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This application was filed on 31.10.2005 as a
divisional application to the application mentioned
under INID code 62.

(54) **Airless spray pump**

(57) An airless spray pump having an inlet tube and
an inlet filter screen, the improvement comprising said
inlet tube being provided with a female threaded end and
said inlet filter screen assembly being provided with a

male threaded end threaded engagement with female
end, said ends having the same size and thread as a
common garden hose such that a user need merely re-
move said screen assembly and attach a garden hose
to said inlet tube to flush out the assembly.

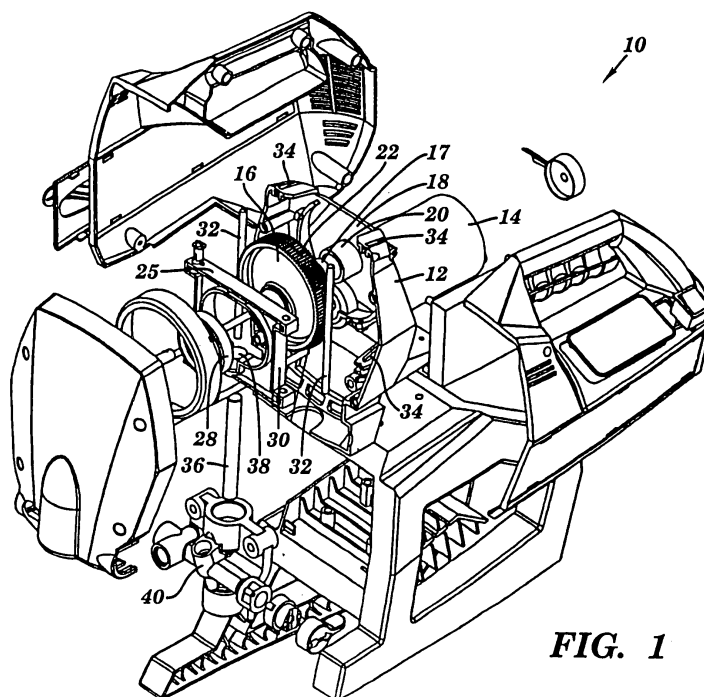


FIG. 1

Description

TECHNICAL FIELD

[0001] Airless spray pumps for the spraying of paints and other coatings.

BACKGROUND ART

[0002] Airless spray pumps for the spraying of paints and other coatings via the airless method are well known and have traditionally been divided into two types, diaphragm pumps for the lower end of the market and reciprocating piston pumps for the higher end.

DISCLOSURE OF THE INVENTION

[0003] An airless spray pump is provided with a single-acting piston pump which allows the use of a low-cost yoke drive. Motor and pump shaft are offset for most efficient force utilization. The main drive housing has a motor mounted to the rear thereof. A gear assembly uses gear teeth which are formed with a 5° helical angle and have a 25° pressure angle. This geometry combines the higher efficiency of straight cut gears with the noise reduction typified in a helical design.

[0004] An eccentric is molded onto the front of the gear assembly and has located thereabout a bearing assembly which rides inside a yoke. The yoke moves vertically on guide rods which are retained in pockets of the drive housing. The yoke is molded of plastic as is the gear assembly leading to lower cost and easier manufacture.

[0005] The pump rod is provided with a cap over the top end thereof which has bearing. Pump assembly is designed as a single acting pump, that is, the pump only pumps on the downward stroke and loads on the upward stroke. This allows the components of the drive train, including the yoke and gear, to be much lighter as the yoke ends up being more of a guidance device rather than a force-applying device.

[0006] The motor and pinion are offset from the centerline of the pump assembly. This arrangement does not have any significant cantilevering as the pump rod, pinion, yoke, eccentric and cap are all located in the same plane. The location of the rod and the single acting pump with respect to the gear centerline reduces the thrust loads on the yoke. The location of the pinion on the gear partially offsets and reduces the pump forces on the gear shaft and bearings. By locating the eccentric bearing directly on the end of the pump rod cap which is press-fit it eliminates the transfer of pumping force through an intermediate member such as the yoke which provides longer life, efficiency and allows the manufacture of a more inexpensive yoke assembly.

[0007] The shaft packing assembly is comprised of a packing housing which screws into the pump housing and which contains a felt member which has been soaked with throat seal lubricant or other solvent or lubricant. A

stack of v-packings are compressed in place by wave spring which is tightened by tightening the seal housing into the pump housing .

[0008] The inlet check is provided with a check ball and a check seat which is pressed into a check housing and which is held in place by a retainer. These parts all press-fit into one another such that the complete assembly be merely screwed into main pump housing for replacement. Similarly, outlet check assembly is formed of an outlet check housing which is screwed into a pump housing and similarly is provided with a check ball held in place by a retainer. The outlet passageway is angled relative to the axis of the pump shaft. This allows the outlet check assembly to operate essentially via gravity and yet requires only the drilling and provision of one passageway while maintaining an essentially vertical ball-seat relationship.

[0009] These and other objects and advantages of the invention will appear more fully from the following description made in conjunction with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views.

BRIEF DESCRIPTION OF DRAWINGS

[0010]

FIG. 1 is a prospective exploded view showing the airless spray pump with the instant invention.

