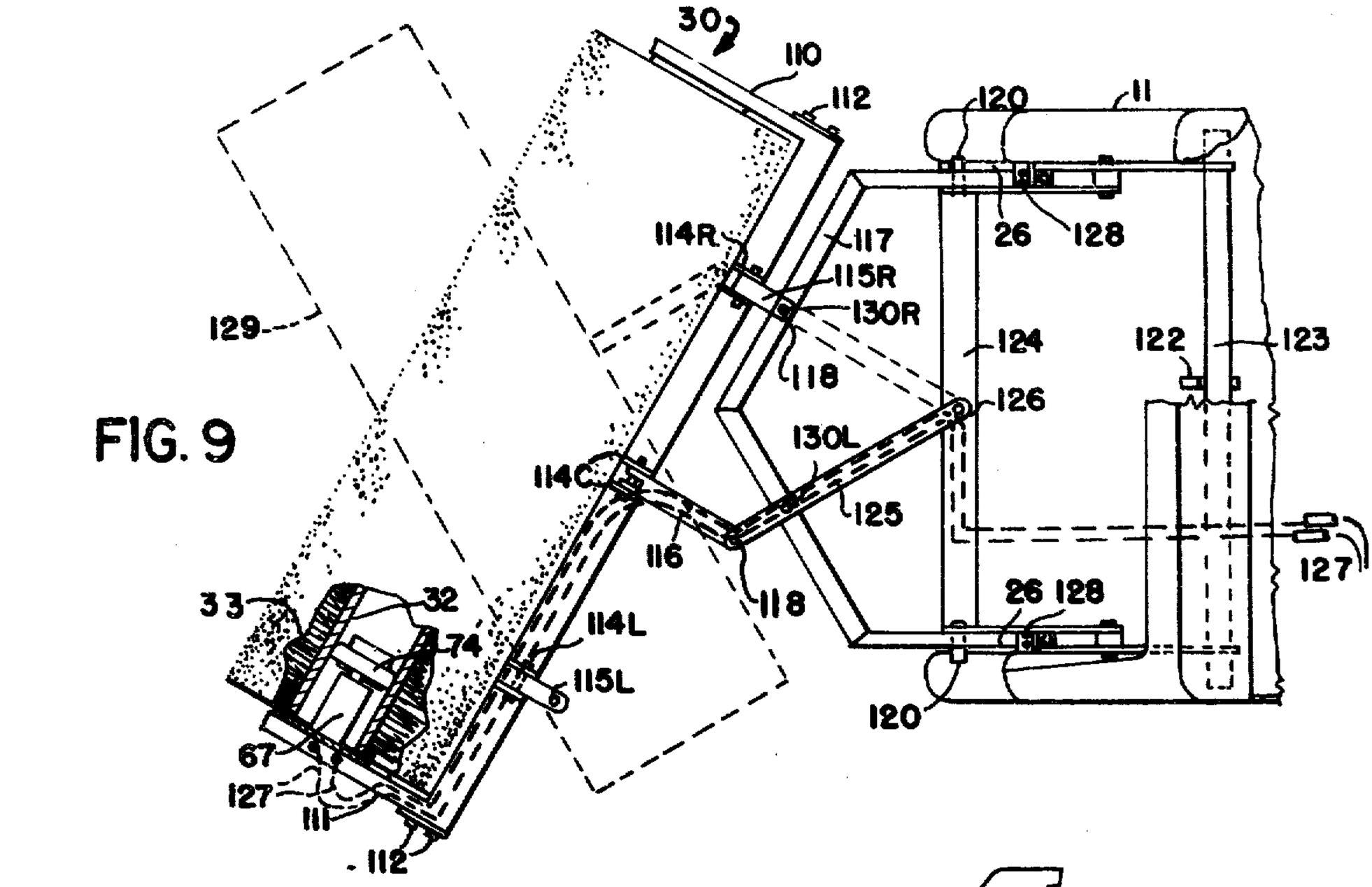

FIG. 9

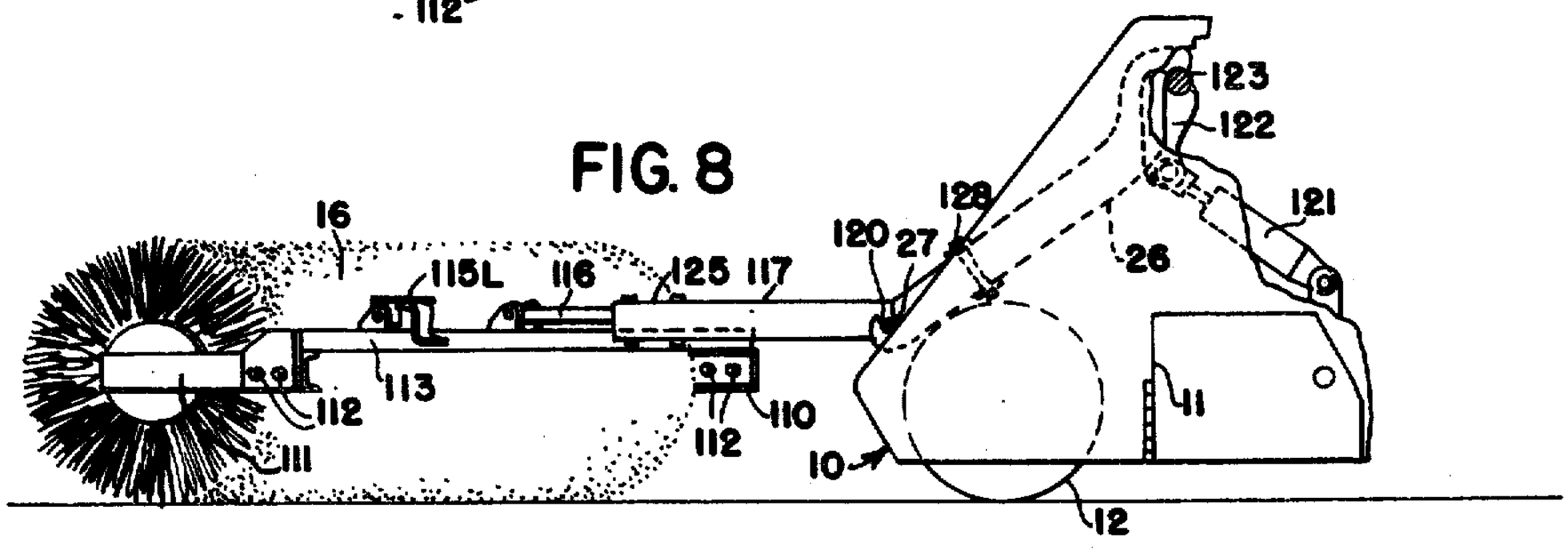

FIG. 8

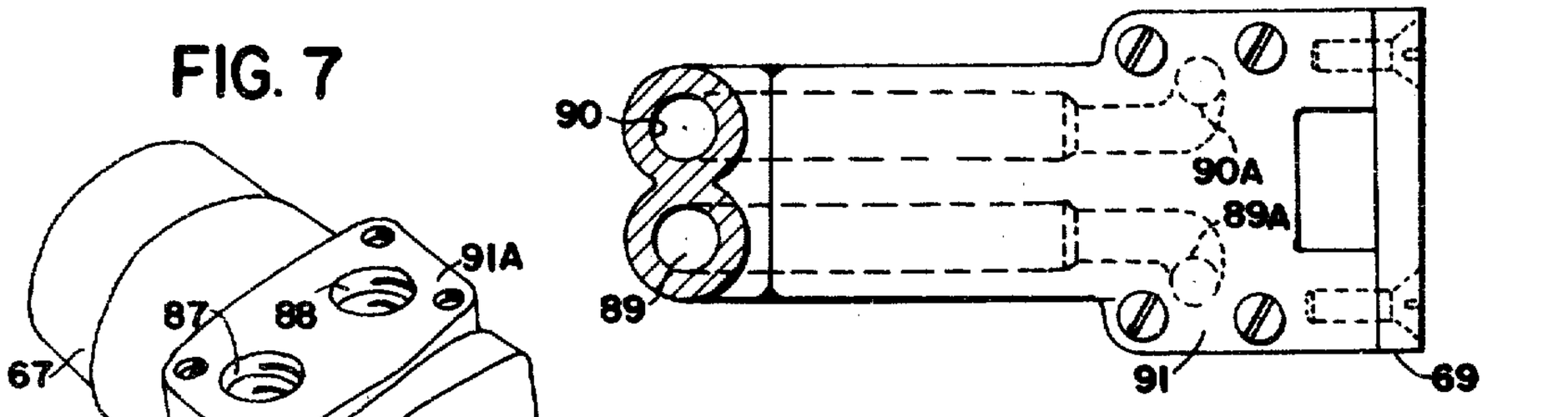

FIG. 6

FIG. 7

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POWERED ROTARY BRUSH

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

This invention relates to powered rotary brushes and more particularly to a rotary brush wherein the drive unit for powering the brush is contained inside the brush dimensions so that no external rotating drive members are present.

Presently, in general practice, cylindrical brushes and similar cylindrically shaped implements used for power driven sweeping and maintenance equipment are mounted on an axial shaft or stub shafts driven through suitable chain and sprocket or similar arrangements from a source of power remote from or external to the brush itself. Such drive arrangements cause many problems in operation due to foreign material getting into the drive, as well as requiring unnecessarily heavy structural components for holding the drives, increased difficulty in maintenance and changing or brush or other implement, and other technical and functional difficulties. Increased overall width of machines using conventional drives is also a problem where compactness is important, as in a street sweeping machine.

