(12) UK Patent Application (19) GB (11) 2 340 754 (13) A

(43) Date of A Publication 01.03.2000

(21) Application No 9818217.3

(22) Date of Filing 20.08.1998

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(51) INT CL^7
A61L 9/03

(52) UK CL (Edition R)
A5G GF

(56) Documents Cited
US 4871115 A
DE 29816381 U1 (P.F.Hung)

(58) Field of Search
UK CL (Edition Q) **A5G GF**
INT CL^6 **A61L 9/03 , A63J 5/02**
On-Line W.P.I.

(54) Abstract Title
Fog generating tube mounting arrangement.

(57) A fog generating guide tube mounting arrangement includes a barrel (40) having a longitudinal centre through hole (41) and two screw holes (44) respectively provided at front and rear sides thereof in axial alignment with the longitudinal center through hole, a connector (42) fastened to one screw hole at the rear side of the barrel to hold a pump tube (43), a fog generating guide tube (30) detachably mounted in the longitudinal center through hole (41), the fog generating guide tube having a rear end fastened to the connector (42), and a front end terminating in an inner threaded portion (34), which is threaded into the screw hole (44) at the front side of the barrel (40), an outer threaded portion (32), and a polygonal collar (31) disposed between the inner threaded portion (34) and the outer threaded portion (32) and stopped outside the front side of the barrel (40), and a nozzle cap (33) threaded onto the outer threaded portion (32) of the fog generating guide tube (30) outside the barrel (40).

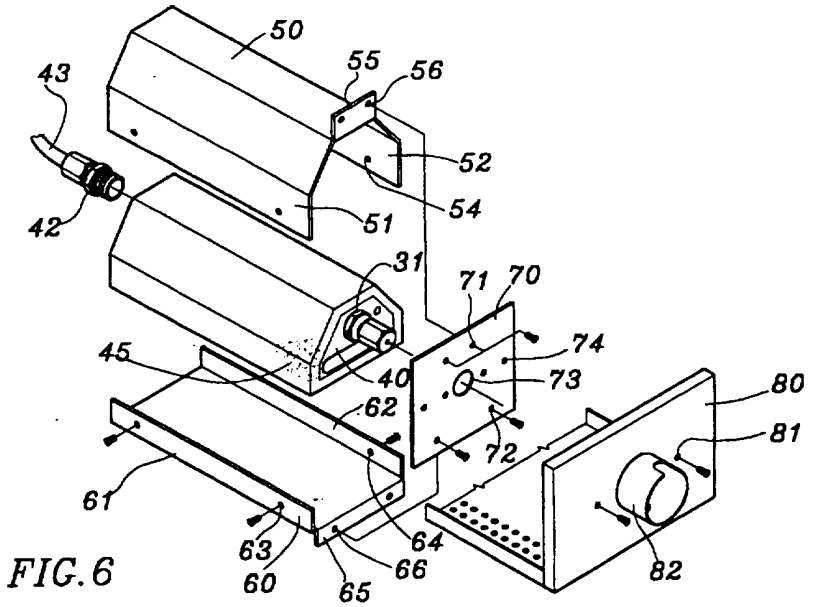

FIG. 6

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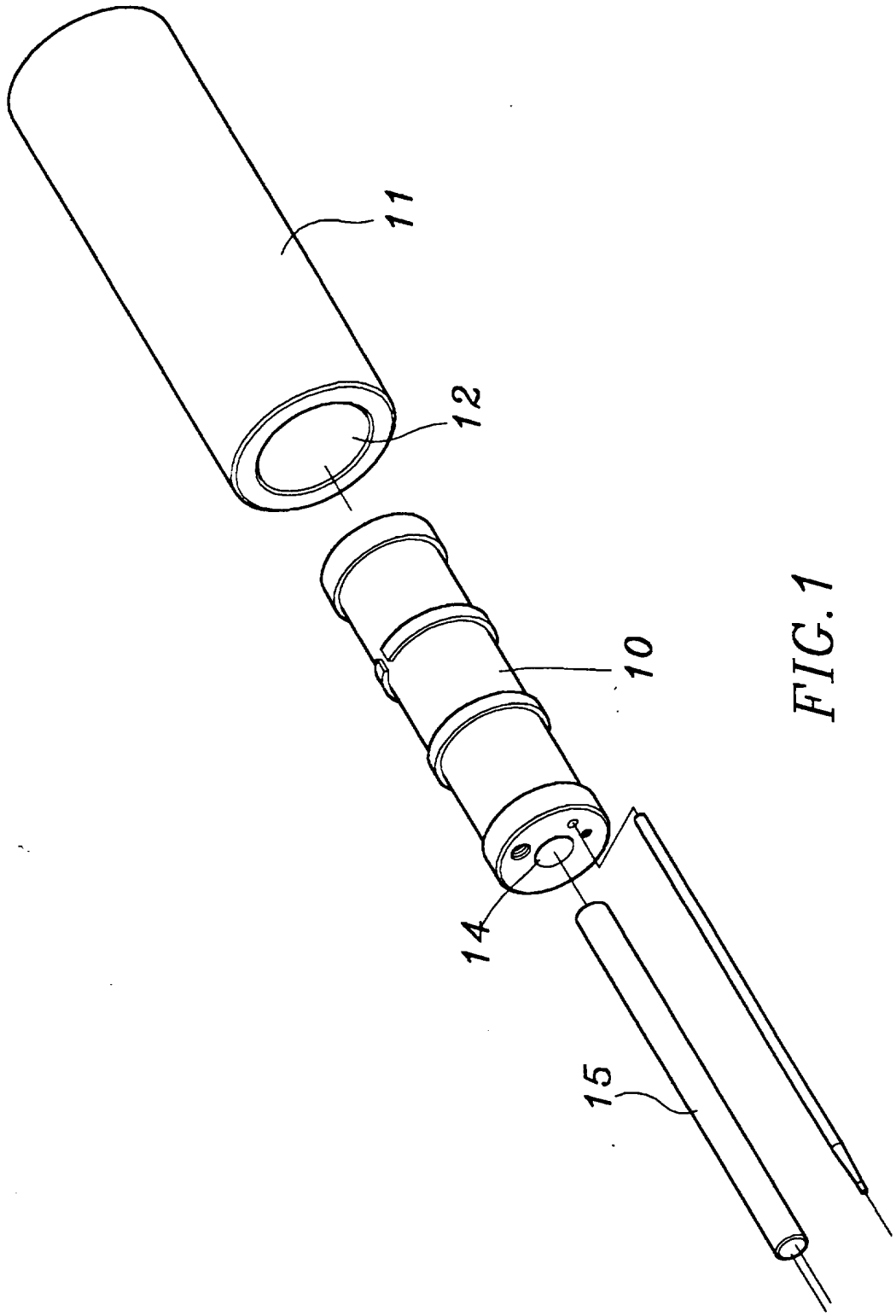