FIG. 2 is a simple front plan view of the drive assembly and pump of the instant invention.

FIG. 3 is a side plan view of the assembly shown in FIG. 1.

FIG. 4 is a detailed exploded view of the circled area in FIG. 3.

FIG. 5 is a cross-sectional view of the pump of the instant invention.

FIG. 6 shows more details of the drive assembly of the instant invention.

FIG. 7 is another cross-sectional view of the pump portion of the instant invention.

FIG. 8 is a cross-section of the outlet filter of the instant invention.

FIG. 9 is an exploded view of the outlet filter of the instant invention.

FIG. 10 is a perspective exploded view of the instant invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0011] The instant invention generally designated 10 is comprised of a main drive housing 12 having a motor 14 mounted to the rear thereof. A gear assembly 16 having a rear bearing 17 and gear teeth 22 is inserted into the bearing housing 20 of drive housing 12. Gear teeth 22 on gear assembly 16 mate with the teeth on pinion 24 on the end of motor 14. The teeth 22 and on pinion 24 are formed with a 5° helical angle and have a 25° pressure angle. This geometry combines the higher efficiency of straight cut gears with the noise reduction typified in a helical design.

[0012] An eccentric 25 is also molded onto the front of gear assembly 16 and has located thereabout a bearing assembly 28 which rides inside a yoke 30. Yoke 30 moves vertically on guide rods 32 which are retained in pockets 34 of drive housing 12. Yoke 30 is molded of plastic. Gear assembly 16 is cast in ZA-12 with an integral counterweight leading to lower cost and easier manufacture.

[0013] Pump rod 36 is provided with a cap 38 over the top end thereof which has bearing upon it bearing 28. Pump assembly 40 is designed as a single acting pump that is the pump only pumps on the downward stroke and loads on the upward stroke. In doing so this allows the components of the drive train, including the yoke and gear, to be much lighter as the yoke 30 ends up being more of a guidance device rather than a force-applying device.

[0014] As can be seen more particularly in FIG. 2, motor and pinion 24 are offset from the centerline 42 of pump assembly 40 which also has offset therefrom bearing 20 in the opposite direction. Also, this arrangement does not have any significant cantilevering as the pump rod, pinion, yoke, eccentric and cap are all located in the same plane. The location of the rod and the single acting pump with respect to the gear centerline reduces the thrust loads on the yoke. The location of the pinion on the gear partially offsets and reduces the pump forces on the gear shaft and bearings. By locating the eccentric bearing directly on the end of the pump rod cap which is press-fit it eliminates the transfer of pumping force through an intermediate member such as the yoke which provides longer life, efficiency and allows the manufacture of a more inexpensive yoke assembly.

[0015] The shaft packing assembly 44 shown in FIG. 4 is comprised of a packing housing 46 which screws into pump housing 48 and which contains a felt member 50 which has been soaked with throat seal lubricant or other solvent or lubricant. A stack of v-packings 52 are compressed in place by wave spring 54 which is tightened by tightening seal housing 46 into pump housing 48.

[0016] Turning to FIG. 7, inlet check 56 is provided with a check ball 58, a check seat 60 which is pressed into check housing 62 and which is held in place by retainer and integral ball guide 64. These parts all press-fit into one another such that the complete assembly be merely

screwed into main pump housing 48 for replacement. Similarly, outlet check assembly is formed of an outlet check housing 60 which is screwed into pump housing 48 and similarly is provided with a check ball 62 held in place by ball seat 65. As can also be seen in FIG. 7, the outlet passageway 66 is angled relative to the axis of pump shaft 36. This allows the outlet check assembly 58 to operate essentially via gravity and yet requires only the drilling and provision of one passageway while maintaining an essentially vertical ball-seat relationship.

[0017] FIGs. 8 and 9 show the outlet filter assembly 80 which is comprised of a filter element 82 contained in passage 84 of pump assembly 40 and which is retained by fitting 86.

[0018] Turning to FIG. 10, inlet tube 70 is provided with a female threaded end 70a. Inlet filter screen assembly 72 has a male threaded end 72a for threaded engagement with end 70a. Ends 70a and 72a use the same size and thread as a common garden hose such that a user need merely remove screen assembly 72, attach a garden hose to inlet tube 70, turn on the water and flush out the assembly.

[0019] It is contemplated that various changes and modifications may be made to the airless spray pump without departing from the scope of the invention as defined by the following claims.

Claims

1. An airless spray pump having an inlet tube and an inlet filter screen, the improvement comprising said inlet tube being provided with a female threaded end and said inlet filter screen assembly being provided with a male threaded end threaded engagement with female end, said ends having the same size and thread as a common garden hose such that a user need merely remove said screen assembly and attach a garden hose to said inlet tube to flush out the assembly.

