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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : A61M 3/00 — **A1**

(11) International Publication Number: WO 93/17733

(43) International Publication Date: 16 September 1993 (16.09.93)

(21) International Application Number: PCT/US93/02221

(22) International Filing Date: 2 March 1993 (02.03.93)

(30) Priority data:
07/844,551 2 March 1992 (02.03.92) US

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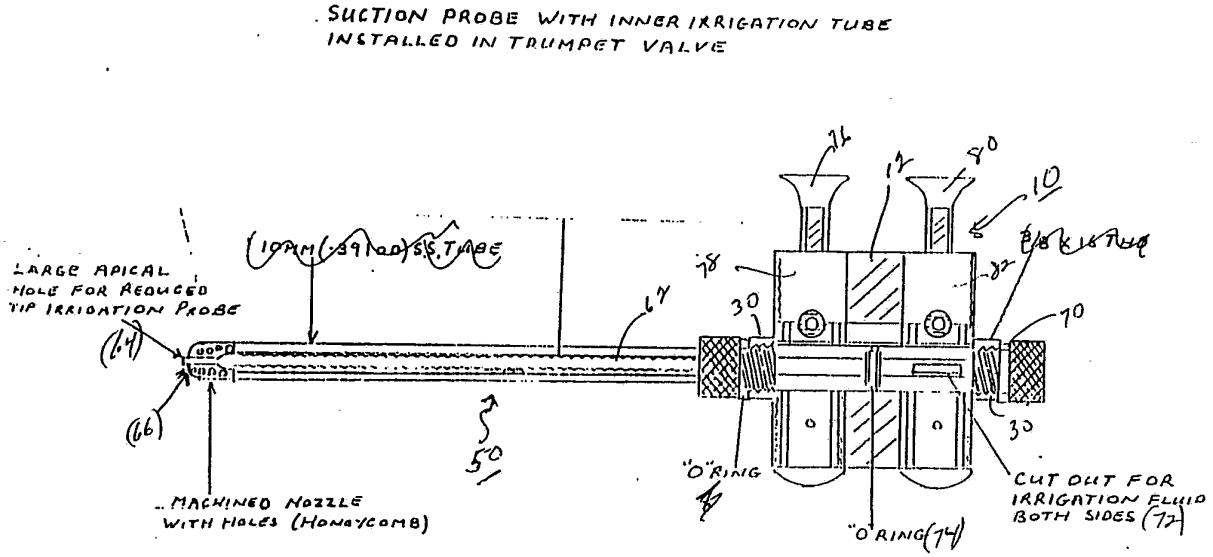
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(81) Designated States: European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
With international search report.

(54) Title: COMPOSITE IRRIGATION AND SUCTION PROBE



(57) Abstract

An improved irrigation control valve (12) for endoscopic instruments is herein described wherein the valve body is bilaterally symmetrical and includes a housing, a plurality of valve chambers (78, 82) pistons (76, 80), for reciprocal movement within each of said chamber, an inlet port (22a) for connection to a source of an irrigation fluid and a vacuum port (22b) for connection to a source of vacuum and symmetrical opposed fitting for mounting a probe (50) in either one of two positions to accomodate both the right handed and left handed clinician. The valve body can be used in conjunction with a variety of probes and in various endoscopic procedures; one of the preferred applications of this invention being in the hydrodissection of gynecological tissue.

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TITLE: COMPOSITE IRRIGATION & SUCTION PROBE

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation in part of co-pending application serial number 07/470/771 filed on January 26, 1990.

BACKGROUND OF INVENTION

1. Field of the Invention: This invention is directed to an apparatus and to a method. More specifically, this invention concerns an improved composite suction/irrigation probe for use in conjunction with a hydrodissection apparatus, and to a method involving concurrent infusion and suction of hydrodissection fluid.

2. Description of the Prior Art: Hydrodissection procedures typically involve directing a pressurized fluid stream at a target tissue through a probe, followed thereafter by suction of the fluid from the operative field through the same probe; or, through a probe connected to a separate instrument. This procedure, as practiced with a symmetrical valve (i.e. trumpet valve) of the type disclosed in the co-pending application serial no. 07/470/771 filed on January 26, 1990, simply involves the sequential depression of the irrigation piston connected to the source of the hydrodissection fluid, release of the irrigation piston, which discontinues the flow of fluid, depression of the suction piston to effect aspiration of fluid from the operative field, and the repetition of the above sequence. As is thus evident, the sequential infusion of hydrodissection fluid, followed, thereafter, by suction through the same probe prolongs the operative procedures. To the extent that the flow of fluid is interrupted and/or a common channel of the same probe is used for both infusion and aspiration of fluid, the probe tip may become fouled with tissue fragments, blood and the like, thereby interrupting the fluid aspiration process and possibly requiring withdrawal of the probe from the operative field, its replacement and thereafter the resumption of the operative procedure by reinsertion of the probe into the patient's body.