FIG. 1

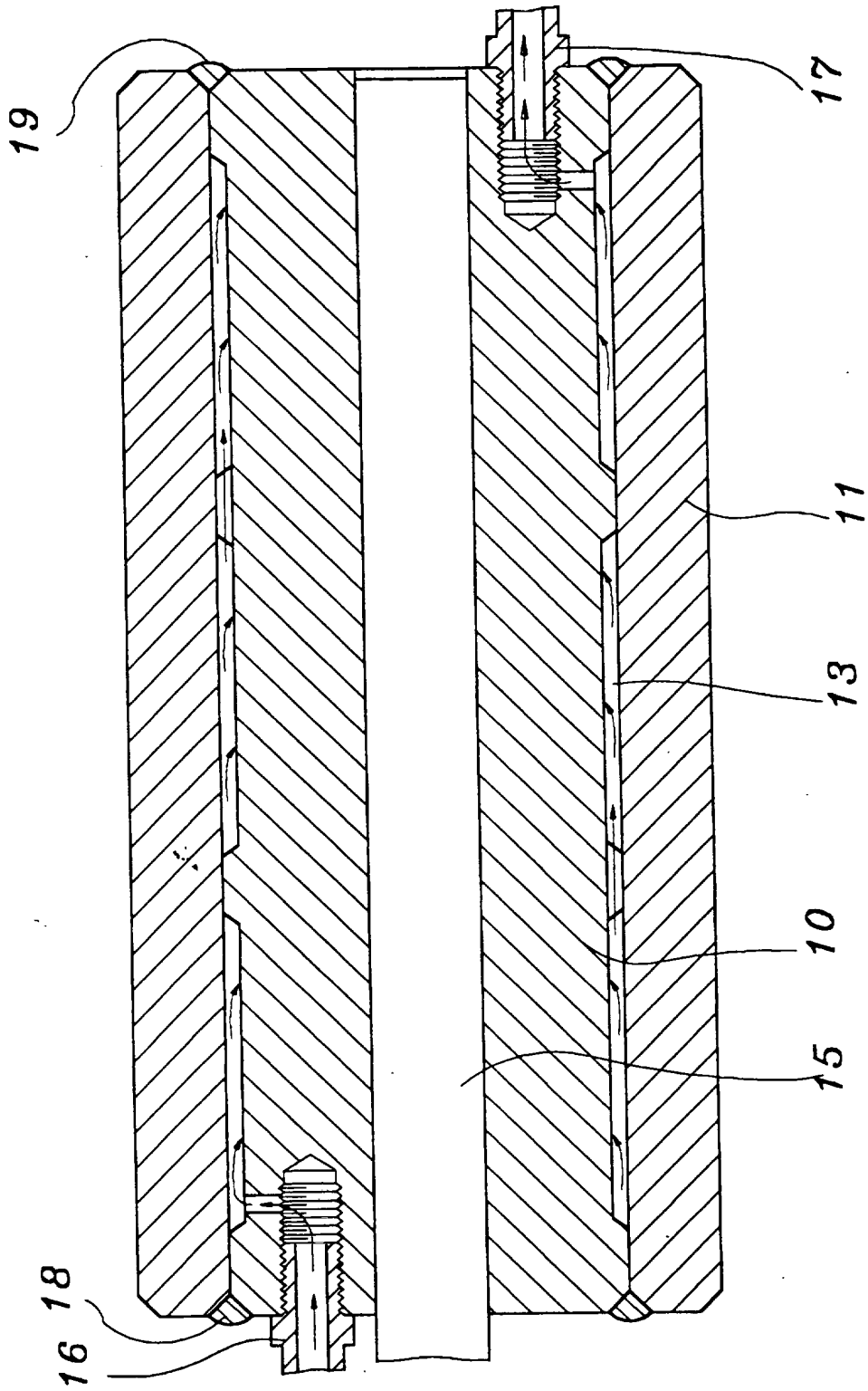

FIG.2

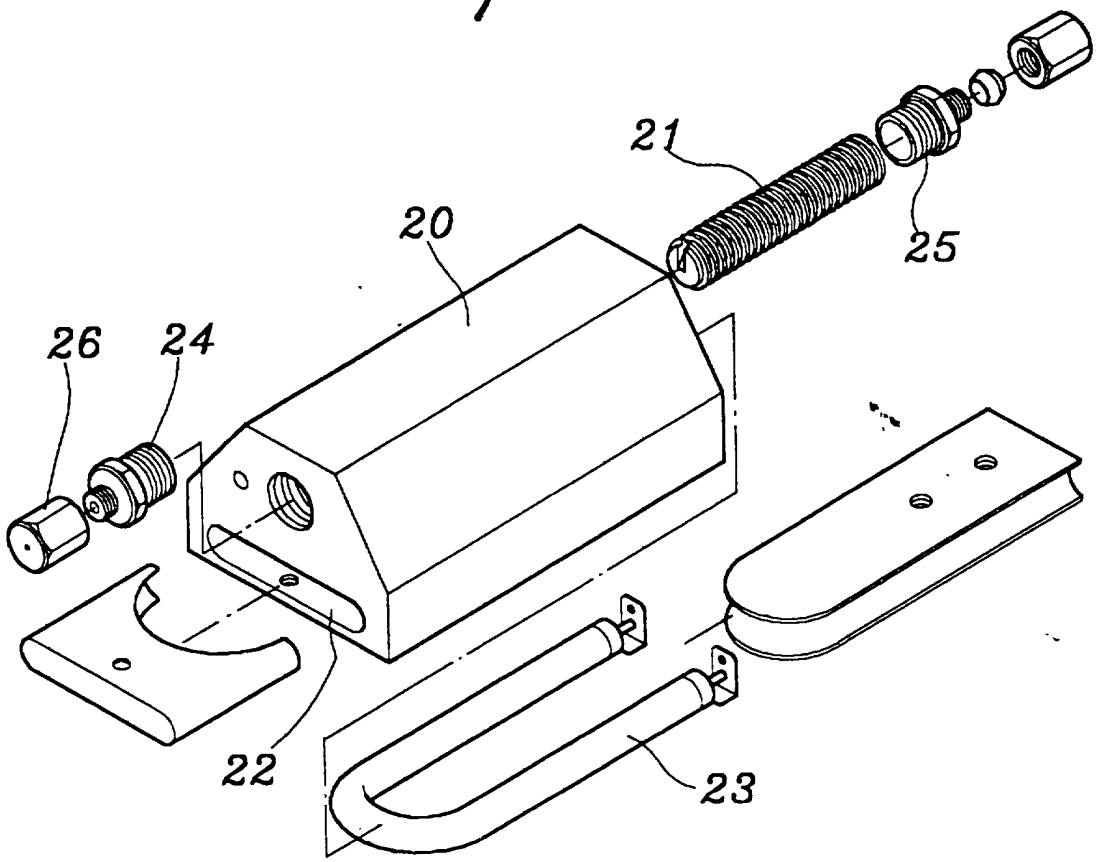

FIG. 3

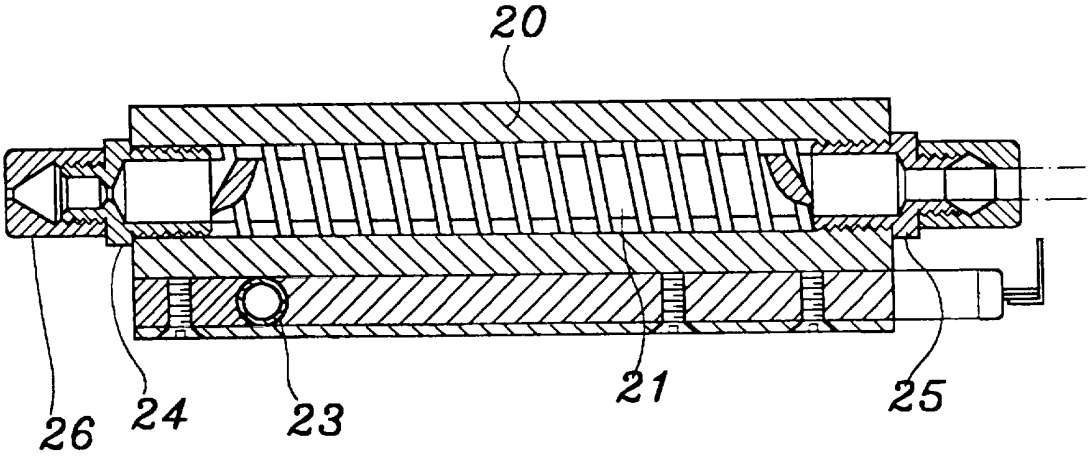

FIG. 4