In order to overcome the problems involved with using external drive members as well as to provide for complete interchangeability of brushes or other implements, various devices have been advanced, none of which have proved entirely satisfactory.

The invention is specifically illustrated with reference to a tubular brush such as disclosed in Pat. No. 2,879,534, having a tubular core and bristles of various materials for sweeping polishing, scouring, etc. Insofar as concerns the present invention, the working implement may be any tool of similar general configuration having a tubular core on the periphery of which there is attached working elements which operate in a cylindrical path. Therefore in this specification the word "implement" will be used and will be understood to be inclusive of brushes, fans, abrading tools, etc. having a tubular center and an exterior working element.

The device disclosed in the present invention includes a completely enclosed rotating implement wherein the drive for the implement is a hydraulic motor and system, the motor being positioned partially or entirely within a tubular core member of the implement. There are no external drive parts used in connection with this device.

The tubular core of the implement has end flanges fixedly mounted to the core. A first of the end flanges, which is on the idler end of the implement, is positioned at or near the end of the tubular core and is rotatably mounted with respect to a support arm or other frame which in turn is mounted on the machine propelling the implement. Adjacent the other end of the implement, which is the drive end, and inside a tubular core thereof, a second end flange is fastened and it is spaced inwardly from the end of the core. An "L-shaped" support arm or frame piece is mounted on the machine propelling the implement and one leg of the L extends into the interior of the tubular core. A hydraulic motor having a powered output shaft is fixedly attached to the leg of the support arm adjacent the second end flange of the

implement. The hydraulic motor has a rotatable powered output shaft which in turn is drivably connected to the second end flange. The hydraulic motor is powered by fluid under pressure conducted through lines which, as disclosed, may be comprised as passageways within the L-shaped support arm itself or sturdy exterior lines mounted thereon. When the hydraulic motor is powered the implement is rotated for use. The only power connections from the brush to the machine propelling it are the two hydraulic conduits.

The implement can be mounted on any type of support mechanism. In the following specification two variations of support mechanisms are shown, one wherein the implement is a brush and is enclosed within the frame of the vehicle propelling it and the other wherein the implement is a heavy brush mounted ahead of the vehicle so that it can be used for windrowing swept material, such as dirt, debris, snow, etc. In either case, the power connections from the vehicle to the implement are composed solely by hydraulic conduits and the entire drive mechanism per se is contained within the core of the implement. This eliminates troublesome chain, gear or V-belt drives and reduces maintenance costs as well as making the whole device rugged, compact and its appearance more appealing.

While this invention is specifically illustrated with reference to a power driven brushing or sweeping machine, it is to be understood that the invention is not limited thereby and, as hereinbefore mentioned, the invention may be employed with equal advantages whereover a tubular cylindrical power driven implement is employed.

It is an object of the present invention to present a rotating tubular member having a self-contained power unit;

It is another object of the present invention to present a rotary tubular implement utilizing a self-contained hydraulic motor for a powering member.

It is a still further object of the present invention to present a power driven rotary implement wherein there are no external rotating drive members and the implement is driven directly by a hydraulic motor without external speed reduction mechanism.

Other and further objects are those inherent in the invention herein illustrated, described and claimed, and will be apparent as the description proceeds.

To the accomplishment of the foregoing and related ends, this invention then comprises the features hereinafter fully described and particularly pointed out in the claims, the following descriptions setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principles of the invention may be employed.

The invention is illustrated with reference to the drawings wherein:

FIG. **1** is a side elevational view of a power driven street sweeping machine having a rotary brush made according to the present invention installed thereon;

FIG. **2** is a fragmentary enlarged side elevational view of a power driven rotary brush mounted on the street sweeping machine shown in FIG. **1** with parts in section and parts broken away to show the drive mechanism of the rotary brush;

FIG. **3** is a sectional view taken as on line **3—3** in FIG. **2**;

FIG. **4** is a sectional view taken as on line **4—4** in FIG. **3**;

FIG. 5 is an end elevational view of an end support member of the device of the invention taken as on line 5—5 in FIG. 3;

FIG. 6 is an enlarged sectional view taken as on line 6—6 in FIG. 3 showing the unitary support arm and self contained conduits to mount the hydraulic motor and supply hydraulic fluid under pressure to the hydraulic motor used to drive the rotating implement;

FIG. 7 is a perspective view of an exemplary form of a hydraulic motor used to power a rotary implement made according to the present invention;

FIGS. 8 and 9 illustrate a rotary brush mounted on a sweeping machine according to another embodiment of the present invention, FIG. 8 being a fragmentary side elevational view thereof and FIG. 9 a top plan view of the device of FIG. 8; and

FIG. 10 is a vertical sectional view of a rotary implement showing a modified mounting for a hydraulic drive motor wherein the motor is partially positioned within the tubular member.