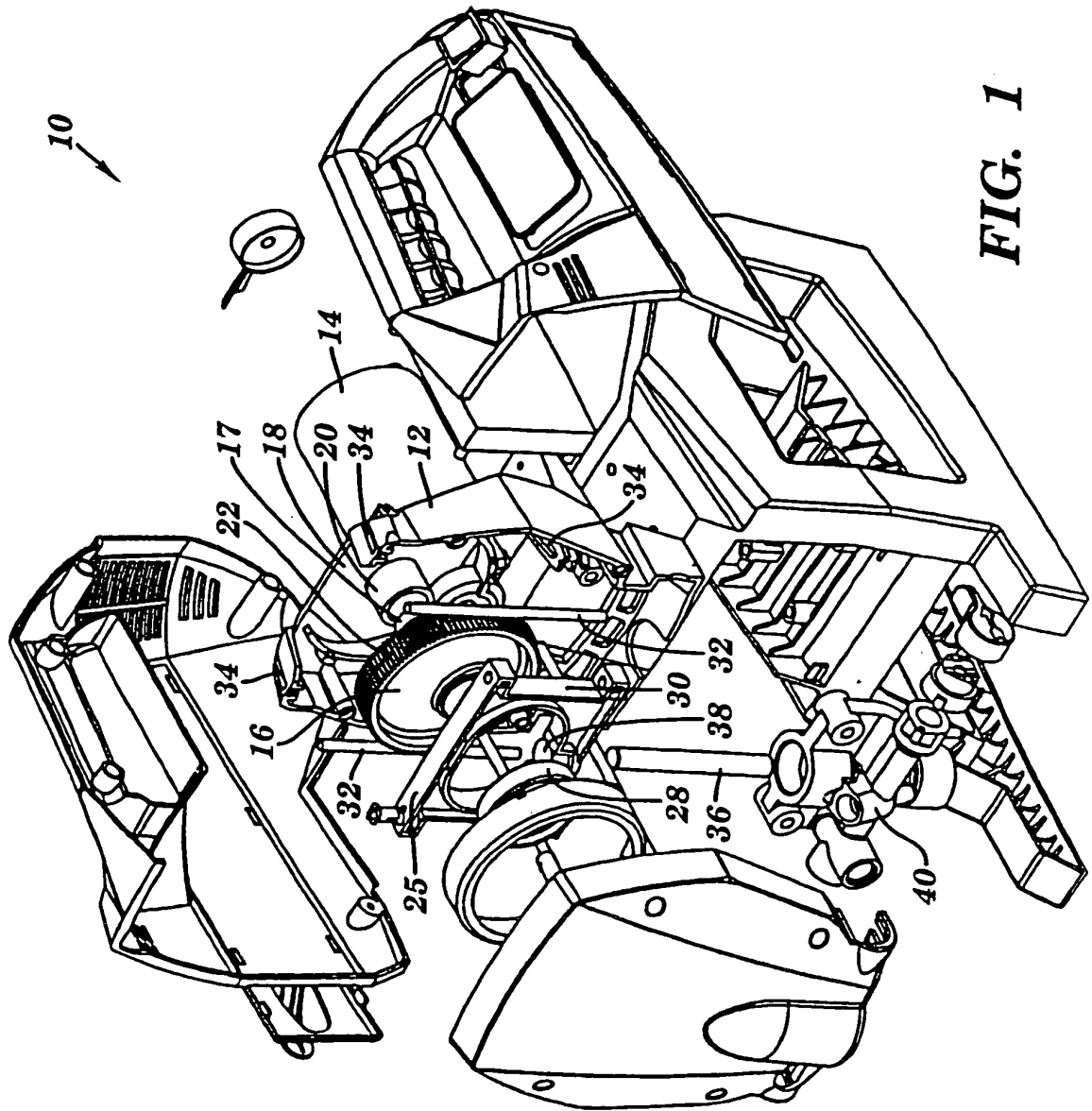
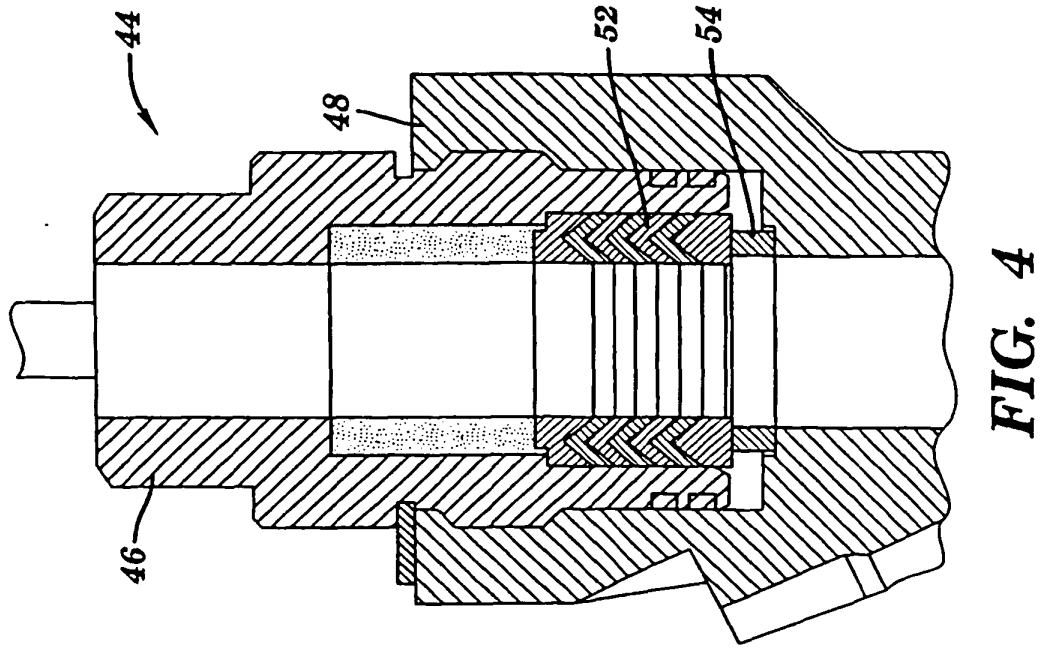