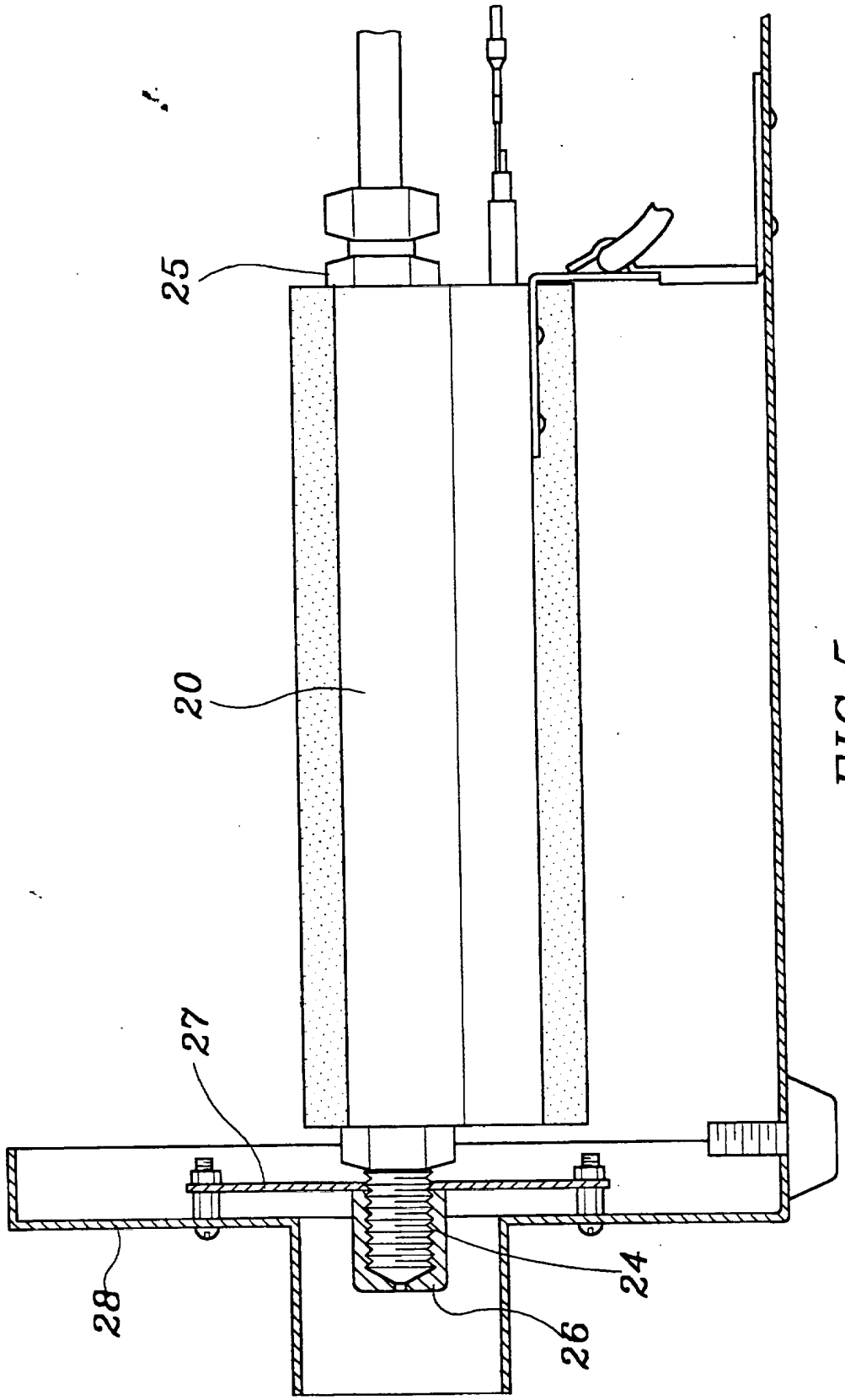

FIG. 5

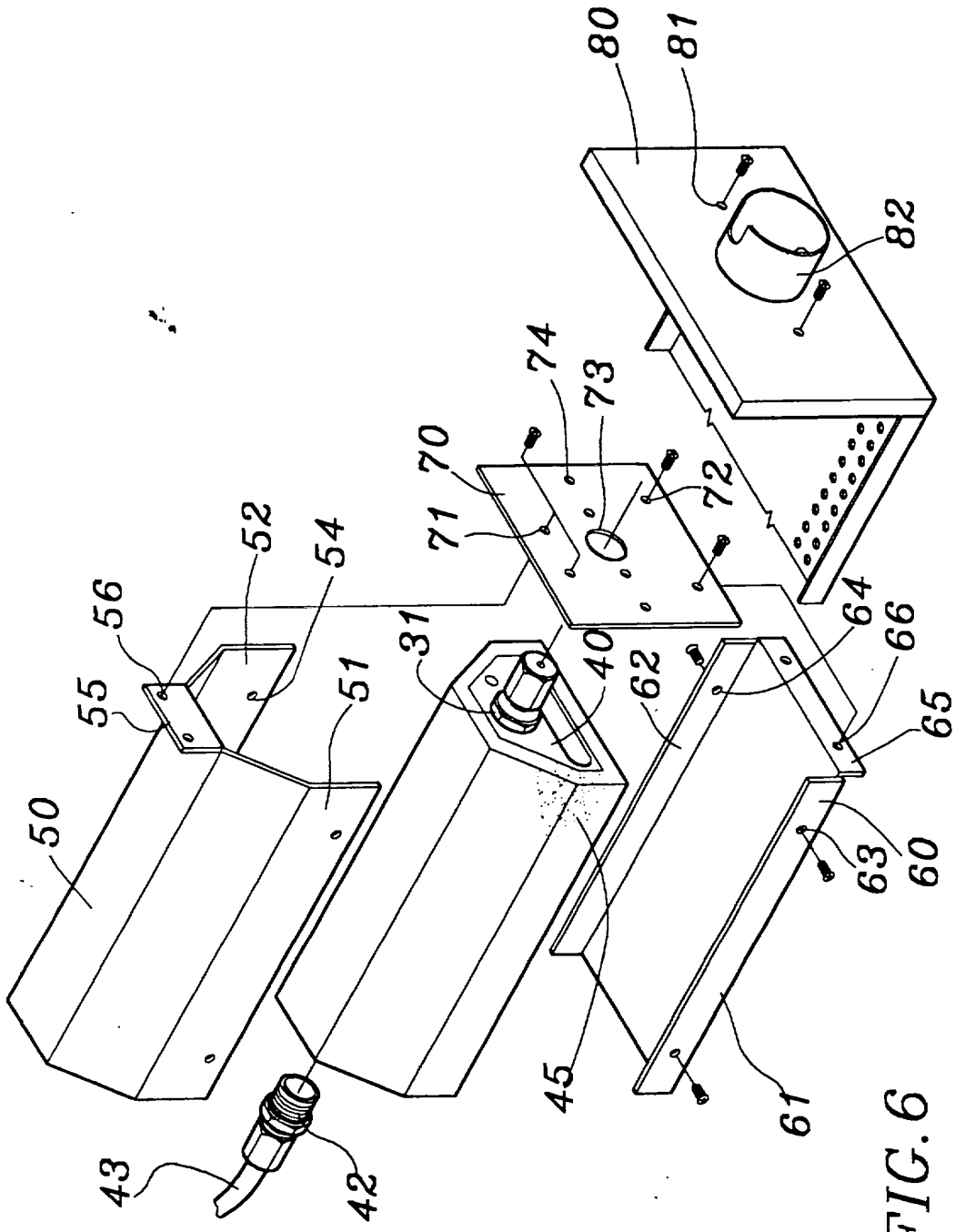
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FIG. 6