A power driven sweeper illustrated generally at 10 includes a lower main frame member 11 that is mounted on rotatable spaced front support idler wheels 12 and rear drive and steering wheel or wheels 13. An engine is mounted under a sheet metal hool 14 and serves to power the vehicle and supply power to operate the various sweeping brushes and accessories. A front curb or gathering brush 15 is drivably rotatably mounted at the front of the machine and a main (cylindrical) center brush 16 is rotatably mounted with its axis transverse to the normal path of motion of the machine, at a central location beneath the frame of the machine, in this illustrated embodiment.

This invention pertains to the main cylindrical brush 16, which is the implement illustrated. This center brush 16 is mounted within a housing 17 and a door 20 (and a similar door on the opposite side) opens through frame 11 to the housing 17 to provide access to the brush. A flexible skirt 21 is mounted around the lower edge of housing 17 and travels in close proximity to a surface 22 to be swept. The brush 16 is rotated in direction as indicated by arrow 23 and dirt and foreign objects on the surface 22 are swept into a pan 24 positioned ahead of the rotary brush. The front housing 25 of the street sweeping machine houses a filter (not shown), for separating the dust from the air flowing through the housing. In the machine illustrated, the upper surface of the filter (not shown) is covered by a suitable plenum chamber which is maintained at a negative pressure by suitable vacuum blower equipment, as illustrated in the copending application of Ralph C. Peabody and Keith N. Krier Ser. No. 137,864, filed Sept. 13, 1961. Air flow thus induced causes dust to be drawn from housing 17 along with the swept dirt. The pan 24 retains the larger dirt particles swept up and dust shaken from the filters is also caught in the pan 24. The front housing 25 (including pan 24) is removable from the main frame 11 of the street sweeping machine. This is accomplished by mounting it on a pair of arms 26, 26 each of which has a socket or notch 27 provided therein. The arms 26, 26 swing up about pivot axis 123 under power to raise or lower the pan 24 and housing 25 and can be used for mounting other devices to provide multiple uses of the sweeping machine, if desired.

The rotary brush 16 is mounted transverse to the direction of movement of the sweeping machine and is best seen in FIG. 3.

The rotary brush 16 is mounted between an idler end support assembly generally designated 30 and a drive end support assembly generally designated 31. As can be seen in FIG. 3, the brush 16 is comprised of a tubular core member 32 having bristles 33 fixedly attached thereto around the outer periphery thereof. This form of brush construction is fully described in Pat. No. 2,879,534. The tubular core 32 is hollow at 39, and, according to this invention this space is used for locating the hydraulic drive motor. The drive end support assembly 31 and the idler end support assembly 30 are, in effect, arms which are mounted on a common pivot shaft 34 that in turn is rotatably mounted in suitable bearings 35, 35 which are fixed to frame side plates 36, 36 of the sweeping machine 10. A pair of lift arms 37, 37 are fixedly attached to the pivot shaft 34. The lift arms 37, 37 are controlled through a pair of lift rods 38, 38 that in turn are movable in directions as indicated by double arrow 42 through power mechanisms (not shown) on the sweeping machine for swinging arms 30 and 31 to thus raise and lower the axis of brush 16.

It will be seen in FIG. 2 that the pivot shaft 34 for the end members of the roller is mounted forwardly from the axis of rotation of the brush 16.

The idler end support assembly 30 includes an arm assembly 43 that has an integral hub 44 that is pinned at 45 on the shaft 34. As shown in FIG. 5, arm assembly 43 includes a detachably secured disc-shaped shield member 46 which is held in place by screws 43A which are accessible through door 20. The rotary brush 16 is journalled on the axis of this disc-shaped member 46.

A flange or metal stamping 47 shaped as shown in FIG. 3 fits into the end of the tube 32. This flange 47 is fastened to the core 32 with a plurality of rivets 48. The flange includes an integral tubular hub 51 that is concentric with the axis of rotation of the rotary brush.

A wheel like member 52 has an easy slip fit into hub and supports the hub 51 and hence brush 16. The wheel member 52 includes an integral stub shaft 53 that extends into a bearing 54 which in turn is mounted in a bearing housing 55 that is made integral with the disc member 46 of the arm 43. The wheel member 52 is made so that the outer peripheral portions thereof are concentric with and overlap the bearing housing 55 in order to save space in the mounting assembly and also shield the bearing. Thus the brush is mounted by idler stub shaft 53 turning in the bearing 54 and brush 16 rotates about the axis of the stub shaft 55.

An annular ring or shield 55, which is channel-shaped in cross section, as best seen in FIG. 3, is fixedly attached to the disc-like member 46 of the arm 43. The outer flange of the annular ring 56 overlaps the outer edge portions 57 of the tubular core 32 of the rotary brush and the inner flange extends into that part of the flange 47 which fits the inner surface of tube 32. As the core 32 rotates, the ring remains stationary and helps to prevent foreign material from entering the region of the bearing 54 and damaging the moving parts.