Without belaboring the foregoing, it is apparent that in order to maintain a clear channel in the hydrodissection (irrigation) probe, it is desirable (if not essential) to (a) maintain a continuous flow of hydrodissection

fluid through the probe; and, (b) effect aspiration of such fluid from the operative field through a separate probe, or separate channel within a common probe.

In the performance of a hydrodissection procedure of the type described above, it is highly desirable to perform concurrent infusion and aspiration of hydrodissection fluid. This continuous circulation of fluid within the operative field permits rapid clearing of the operative field of debris and, thus, facilitates the operative procedure.

In the event the hydrodissection procedure is performed utilizing a symmetrical valve (i.e. trumpet valve), concurrent infusion and aspiration of fluid is not readily possible insofar as a common channel, within the valve body, connects each of the valve chambers to one another, and, when both plungers are concurrently depressed, the irrigant will begin to flow through the valve body at the same time a negative pressure is exerted upon the valve body in proximity to the common channel. Accordingly, irrigation fluid will be diverted from flowing into the probe tip by such negative pressure, resulting in it being simply cycled through the value from the reservoir containing the hydrodissection fluid into the reservoir (fluid trap) associated with suction pump. The versatility afforded by the symmetrical design of the trumpet valve, thus, has up to now prevented the effective concurrent infusion and aspiration of hydrodissection fluid due to a design limitation inherent in the construction of the valve body. Accordingly. there exists a continuing need to enhance both the versatility of a symmetrical (trumpet) valve along with its ability to concurrently irrigate and aspirate fluid from an operative field.

OBJECTS OF THE INVENTION

It is the object of this invention to remedy the above as well as related deficiencies in the prior art.

More specifically, it is the principal object of this invention to provide enhancement in the operation of a symmetrical hydrodissection valve body to allow for concurrent infusion and aspiration of hydrodissection fluid.

It is another object of this invention to provide a composite probe tip adapted for use in conjunction with a symmetrical hydrodissection valve to allow for concurrent irrigation and aspiration of fluid therethrough.

It is yet another object of this invention to provide an improve hydrodissection method involving concurrent infusion and aspiration of hydrodissection fluid.

SUMMARY OF INVENTION

The above and related objects are achieved by providing a symmetrical valve body having at least one pair of valves, one member of said pair connected to a source of pressurized fluid and the other member of said pair connected to a source of negative pressure (vacuum). The symmetry of the valve body allows for connection of a probe tip at either of one or two diametrically opposite positions to accommodate clinician preference (right handed versus left handed operation).

A composite probe tip is herein provided to attach to the valve body to each of two mounts on the valve body designed for this purpose. This composite probe includes an outer, or suction, barrel and an inner, or irrigation, barrel, each of which is operatively connected to a different mount on the valve body, however, oriented in a common direction. More specifically, the orientation (mounting) of the suction barrel relative to the valve body is based on clinician preference (right hand versus left hand in operation); and, the irrigation barrel connected to the opposite mount. In mounting of the irrigation barrel to the valve body, it is designed for attachment thereof to the valve body so as to orient it in the same direction as the suction barrel, by passing the irrigation barrel through the valve body and thereby extending down through the suction barrel where it ultimately protrudes from a hole in the tip (distal end) of the suction barrel. This composite probe thus allows for allowing irrigation of the operative field concurrent with the aspiration of fluid therefrom.

The irrigation barrel is further provided at it proximal end with a complimentary connector for sealing engagement of the valve body at the point where it is connected to the mount. In order to allow for flow of fluid through the irrigation barrel, an opening is positioned on the side of the barrel

approximately coincident with an opening in the valve chamber which supplies the pressurized source of irrigation fluid to the barrel, thus, affording flow of irrigation through the composite probe to the operative field.

The infusion of fluid through the inner barrel, and suction of fluid through the outer barrel, requires effective isolation of each member of the composite probe within the valve body. This is achieved by placement of a flexible "O" ring on the irrigation barrel which is positioned near the proximal end thereof to effectively seal the common passageway (channel) which connects each of the valve chambers to one another.

In operation of a hydrodissection valve as described above, a source of suction is connected to the valve body so as to permit the introduction of negative pressure at the tip of the suction barrel upon movement/depression of the piston within a valve chamber operatively connected to the source of negative pressure; and infusion of pressurized fluid to the tip of the irrigation barrel upon movement/depression of the piston within a chamber operatively associated with a source of irrigation fluid. Insofar as each of the source of negative pressure and pressurized fluid are isolated by one another within the valve body by the "O" ring seal on the irrigation barrel, it is possible to depress either one or both pistons concurrently and thereby infuse fluid into the operative field and aspiration thereof within a single symmetrical instrument. Concurrent depression of these pistons will result in concurrent infusion and aspirations of fluid. The continuous flow of fluid through one barrel and aspiration thereof through a different barrel, virtually eliminates the possibility of obstruction of irrigation fluid flow. In the preferred embodiments of this invention, the inner (irrigation) barrel can have a variety of tip configurations. In the most preferred embodiment to this invention, the probe tip is tapered. It is also contemplated that the respective functions of each member of the composite probe be reversed simply be reversal of the connection of the pressurized source of irrigation fluid and negative pressure to the valve body.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a symmetrically irrigation control valve of this invention.