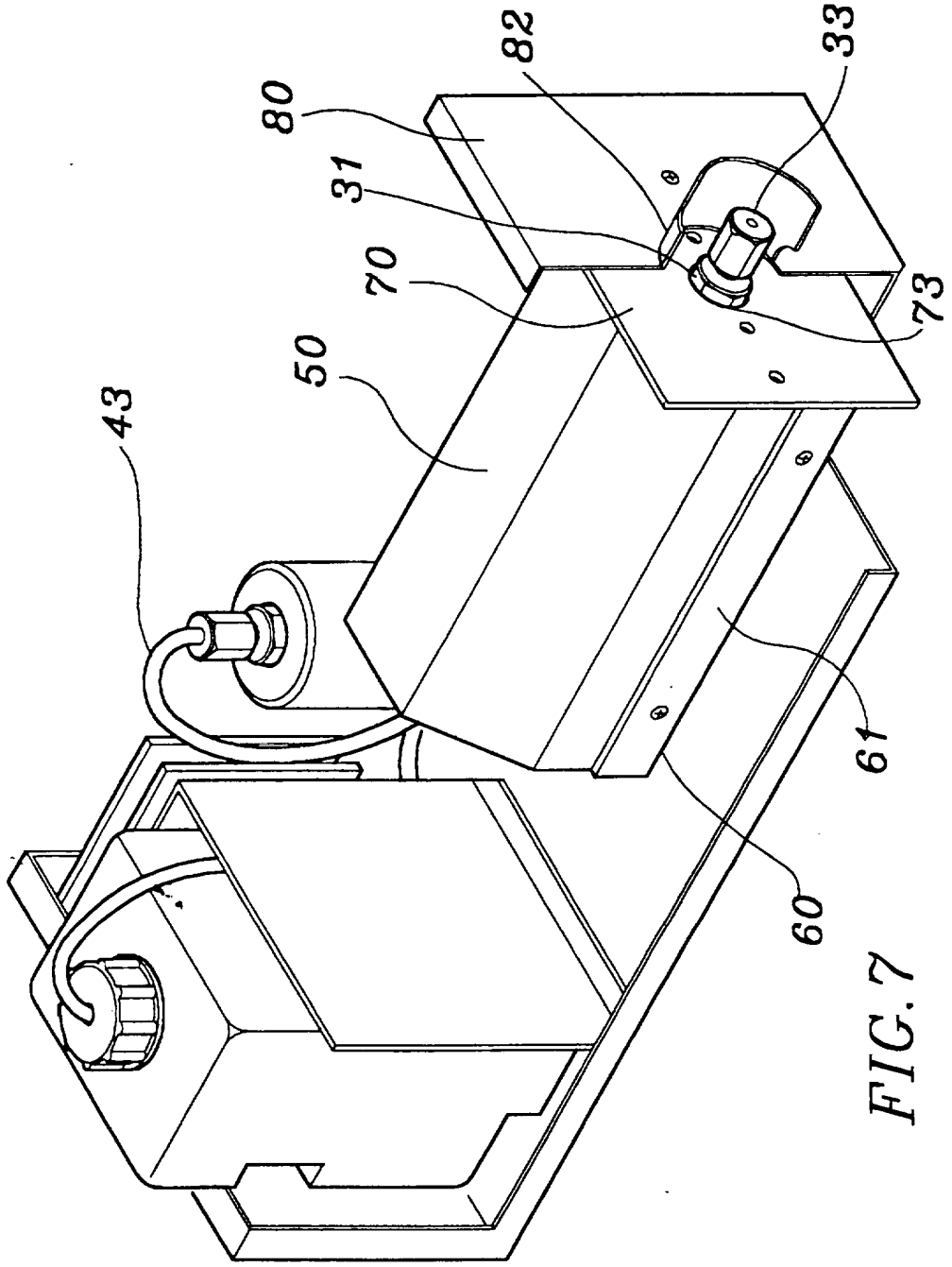

FIG. 7

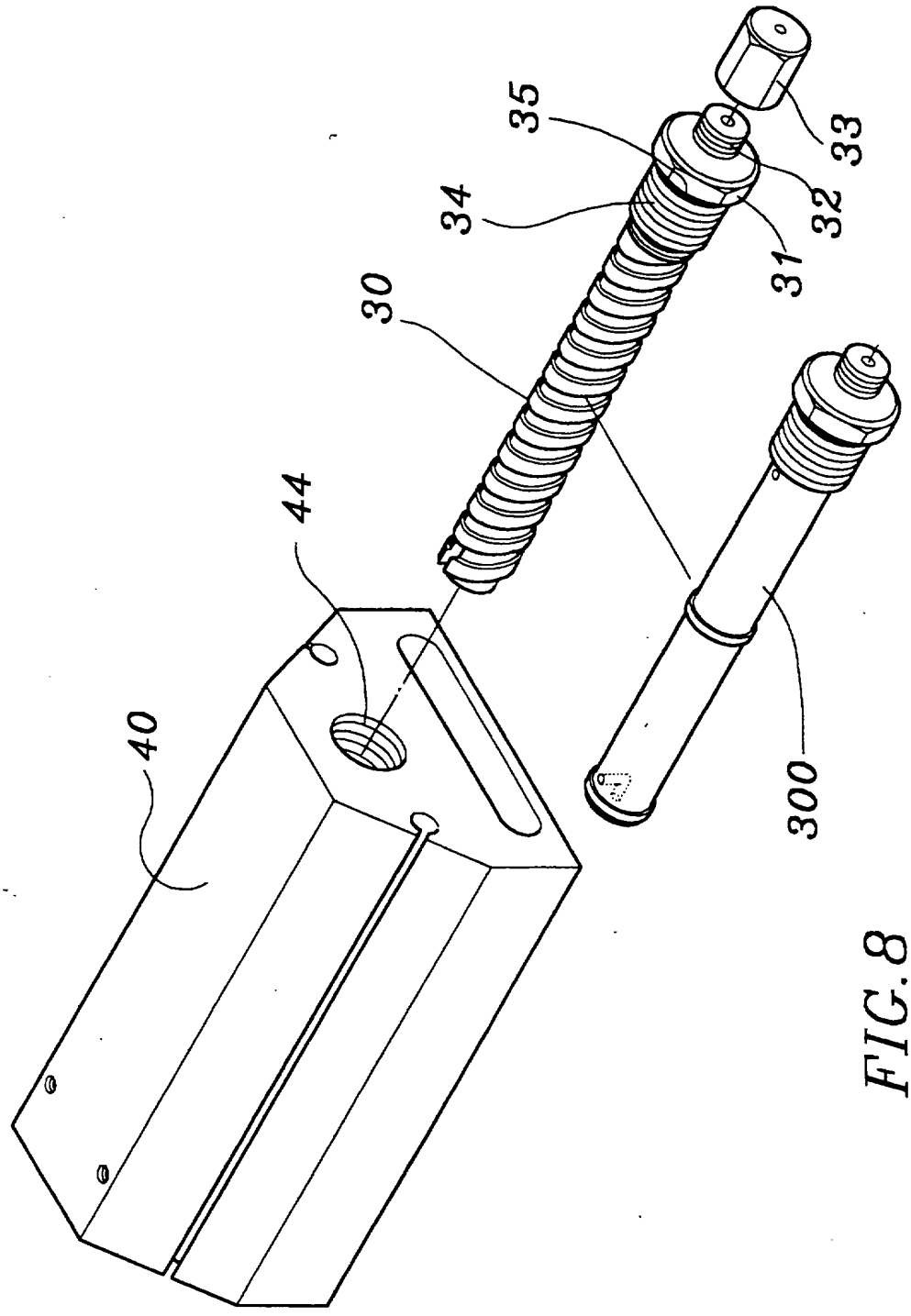

FIG. 8

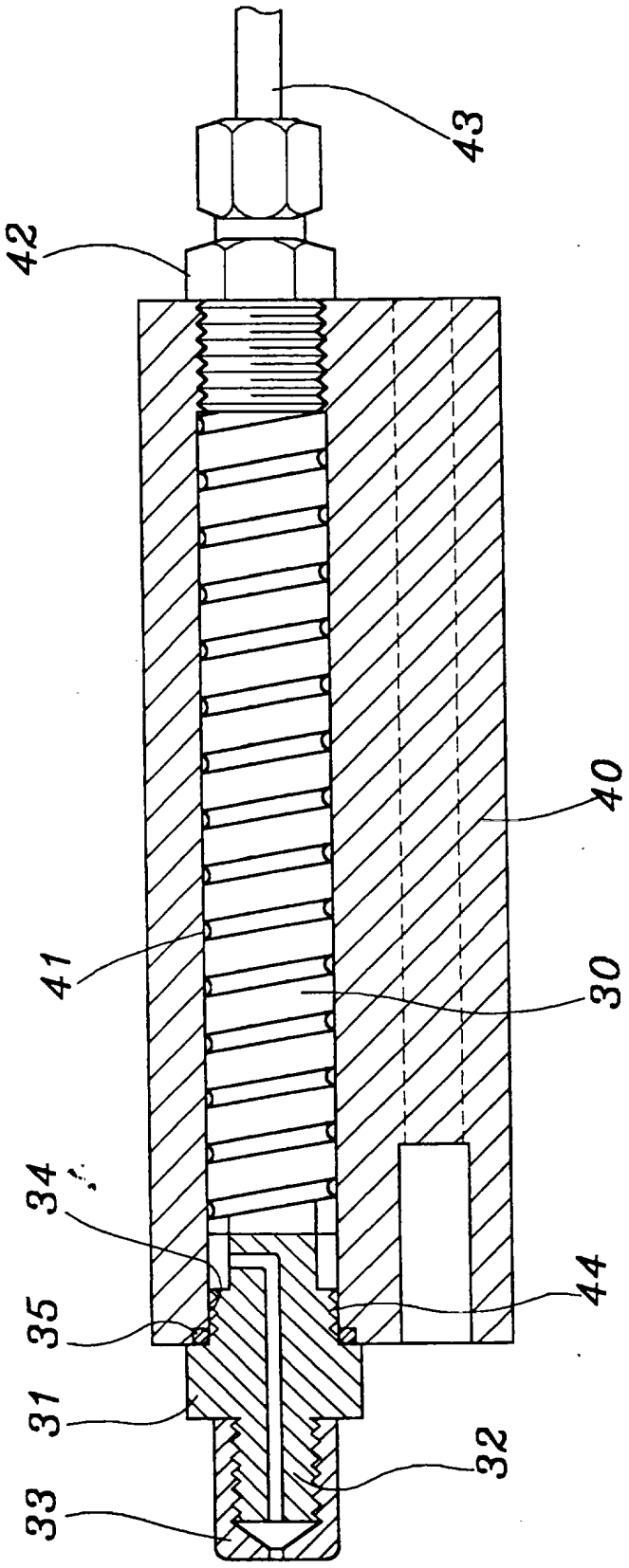

FIG. 9

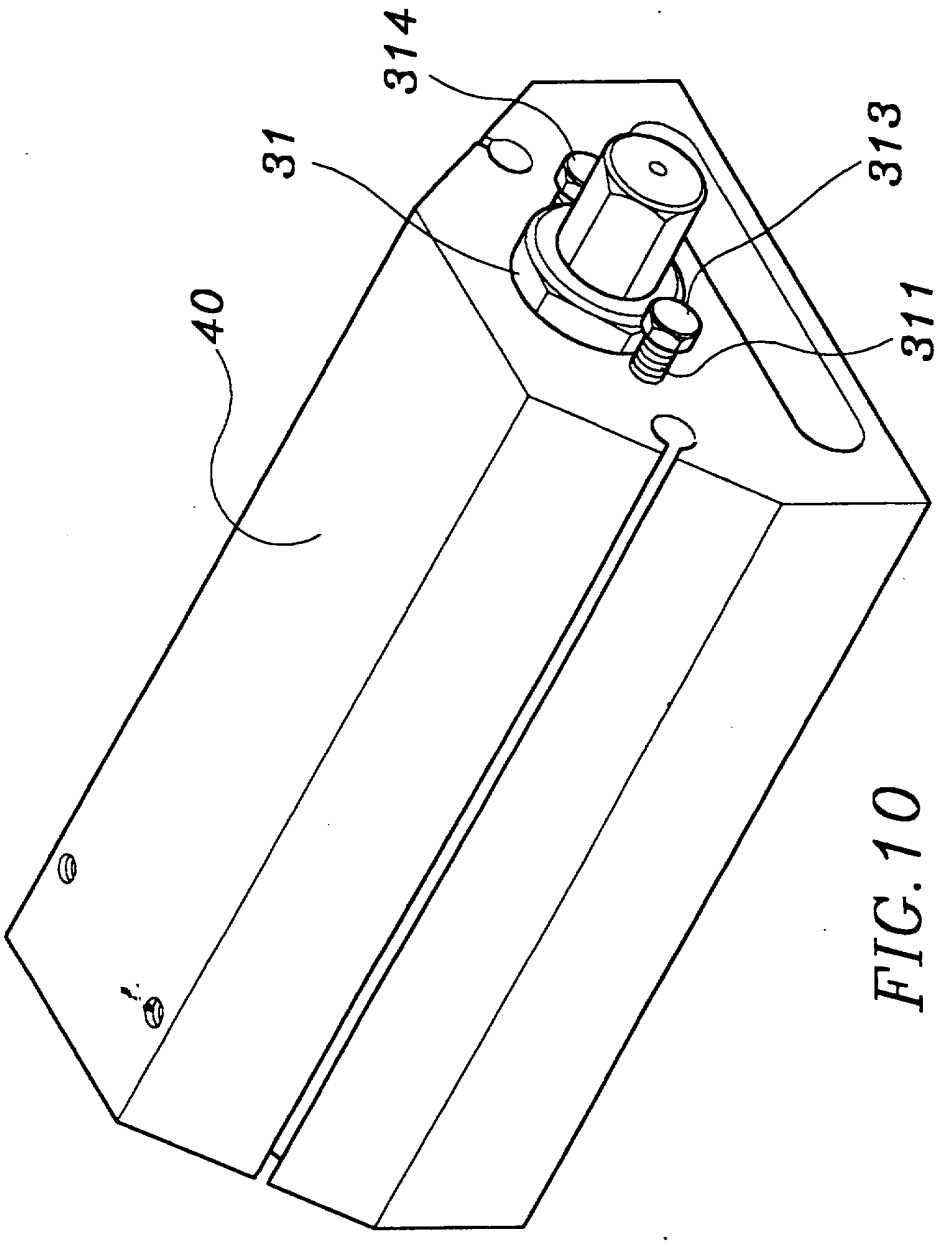

FIG. 10

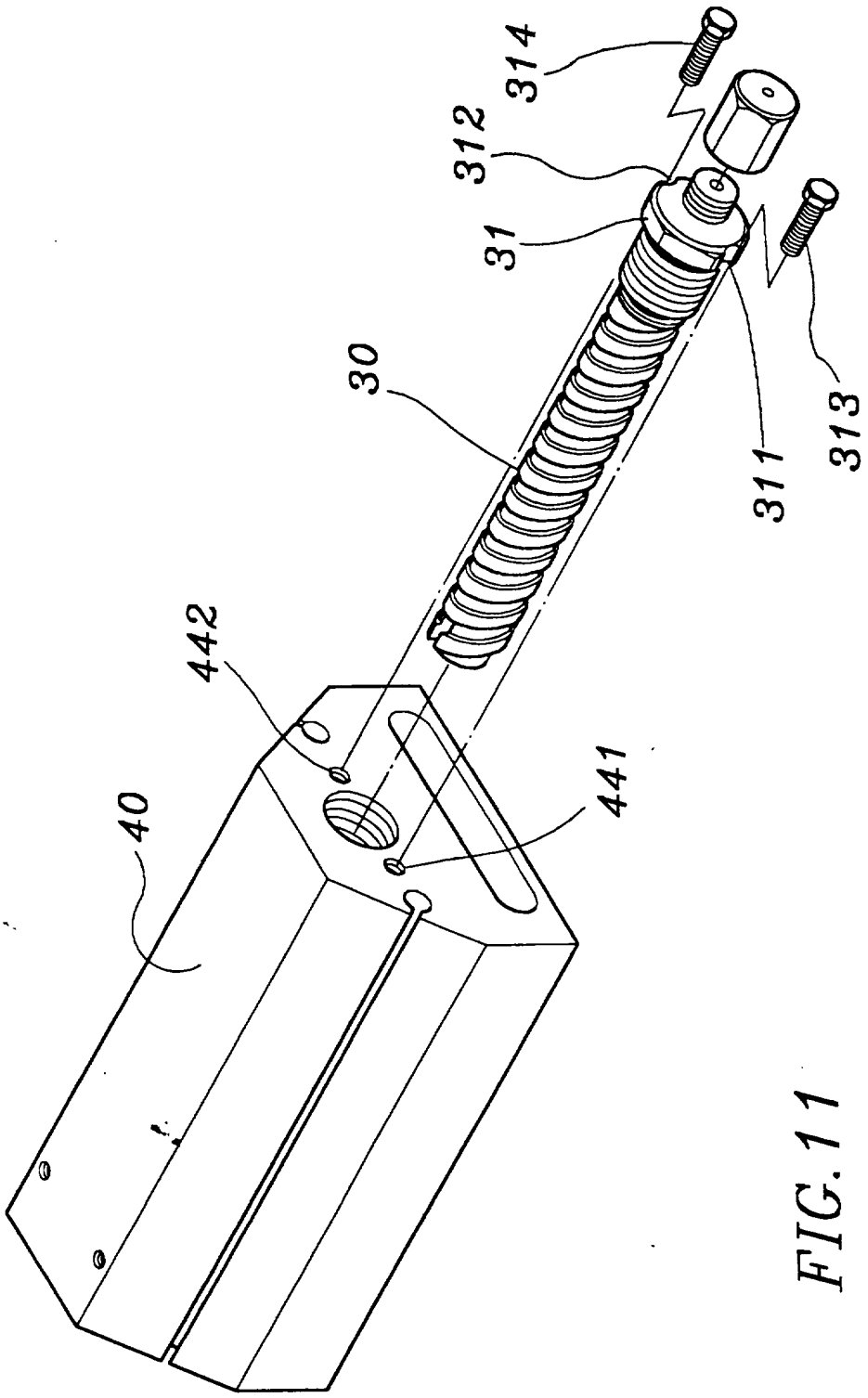

FIG. 11

FOG GENERATING GUIDE TUBE MOUNTING ARRANGEMENT

BACKGROUND OF THE INVENTION

The present invention relates to fog generating apparatus for use in a stage or entertainment center, and more specifically to a fog generating guide tube mounting arrangement for a fog generating apparatus which enables the fog generating guide tube to be conveniently detached fro a maintenance work.

In a stage or entertainment center, a fog generating apparatus may be used to generate fog, so as to produce a misty effect. A fog generating apparatus for this purpose generally comprises a fog generating guide tube mounted in a barrel, heating means installed in the fog generating guide tube to heat a chemical solution into fog. Figures 1 and 2 show the mounting arrangement of a fog generating guide tube **10** and a barrel **11** according to the prior art. The barrel **11** has a longitudinal center through hole **12**, which receives the fog generating guide tube **10**. The fog generating guide tube **10** has a longitudinal center through hole **14**, which receives a heating element **15**. After the insertion of the fog generating guide tube **10** into the barrel **11**, a chemical solution input tube **16** and a fog output tube **17** are respectively connected to two opposite ends of the fog generating guide tube **10**, and then the periphery of the front end **18** and rear end **19** of the fog