The driven-end support assembly 31 of the rotary brush includes an L-shaped arm 62 having a spur 71 on which is mounted a disc-shaped member 63 which covers the end of tube 32. This member 63 is of substantially the same outer diameter as the tubular core 32 of the rotary brush, is transverse to the axis thereof and is held in place by bolts 58. Arm 66 extends through a hole in disc 63. Disc 63 has two concentric flanges 85 which fit close to but clear the marginal inner and outer edges of tube 32, much like the flanges on ring 56 at the opposite

end of tube **42**. These prevent entry of undue amounts of dust, dirt, string, etc. into tube **32**.

The arm **62** has an integral hub **64** that is fastened on shaft **34** by pin **65**. A leg member **66** on the L-shaped arm extends through disc **63** into the interior chamber **39** of tubular core member **32**. Leg **66** is substantially parallel to the longitudinal axis of tube **32** but is offset from the center.

A hydraulic motor **67** is fastened to the leg **66** with a plurality of screws **68** and with a motor retainer plate **69** that is fastened to the motor and to the leg **66** with screws **70**.

An internal flange **74** is shaped as shown in FIG. **3** is slipped inside the tubular core **32** and fastened to the wall of the core with rivets **75**. The internal flange **74** is the drive flange for the brush. The flange **74** has an integral hub **76** that is concentric with the hub **51** of the idler flange and concentric with tube **32**. An internal drive member **77** has an easy slip fit within hub **76** and is driven through suitable drive keys **78** that are fixedly attached to the interior surfaces of hub **76** and fit in grooves **79** provided in drive member **77**.

The drive member **77** is provided with a bore **80** that receives motor output drive shaft **81** to which it is pinned at **82**. Thus whenever the motor output shaft **81** is rotating under power the drive member **77** rotates and consequently flange **74** and the rotary brush **16** will also be rotated.

The flanges **85**, which are fixed to disc-shaped member **63** overlap end portion **86** of the drive end of the tubular core member **32** and, as does ring **56** on the idler end of the brush, prevent entry of dirt and foreign material into the interior chamber of the tubular core **32**. Thus the rotary brush is mounted so that it is rotatable with respect to the drive end support assembly **31** and the idler end support assembly **30**. The idler end of brush is rotatably mounted in bearing **54** and the drive end is mounted on and rotatably carried by the hydraulic motor output shaft **81**. The axis of the motor shaft and the center line of the bearing are concentric.

The motor **67** is a hydraulic motor of known design and has an inlet opening **87** and an outlet opening **88**. The inlet opening **87** and outlet opening **83** are positioned to align with the ends **89A** of an inlet conduit **89** and end **90A** of outlet conduit **90**, respectively. These conduits are provided by passageways in the L-shaped arm **62**. The leg **66** of arm **62** has a manifold platform **91** that aligns with a flat manifold **91A** on the hydraulic motor **67** and it is through these manifold portions that the connection between the conduits in leg **66** and the inlet and outlet openings **87** and **88** respectively of the motor is accomplished. Suitable sealing means (not shown) are provided to prevent leakage of hydraulic fluid.

The inlet and outlet conduits **89** and **90**, respectively, are connected to a suitable flexible inlet hose **96** and an outlet hose **95** which in turn pass through openings in housing **17** and are connected to a valve **97**. The valve **97** receives fluid under pressure from a pump **98** which draws hydraulic fluid from reservoir **99**. The pump **98** is capable of delivering a sufficient volume of fluid at a high enough pressure to operate motor **67** effectively. A reservoir **99** is also provided to receive returned hydraulic fluid. The pump, valve and reservoir are connected together with suitable conduits **100** as shown schematically in FIG. **2**.

In order to operate the brush, the valve **97** is moved to position to direct fluid under pressure from pump **98** through inlet hose **96** and thus through conduit **89** and into inlet opening **87** of the motor. The motor then drives output shaft **81** which in turn drives through drive member **77** and flange **74** to the tubular core member **32** of the rotary brush. Fluid will be exhausted out through the opposite motor opening and outlet conduits. The brush will be rotated in direction as indicated by arrow **23** and will sweep debris and dirt from surface **22** into the pan **24**. If the motor or the brush is to be stopped, the valve is returned to a "neutral" position wherein fluid from the pump is recirculated directly to a reservoir **99** and the motor **67** will stop. The device can be reversed by reversing the direction of flow of the fluid under pressure, if desired.

The rotary brush can be raised and lowered very easily by suitable mechanism operating lift rods **38** and arms **37**. There is no need to provide for change of chain length or other problems encountered when mechanical drives are employed. The self-contained drive unit makes the rotary brush simple to operate and prevents damage to the drive components, as the components are within the interior chamber **39** of tubular core **32**. The components are also protected from dirt and dust as the slinger rings provide an adequate seal to prevent introduction of foreign material. The unit is compact in design and thus highly maneuverable, particularly in narrow places.