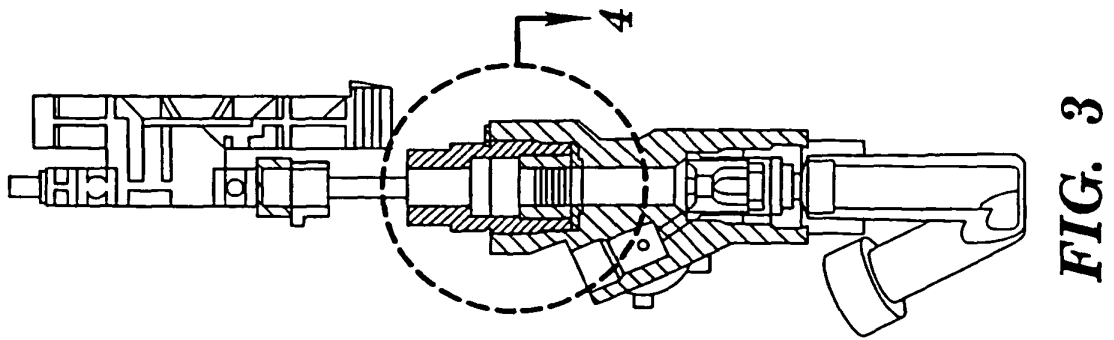
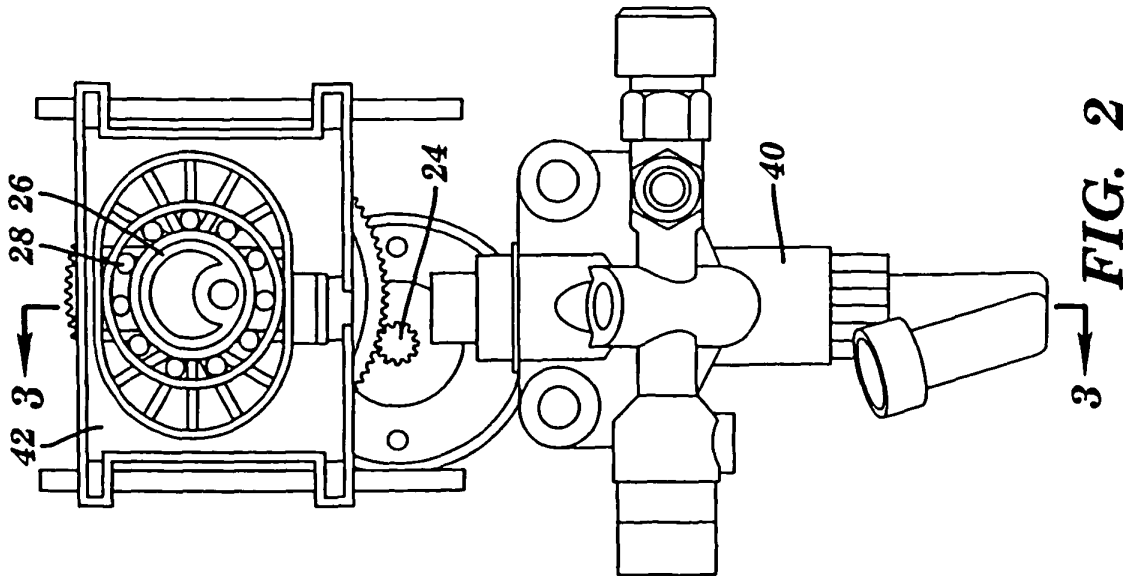