generating guide tube **10** is welded to the barrel **11**. When a chemical solution is delivered through the chemical solution input tube **16** into the fog generating guide tube **10**, it is heated by the heating element **15** into fog, permitting fog to pass through a fog passage **13** within the barrel **11** around the fog generating guide tube **10** and then to pass out of the fog generating guide tube **10** through the fog output tube **17**. This arrangement has a drawback. Because the fog generating guide tube **10** is welded to the barrel **11**, it cannot be detached from the barrel **11** for a maintenance work. If the fog passage **13** is blocked, the whole assembly becomes useless. Figures 3, 4 and 5 show another arrangement according to the prior art. According to this arrangement, a fog generating guide tube **21** is mounted in a barrel **20**, a heating element **23** is mounted in a slot **22** inside the barrel **20** below the fog generating guide tube **20**, a first connector **25** is fastened to one end of the fog generating guide tube **21** outside the barrel **20** for guiding a chemical solution from a pump to the fog generating guide tube **21**, and a second connector **24** is fastened to an opposite end of the fog generating guide tube **20** and threaded with a nozzle cap **26** for output of fog. Further, a mounting plate **27** is mounted on the second connector **24** and fastened to the shell **28** of the fog generating apparatus to secure the whole assembly in place.

When the fog passage in the barrel **20** is blocked, the outer cover of the fog generating apparatus must be removed from the shell **28**, then the mounting plate **27** must be disconnected from the shell **28** and then removed from the second connector **24**, and then the first connector **25** and the second connector **24** must be disconnected from the fog generating guide tube **21** for permitting the fog generating guide tube **21** to be removed from the barrel **20** for cleaning. This arrangement makes the maintenance work difficult.

SUMMARY OF THE INVENTION

The present invention has been accomplished to provide a fog generating guide tube mounting arrangement which eliminates the aforesaid problems. According to one aspect of the present invention, the fog generating guide tube mounting arrangement comprises a barrel, the barrel having a longitudinal center through hole and two screw holes respectively provided at front and rear sides thereof in axial alignment with the longitudinal center through hole, a connector fastened to one screw hole at the rear side of the barrel to hold a pump tube, a fog generating guide tube detachably mounted in the longitudinal center through hole, the fog generating guide tube having a rear end fastened to the connector, and a front end terminating in an inner threaded portion, which is