A second embodiment of the invention is illustrated in FIGS. **8** and **9**. In this form of the invention the rotary brush is mounted ahead of the sweeping machine and can easily be attached and removed for use in special jobs such as windrowing dirt, debris and snow. There are no chains or other moving drive members that have to be connected. It should be noted that parts identical with parts in the first form of the invention will be identically numbered.

In this embodiment of the invention also, a rotary brush **16** includes a tubular core member **32** with bristles **33** mounted thereon. A hydraulic motor **67** is positioned to drive the drive flange **74** in the same manner as in the previous form of the invention. The idler end assembly **30** is substantially the same as in the first form of the invention with the exception that an arm **110** is utilized which is removably attached by bolts **112** to a cross frame **113**.

On the drive end of the brush an arm **111** is utilized which is also fastened with suitable bolts **112** to a cross frame **113**. Cross frame **113** is positioned behind the brush **116** and extends parallel to the brush. Three pairs of ears **114L**, **114C** and **114R** are fixedly attached to the top surface of cross frame **113** and all are apertured along a common axis. These ears are utilized (the center pair and either end pair), two at a time, to hold the cross frame **113**. A pair of short connector links **115L** and **115R** are pivotally mounted on the common aperture axis and attached to the two outer parts of ears **114L** or **114R**. A long connector link **116** is pivotally mounted also on the common axis and attached to the center pair of ears **114C**.

The long connector link **116**, in the center, and one short connector at either end are attached to a suitable pusher frame assembly **117–125–124** with pins **118**. The pusher frame assembly **117–125–124** has a pair of integral stub lift pins **120, 120** that are adapted to fit into notches **27** of the forward arms **26** of the street sweeping machine **10**. The arms **26** are adapted to be swung up and down through the instrumentality of hydraulic cylinder **121** on the machine that can be caused to exert

a force on a lever **122** and rotate a rock shaft **123**, on which the arms **26** are mounted. The rock shaft is rotatably mounted with respect to the sweeping machine **10**. Thus the arms which can be raised or lowered to dump pan **24** (FIG. **1**) can also be raised or lowered to pick up an object, such as the pusher frame assembly **117** or to adjust the height thereof, and the machine **10** therefore has much versatility.

It should be noted that the pusher frame assembly includes a cross member **124** to which a swinging support arm **125** is pivotally mounted, as at **126**. The long connector link **116** is pivoted on the end of arm **125** by pin **118**. The short connector links **115L** or **115R** at either the left or right end of cross member **113** can be attached to frame **117**. The swinging support arm **125** can be moved from position as shown in FIG. **9** toward the opposite side of the pusher frame and secured at either position by a drop pin at position **130L** or **130R**. In either position the whole brush **16** and cross frame **113** can be swung on pivot **118** to bring the other short link **115L** or **115R** to registry with frame **117**. In FIG. **9** the short connector link **115R** at the right end of the cross member **113** is attached to frame **117** by pin **130R** and the angle of the rotary brush is set to sweep to the right. This can be changed to the position as shown in dotted lines at **129** in FIG. **9** by changing the position of the arm **125** and securing it at pin **130R** and by then swinging brush **16** and frame **113** to bring link **115L** to a position to register with pin **130L** where it is secured.

In order to drive the rotary brush in its position as shown in FIGS. **8** and **9** it is only necessary to connect two hydraulic lines **127, 127** leading to the hydraulic motor **67**. This can be accomplished with quick acting hydraulic couplers. The drive connection is thus very simple and rapid to make.

As stated previously, the front housing **25** and pan **24** of the sweeping machine can be removed from the arms **26** and the pusher frame **117** installed in a matter of minutes. In addition to the stub pins **120** for connecting the pusher frame to the arms **26** a clamp **128** can be utilized to hold the frame in place on the arms.

The brush will be operated as in the form of the invention, by moving a valve to position to direct fluid under pressure to motor **67** and rotate the brush. As the street sweeping machine moves forward the brush will rotate and sweep material into a windrow deposited outside the trailing end of the brush. The brush mounted in this manner can be used for sweeping snow or for other jobs where the material does not have to be removed but merely placed in a windrow. The rotation of the brush is reversible by reversing the flow of fluid under pressure to the motor.

The brush angle can be reversed quickly through use of the swinging arm and releasable connector links. The unit can be adapted to any sweeping job.

FIG. **10** illustrates a further modification of the device of the invention wherein a hydraulic drive motor **135** is mounted partially within a tubular core member **136** of an implement and has an output shaft **137** that is drivably mounted in a flange **138** that is fixed to the core member **136**.

The hydraulic motor **135** is of modified design, having a manifold portion **140** at a rear end thereof that mates with a manifold **141** of a support arm **142**. Inlet and outlet hydraulic conduits **143** and **144** respectively are provided within the support arm **142** and these align with inlet and outlet openings in the hydraulic motor.