FIG. 1



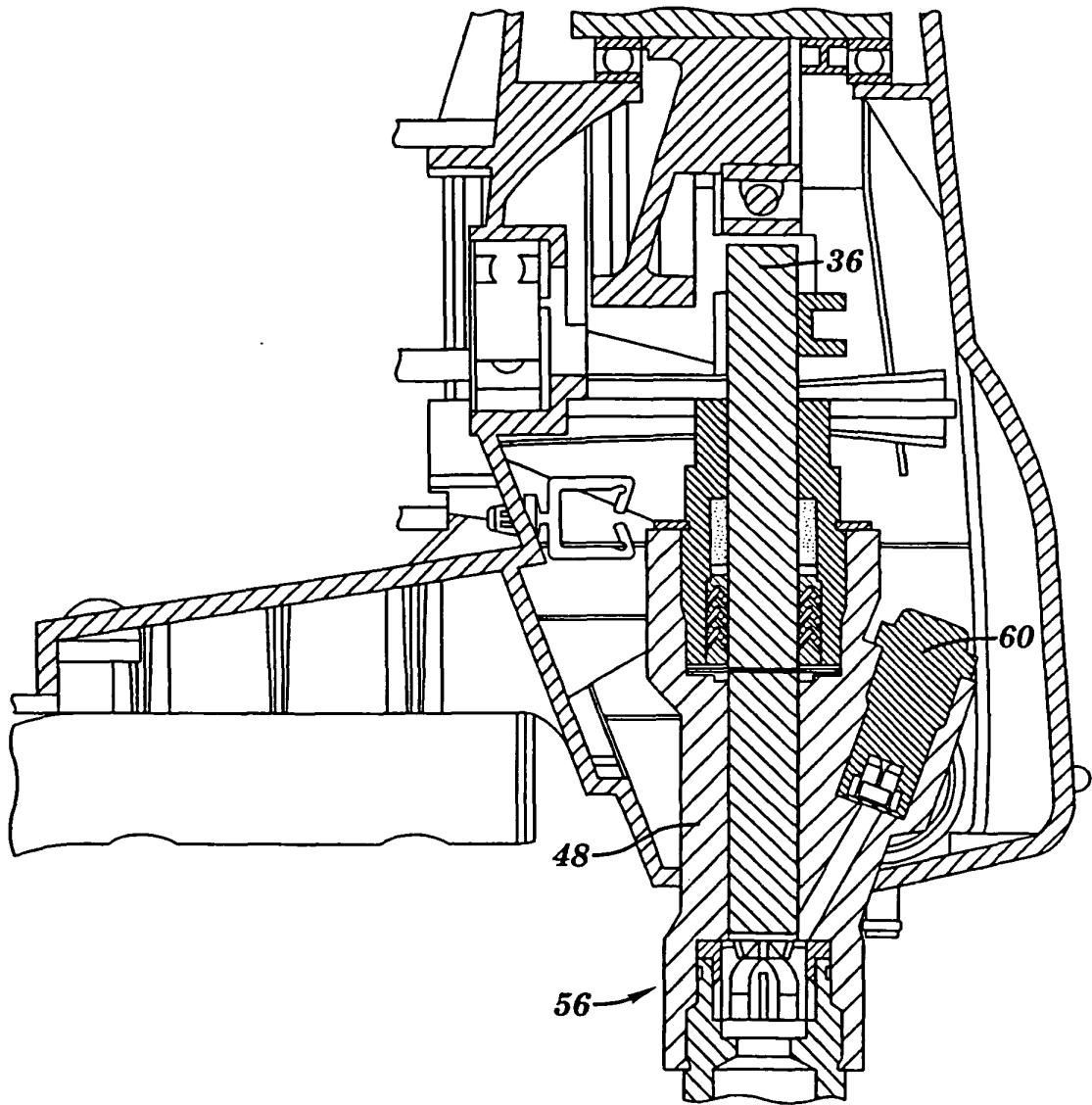


FIG. 5