threaded into the screw hole at the front side of the barrel, an outer threaded portion, and a polygonal collar disposed between the inner threaded portion and the outer threaded portion and stopped outside the front side of the barrel, and a nozzle cap threaded onto the outer threaded portion of the fog generating guide tube outside the barrel. According to another aspect of the present invention, the barrel is coated with a layer of heat insulative material and mounted within a shield fastened to the shell of the fog generating apparatus, the shield comprising a bottom frame, which carries the barrel, a top cover frame fastened to the bottom frame and covered over the barrel, and a front cover plate fastened to the bottom frame and the top cover frame at one side, the front cover plate having a center through hole through which the polygonal collar of the fog generating guide tube passes to the outside.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an exploded view of a fog generating guide tube mounting arrangement according to the prior art.

Figure 2 is sectional assembly view of Figure 1.

Figure 3 is an exploded view of another structure of fog generating guide tube mounting arrangement according to the prior art.

Figure 4 is a sectional assembly view of Figure 3.

Figure 5 shows the assembly of Figure 3 installed in the shell of the fog generating apparatus.

Figure 6 is an exploded view of the present invention.

Figure 7 is an installed view of the present invention.

Figure 8 shows two fog generating guide tubes alternatively used according to the present invention.

Figure 9 is a longitudinal view in section showing the fog generating guide tube installed in the barrel according to the present invention.

Figure 10 is a perspective view of an alternate form of the present invention.