The motor may be attached to support arm **142** with cap screws **145** and a support plate **146**.

An end plate **149** is fixed to arm **142** and has an annular slinger ring **150** that overlaps the end portion of the tubular core member **136** to prevent entry of dirt and foreign material into the core. The motor **135** extends through a provided hole **148** into the interior of the core.

As can be seen, the hydraulic motor **135** extends only partially into the chamber of the core member. However, the drive shaft of the motor is protected from damage and the overall width of the unit is not increased.

It is apparent that many modifications and variations of this invention as hereinbefore set forth may be made without departing from the spirit and scope thereof. The specific embodiments described are given by way of example only and the invention is limited only by the terms of the appended claims.

What is claimed is:

1. The combination with a sweeping machine having a frame *including an implement housing with a pair of end walls* a pair of *pinstable* support members, means for mounting said support members on said frame *closely adjacent said housing end walls,* and a tubular member rotatably mounted between said support members for rotation about the longitudinal axis of the tubular member, of:

a drive mechanism for rotating said tubular member, said drive mechanism including:

a source of *fluid* power in a form capable of being transmitted by conduit means,

a motor fixedly attached to a first of said support members, said motor having an output shaft and being capable of utilizing power from said source to rotate said output shaft, said motor being located substantially within the interior chamber defined by said tubular member,

drive means connected between said output shaft for driving said tubular member and supporting a first end of said tubular member,

fluid conduit means connected between said power source and said motor, and

control means to control the transmission of power through said conduit means to said motor.

2. The combination as specified in claim **1** wherein said source of power is a source of fluid under pressure and said motor is a fluid motor.

3. The combination with a frame movable over a supporting surface, and a pair of support arms attached to said frame, of:

a source of fluid under pressure on said frame,

a fluid motor fixedly attached to a first of said support arms, said motor having an output shaft and being capable of utilizing said fluid under pressure to rotate said output shaft under power,

a drive flange drivably mounted on the output shaft of said fluid motor,

a tubular implement drivably mounted in surrounding relationship to the drive flange adjacent a first end thereof and rotatably mounted on a second of said arms at a second end thereof,

conduit means connected between said source of fluid under pressure and said fluid motor *said conduit means including passageways in said support arms*, and

control valve means located in said conduit means to selectively control the flow of fluid under the pres-

sure from said source to said motor, said motor being located at least partially within the interior chamber defined by said tubular implement.

[4. The combination as specified in claim 3 wherein said support arm to which said motor is attached has passageways therein constituting portions of said conduit means.]

5. The combination with a power sweeping machine having a main frame and support means comprising first and second arms on said frame, of:

a source of fluid under pressure,

a fluid motor fixedly mounted on a first of said support arms and having an output shaft rotatable under power when said motor receives fluid under pressure,

a tubular implement drivably mounted on and supported by said output shaft of said fluid motor at a first end thereof and rotatably mounted on a second of said arms at a second end thereof, said motor being mounted substantially within the interior chamber defined by said tubular implement, *means for adjusting the orientation of said tubular implement so that the axis of said tubular implement may be selectively positioned in opposite angular directions with respect to the direction of travel of said machine,*

conduit means open from said source of fluid under pressure to said fluid motor, and

control valve means located in said conduit means and adapted to selectively control flow of fluid under pressure from said source to said fluid motor.

6. The combination as specified in claim 5 wherein said second arm is substantially planar and said first arm is L-shaped, one of the legs of said L-shaped arm projecting inwardly into the interior chamber defined by said tubular implement, said fluid motor being fixedly attached to the leg of said arm that extends into said chamber of said tubular implement.

7. The combination of specified in claim 5 wherein said support arms are mounted on said sweeping machine through independent means comprising a pusher frame mounted on said main frame and extending forwardly from said power sweeping machine, and means for pivotally mounting said support arms to said pusher frame.

8. The combination with a prime mover having a main frame and adaptable to be propelled along a supporting surface, of:

a pusher frame mounted with respect to said main frame ahead of said prime mover,

a pair of support arms, means for pivotally mounting said support arms on said pusher frame,

a substantially cylindrical implement having a central tubular core member rotatably mounted with respect to, and between said support arms for rotation about the longitudinal axis of said tubular core member,

a source of fluid under pressure mounted on said prime mover,

a fluid motor fixedly mounted with respect to one of said support arms and having an output shaft rotatable under power when said motor receives fluid under pressure, said motor being mounted within the interior chamber defined by said tubular core member,

drive means connected between said output shaft of said fluid motor and said tubular core so that when said output shaft is rotated said implement will rotate about its longitudinal axis,

said pusher frame including adjustable mounting mechanism so that the axis of said tubular core member can be selectively positioned in opposite angular directions with respect to the direction of travel of said prime mover,

flexible conduit means open from said source of fluid under pressure to said fluid motor, said conduit means being of sufficient length and flexibility to permit the angular position of said implement to be changed without disconnecting said conduit means, and

control valve means located in said conduit means and adapted to selectively control flow of fluid under pressure from said source to said fluid motor.