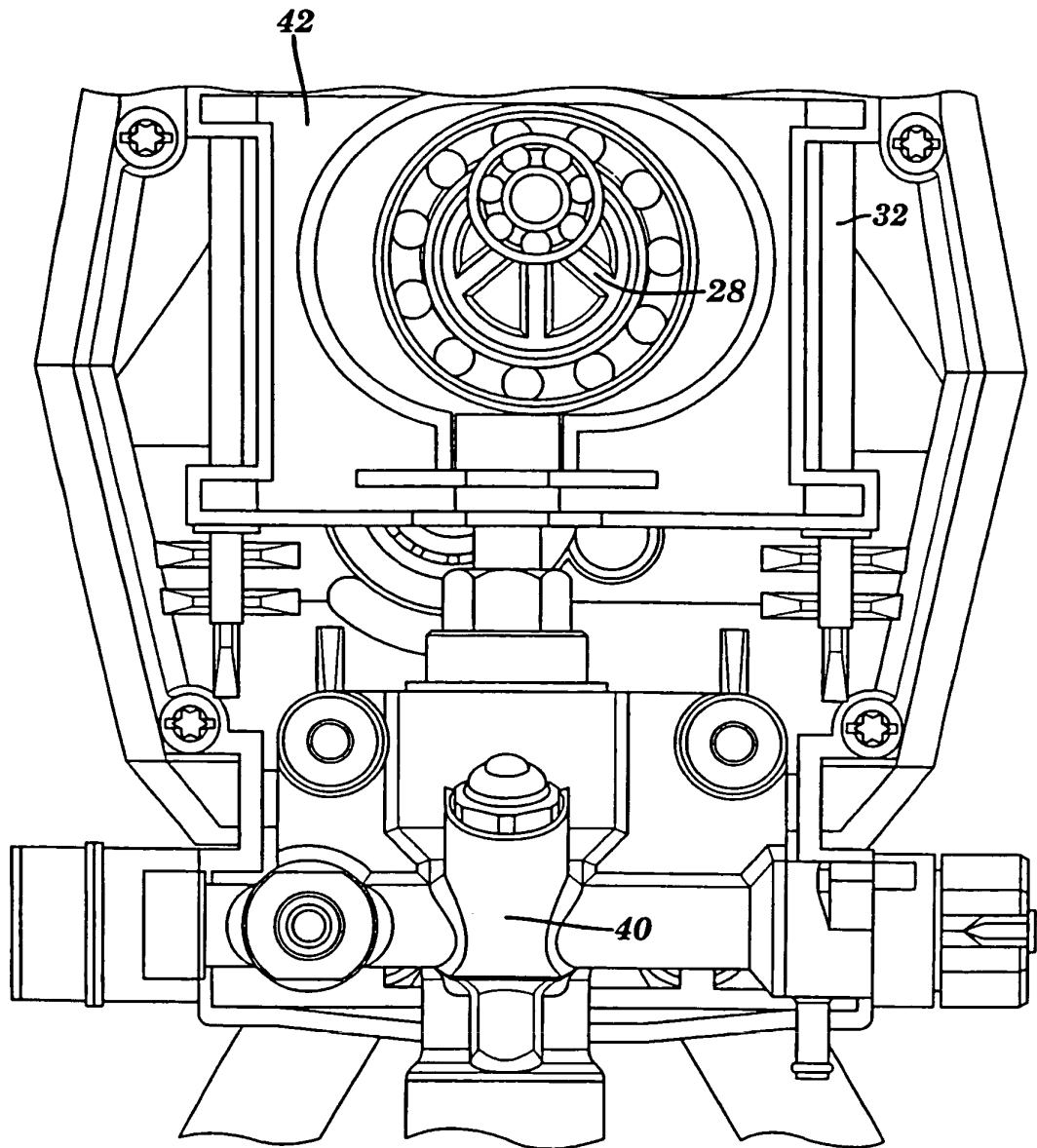


FIG. 6

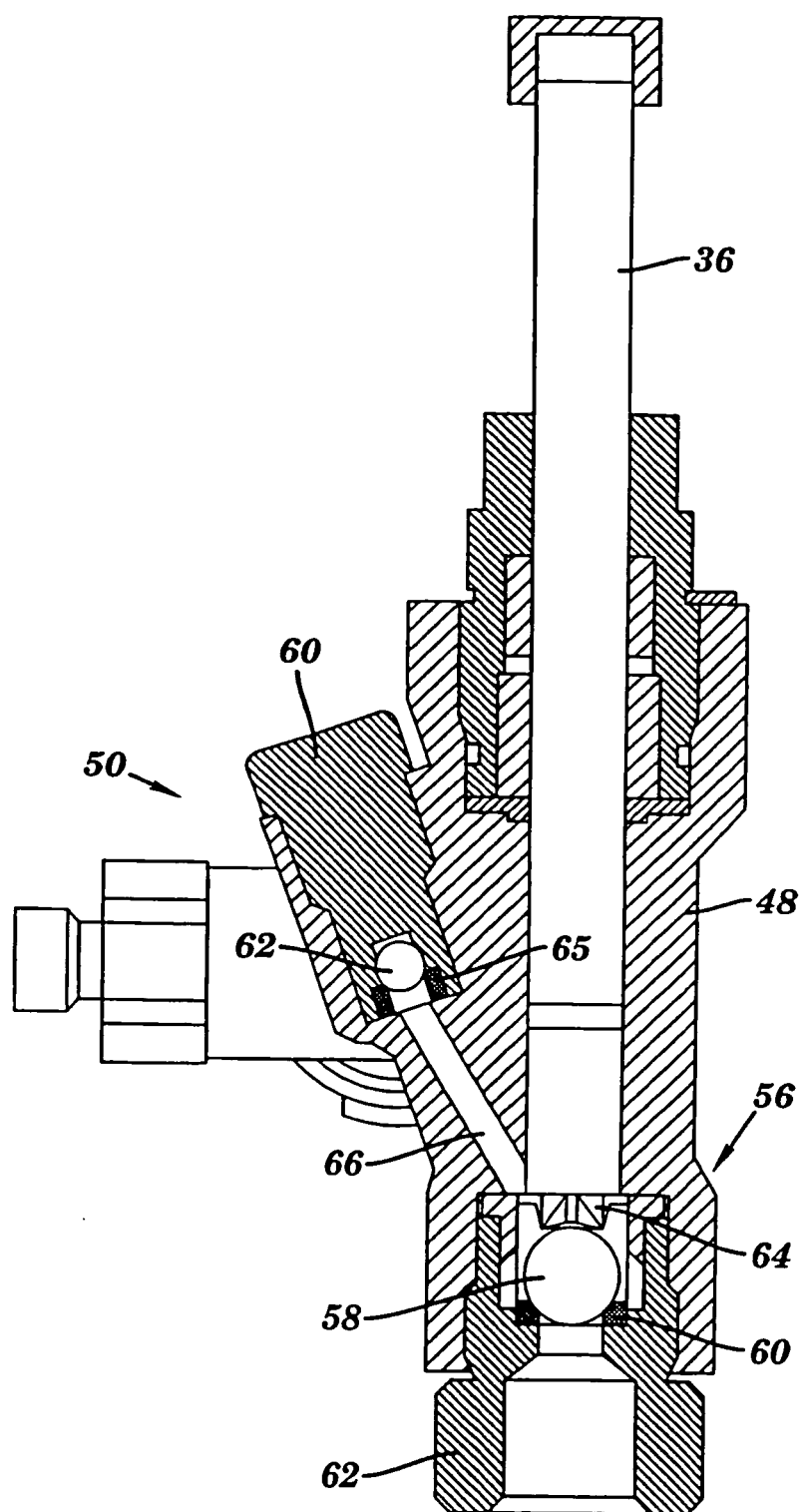