Figure 11 is an exploded view of Figure 10.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figures from 6 through 9, a fog generating guide tube **30** or **300** is inserted into a longitudinal through hole **41** on a barrel **40**. A connector **42** is fastened to one end of the longitudinal through hole **41** to hold a pump tube **43**. The opposite end of the longitudinal through hole **41** is integral with a screw hole **44** for the positioning of the guide tube **30**.

The barrel **40** is coated with a layer of heat-insulative material **45**, and mounted in a shield, which is comprised of a bottom frame **60**, a top cover frame **50**, and a front cover plate **70**.

The shield **50,60,70** is fastened to a shell **80**. The top cover frame **50** is covered over the barrel **40** at the top, having two opposite side walls **51,52**, a plurality of side mounting holes **53** symmetrically provided at the side walls **51,52**, an upward front flange **55** raised from the opened front side thereof, and a plurality of front mounting holes **56** provided at the upward front flange **55**. The bottom frame **60** carries the barrel **40**, having two upward side flanges **61,62** raised from two long sides thereof, a plurality of side mounting holes **63,64** symmetrically provided at the upward side flanges **61,62** and respectively fastened to the side mounting holes **53,54** at the top cover frame **50** by rivets, a downward front flange **65** downwardly extended from the front side thereof, and a plurality of front mounting holes **66** provided at the downward front flange **65**. The front cover plate **70** is connected between an upright wall of the shell **80** and the front flanges **55,65** of the top cover frame **50** and the bottom frame **60**, having a plurality of upper mounting holes **71** respectively fastened to the front mounting holes **56** at the upward front flange **55** of the top cover frame **50** by rivets, a plurality of lower mounting holes **72** respectively fastened to the front mounting holes **66** at the downward front flange **65** of the bottom frame **60** by rivets, a center through hole **73**, and a plurality of screw holes **74** horizontally

spaced from the center through hole **73** at two opposite sides and respectively fastened to respective mounting holes **81** at the shell **80** by screws.

The guide tube **30** or **300** has a rear end fastened to the connector **42**, and a front end terminating in an inner threaded portion **34**, an outer threaded portion **32**, and a polygonal collar **31** between the inner threaded portion **34** and the outer threaded portion **32**. When the rear end of the guide tube **30** or **300** is inserted into the longitudinal through hole **41** on the barrel **40** and connected to the connector **42**, the inner threaded portion **34** is threaded into the screw hole **44** at one end of the longitudinal through hole **41**, permitting the polygonal collar **31** to be stopped outside the barrel **40**, and then a nozzle cap **33** is threaded onto the outer threaded portion **32**. Further, a gasket ring **35** is mounted around the inner threaded portion **34** and stopped between the polygonal collar **41** and the barrel **40** to seal the gap. When assembled, the polygonal collar **31** projects out of the center through hole **73** of the front cover plate **70** and suspended in an access hole **82** at the shell **80**. Through the access hole **82**, a tool can be attached to the polygonal collar **31** and turned by hand to disengage the guide tube **30** from the barrel **40** for cleaning. In Figure 8, the guide tube which is referenced by **30** has a spiral

guide groove around the periphery, the guide tube which is referenced by **300** has a plain outside surface.

Figures 10 and 11 show an alternate form of the present invention. According to this alternate form, the aforesaid inner threaded portion **34** is eliminated from the guide tube **30**, the polygonal collar **31** of the guide tube **30** has two axially extended grooves **311,312** at two opposite sides, and two screw bolts **313,314** are respectively axially inserted through the axially extended grooves **311,312** and threaded into respective screw holes **441,442** at the front side of the barrel **40** to secure the guide tube **30** in the barrel **40**.

It is to be understood that the drawings are designed for purposes of illustration only, and are not intended as a definition of the limits and scope of the invention disclosed.

CLAIMS

1. A fog generating guide tube mounting arrangement comprising a barrel, said barrel having a longitudinal center through hole, a first screw hole at one end of said longitudinal center through hole, and a second screw hole at an opposite end of said longitudinal center through hole, a connector fastened to said first screw hole to hold a pump tube, a fog generating guide tube mounted in said longitudinal through hole, said fog generating guide tube comprising a rear end fastened to said connector, and a front end terminating in an inner threaded portion, which is threaded into said second screw hole of said barrel, an outer threaded portion, and a polygonal collar disposed between said inner threaded portion and said outer threaded portion and stopped outside said barrel, and a nozzle cap threaded onto the outer threaded portion of said fog generating guide tube outside said barrel.

2. The fog generating guide tube mounting arrangement of claim 1 wherein said barrel is coated with a layer of heat insulative material and mounted within a shield fastened to a shell of a fog generating apparatus, said shield comprising a bottom frame, which carries said barrel, a top cover frame fastened to said bottom frame and covered over said barrel, and a front cover plate fastened

to said bottom frame and said top cover frame at one side, said front cover plate having a center through hole through which said polygonal collar of said fog generating guide tube passes to the outside.

3. The fog generating guide tube mounting arrangement of claim 2, wherein said bottom frame comprises two upward side flanges raised from two opposite long sides thereof and a downward front flange downwardly extended from a front side thereof, said top cover frame comprises two side walls respectively fastened to the upward side flanges of said bottom frame by fastening means and an upward front flange raised from a front side thereof, said front cover plate is fastened to the upward front flange of said top cover frame and the downward front flange of said bottom frame by fastening means.

4. A fog generating guide tube mounting arrangement comprising a barrel, said barrel having a longitudinal center through hole extended to front and rear sides thereof and two screw holes provided at the front side of said barrel and equally spaced from said longitudinal center through hole at two opposite sides, a connector fastened to one end of said longitudinal center through hole at the rear side of said barrel to hold a pump tube, a fog generating guide tube mounted in said longitudinal center through hole, said fog generating guide tube comprising a rear end fastened

to said connector, and a front end terminating in a polygonal collar, which is stopped outside the front side of said barrel to seal one end of said longitudinal center through hole, and an outer threaded portion, said polygonal collar having two axially extended peripheral grooves, a nozzle cap threaded onto the outer threaded portion of said fog generating guide tube, and two screw bolts axially inserted through said peripheral grooves at said polygonal collar and respectively threaded into the screw holes at the front side of said barrel to fix said fog generating guide tube in position.

5. A fog generating guide tube substantially as described herein with reference to Figs. 6 to 9 of the drawings.

The Patent Office

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INVESTOR IN PEOPLE

Application No:	GB 9818217.3	**Examiner:**	R.B. Luck
Claims searched:	1-3	**Date of search:**	23 August 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): A5G GF

Int Cl (Ed.6): A61L 9/03 A63J 5/02

Other: On-Line W.P.I.

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	US4871115	B.R.Hessey	
X	DE29816381 U1	P.F.Hung(See Figs 1-4)	1-3 & 5

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.