9. The combination as specified in claim 8 wherein said implement is a cylindrical powered brush.

10. The combination with a sweeping machine adapted to move over a surface to be swept comprising:

a frame including implement housing means;

first and second support members;

means for pivotally mounting said first and second support members to said frame housing in spaced apart relationship, said first and second support members being pivotable vertically away from said surface to be swept; and

a tubular implement member rotatably mounted between said first and second support members for rotation about the longitudinal axis of the tubular member, of:

a drive mechanism for rotating said tubular member, said drive mechanism including:

a source of power in a form capable of being transmitted by a conduit means;

a motor fixedly attached to said first support member;

said motor having an output shaft and being capable of utilizing power from said source to rotate said output shaft;

said motor being located substantially within the interior chamber defined by said tubular member;

drive means connected between said output shaft for driving said tubular member and supporting a first end of said tubular member;

conduit means connected between said power source and said motor;

said conduit means being at least partially flexible to allow pivotable movement of said first and second support members;

control means to control the transmission of power through said conduit means to said motor; and

means connected to raise and lower said first and second support arms and the axis of said tubular member.

11. A power driven sweeper comprising:

a frame member mounted on support wheels and at least one drive wheel and adapted to move over a surface to be swept, said frame member including a brush housing;

first and second support members;

means for pivotally mounting said first and second support members in said brush housing in spaced apart relationship, said first and second support members being pivotable within said housing for movement vertically away from said surface to be swept;

a cylindrical brush member rotatably mounted between said first and second support member for rotation about the longitudinal axis of the brush member;

a source of fluid under pressure on said frame;

a motor fixedly attached to said first support member;

said motor having an output shaft and being capable of utilizing said fluid under pressure to rotate said output shaft under power;

said motor being located substantially within the interior chamber defined by said brush member;

conduit means connected between said source of fluid under pressure and said motor, said conduit means being at least partially flexible to allow pivotable movement of said first and second support members;

control means connected to control the flow of fluid under pressure through said conduit means to said motor independent of any drive to said sweeper; and

means connected to raise and lower said first and second support arms and the axis of said brush member.

12. A power driven sweeper comprising:

a frame member mounted on support wheels and at least one drive wheel and adapted to move over a surface to be swept;

first and second support members each having first and second ends, the second end of said first support member having a protrusion extending inwardly of said sweeper generally transversely at said sweeper;

means for pivotally mounting the first ends of each of said first and second support members to said frame in spaced apart relationship, said first and second support members being pivotable vertically away from said surface to be swept;

a cylindrical brush member having a central tubular core member rotatably mounted between said first and second support members for rotation about the longitudinal axis of the brush member, the protrusion of said first support member extending into said control tubular core member;

a source of fluid under pressure on said frame;

a motor fixedly attached to the protrusion of said first support member;

said motor having an output shaft and being capable of utilizing said fluid under pressure to rotate said output shaft under power;

said motor being located at least partially within the interior chamber defined by said tubular core member;

drive means connected between said output shaft for supporting a first end of said brush member and for driving said brush member;

conduit means connected between said source of fluid under pressure and said motor, said conduit means being at least partially flexible to allow pivotable movement of said first and second support members;

control means connected to control the flow of fluid under pressure through said conduit means to said motor independent of any drive to said sweeper; and

means connected to raise and lower said first and second support arms and the axis of said brush member.

13. The combination with a sweeping machine comprising:

a frame;

a pair of support members;

means for mounting said support members on said frame; and

a tubular member rotatably mounted between said support members for rotation about the longitudinal axis of the tubular member, of:

a drive mechanism for rotating said tubular member, said drive mechanism including:

a source of power in a form capable of being transmitted by conduit means;

a motor fixedly attached to a first of said support members;

said motor having an output shaft and being capable of utilizing power from said source to rotate said output shaft;

said motor being located at least partially within the interior chamber defined by said tubular member;

conduit means connected between said power source and said motor;

control means to control the transmission of power through said conduit means to said motor;

drive means connected between said output shaft for driving said tubular member and supporting a first end of said tubular member, said drive means including:

an internal flange attached to said tubular member within said interior chamber; and

an internal drive member mounted on the output shaft of said motor, said shaft extending through and directly driving said flange.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : Re. 29,957
DATED : April 10, 1979
INVENTOR(S) : Joseph G. Kasper

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1, line 3, change "pinstable" to --pivotable--.

Signed and Sealed this

Twenty-fourth Day of *July 1979*

[SEAL]

Attest:

Attesting Officer

LUTRELLE F. PARKER
Acting Commissioner of Patents and Trademarks