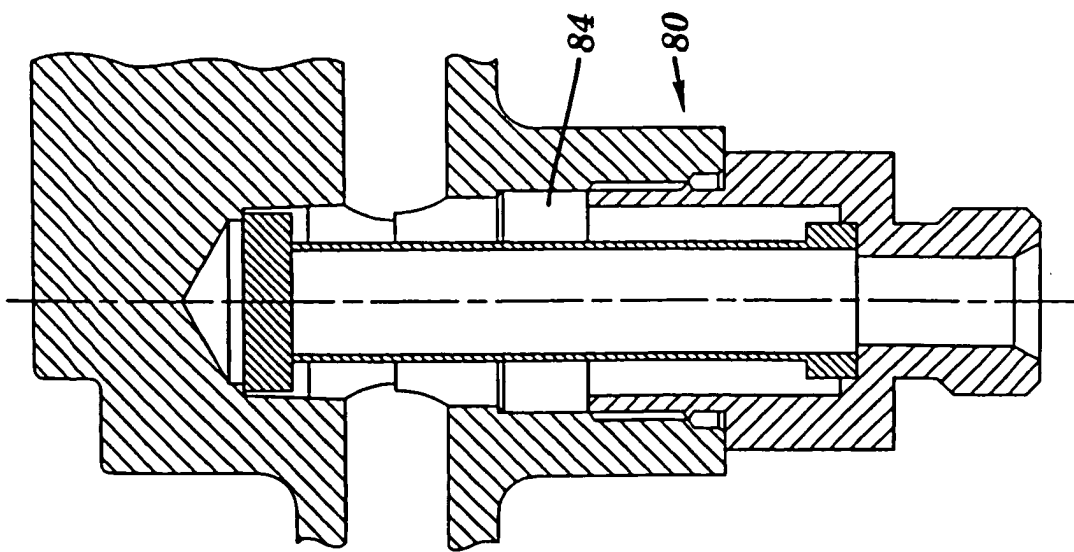
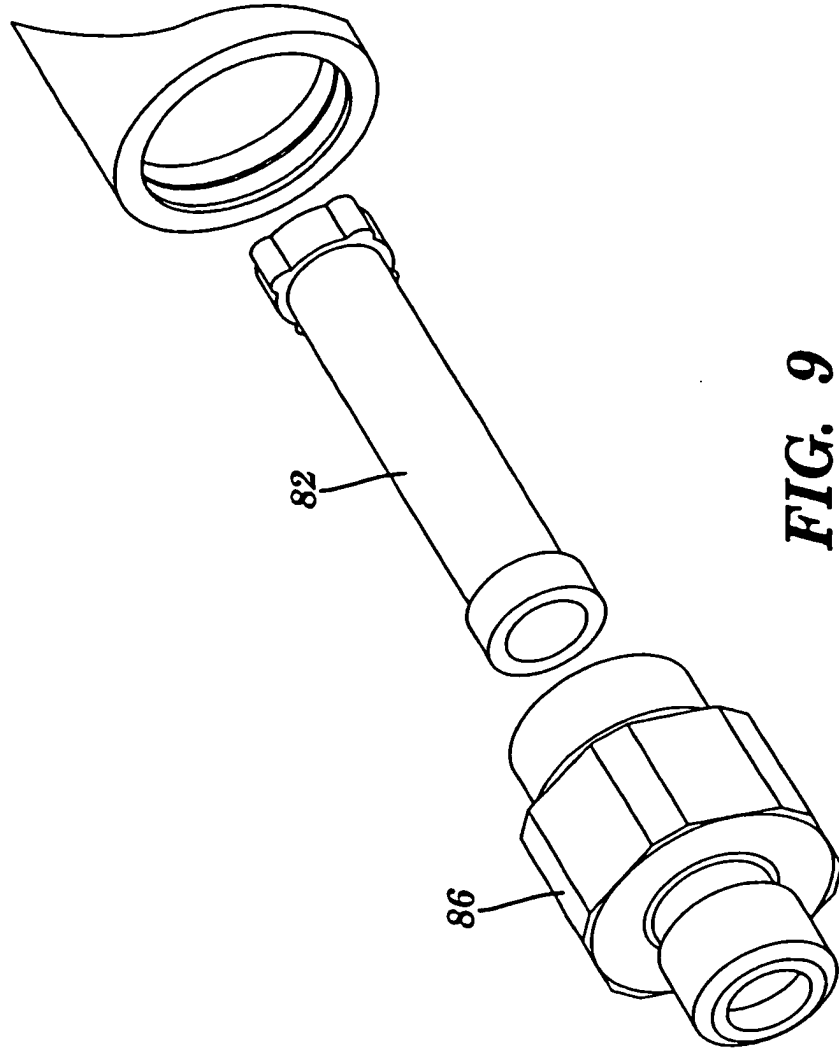


FIG. 7



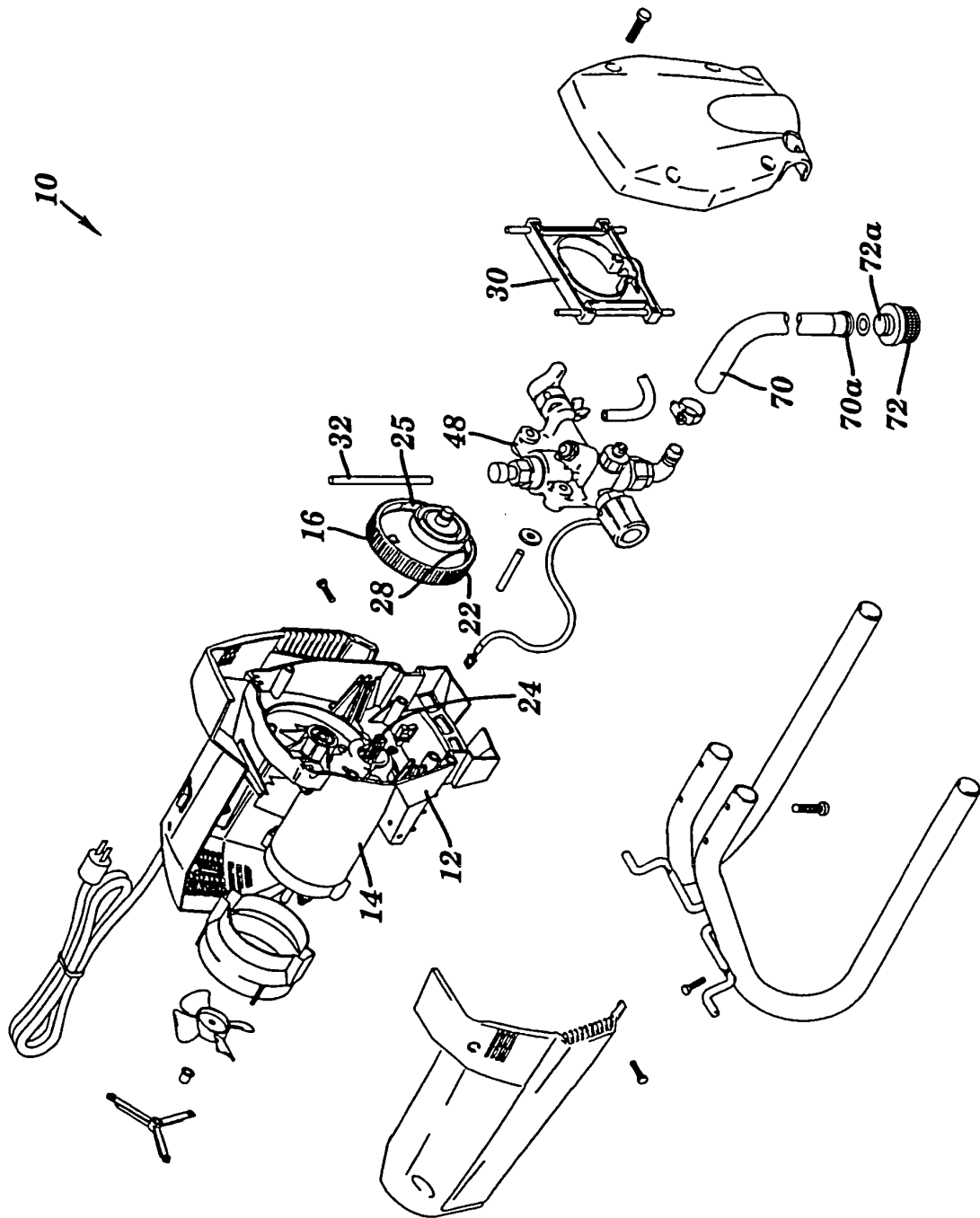


FIG. 10



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 07 7480

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 567 323 A (HARRISON, JR. ET AL) 22 October 1996 (1996-10-22) * abstract; figures 5,8,9,13 * * column 3, lines 57-65 * * column 6, lines 3-19 * -----	1	F04B53/20 B01D29/15
X	US 5 842 639 A (WALKER ET AL) 1 December 1998 (1998-12-01) * abstract; figures 3,5 * * column 1, lines 46-54 * * column 3, lines 27-30 * * column 3, lines 63-65 * * column 4, lines 16-18 * -----	1	
A	US 5 769 321 A (CYPHERS ET AL) 23 June 1998 (1998-06-23) * abstract * * column 2, line 38 - column 3, line 10 * -----	1	
A	US 4 416 588 A (KARLINER ET AL) 22 November 1983 (1983-11-22) * abstract; figures 3,6 * * column 4, lines 33-63 * -----	1	TECHNICAL FIELDS SEARCHED (IPC) F04B B01D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 20 January 2006	Examiner Richmond, R
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 07 7480

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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20-01-2006

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