FIG. 2 is a sectional view, along the horizontal plain, of the irrigation control valve of FIG. 1.

FIG. 3 is a plan view of a piston of the irrigation control valve of FIG. 1.

FIG. 4 is a sectional view, along the horizontal plain of the piston of FIG. 3.

FIG. 5 is a sectional view of the irrigation control valve of FIG. 1 AA.

FIG. 6 is a cross-sectional view of the symmetrical trumpet valve of Fig. 1 equipped with the composite probe of the invention.

FIG. 7 is a perspective view of the composite probe.

FIG. 8 is a perspective view of the irrigation barrel of the composite probe.

DESCRIPTION OF THE INVENTION INCLUDING PREFERRED EMBODIMENTS

The preferred embodiments of this invention are illustrated in reference to the foregoing enumerated figures. For ease of discussion and simplification of description, a common reference numeral is assigned to a particular component feature of the irrigation control valve and such common reference numeral used within each of the figures.

In the illustration of this invention shown in FIG. 1, the irrigation valve (10) comprises a valve housing or body (12) having two valve chambers (14a, 14b), one valve chamber adapted for communication between a common conduit (16) of the control valve and a source of irrigation fluid (not shown) and a second valve chamber for communication between a source of suction (not shown) and a common conduit (16) of a the control valve body. In each instances, the common conduit of the control valve is provided with a probe (not shown). This probe can be connected to either the right hand or left hand fitting located on the side of the control valve. The positioning of the probe relative to the body of the control valve will be based upon clinician preference - whether the clinician is right handed or left handed. In either instance the control valve will operate essentially the same. It is also

important to note that in the embodiment of this illustrated herein either chamber (18a, 18b) of the control valve can be connected to either a source of vacuum or a source of irrigation fluid in that both chambers, and, thus, in the preferred embodiments of this invention, are essentially the same. In each instance the irrigation control valve of this invention comprises a valve housing or body within which are formed two cylindrical valve chamber. The housing of the control valve is further equipped with a pair of fittings (20a, 20b) for each chamber which defines a conduit (22a, 22b). The fitting can be connected to a source of vacuum or a source of irrigation fluid. These conduits (22a, 22b) provide communication between the source of vacuum and/or irrigation fluid and the interior of the valve chamber which is formed within the body of the control valve. The valve chamber is essentially uniform in diameter and of a defined length.

As more completely illustrated in FIGS. 2 and 5, the valve body defines two interior cylindrical chamber (18a, 18b), each of which is essentially the same in both dimension and in its contemplated operation. Each such chamber is of a defined length. The fitting or inlet port on the valve body defines a conduit which terminates as an inlet orifice (24a, 24b) in the chamber wall (26a, 26b). The chamber wall is provided with yet a second orifice (28a, 28b), offset from the inlet orifice. This second orifice provides for communication between the interior of the chamber and a conduit (30) which is at right angles to the orientation of the chamber. This conduit (30) can also be positioned on the same side of the valve body as the inlet orifice (24a, 24b) to enhance the ergonomics in the valve design. Of course, the orientation of the piston would be modified accordingly to allow for corresponding modification in flow path within the valve body. This conduit is provided on either end with a fitting (32a, 32b) adapted to connect to a probe (not shown).

Each of the valve chambers within the valve body is further provided with a piston (34a, 34b). As more fully illustrated in FIGS. 2, 3 and 4, these pistons are designed for reciprocating movement within the cylinder. In order to provide for watertight and airtight operation, these pistons are each equipped with a series of seals (36a-c, 38a-c). Each piston is further provided with an oval opening (40a, 40b) approximately equivalent in width to the orifices in the chamber wall. The length of the piston is such as to allow reciprocating movement within the cylindrical chamber and accommodation of spring bias means (not shown) within the cylinder chamber between the

base of the piston and the bottom of the cylindrical chamber. The spring bias means is intended to maintain the valve in the closed portion.

The seals which are located both fore (36a, 38a) and aft (36b, 38b) relative to the oval opening (40a, 40b) in the piston prevent fluid from inadvertently flowing from the source of irrigation fluid to the common conduit. As the cylinder is depressed (in the direction indicated by the arrow), and the oval opening in the piston aligned to permit communication between the inlet orifice and the orifice to the common conduit, fluid will begin to flow therebetween. The seal at the base of the piston ensures against fluid being trapped between the base of the piston and the base of the valve chamber which, if not vented, could prevent depression of the piston within the chamber.

FIG. 5 illustrates the relative positioning of the two orifices within each cylinder wall and the contemplated direction of flow of fluid upon reciprocal movement of the piston to allow for such flow.

In operation of this valve, a conduit is connected to each of the fittings on the valve body. The conduit can be connected to either a source of irrigation fluid or to a source of vacuum. For the purpose of simplification of description, it is assumed the conduit is connected to a source of irrigation fluid. Upon depression of the piston, the oval shaped opening in the piston barrel effects communication between the inlet orifice and the piston wall and the orifice of the common conduit thereby allowing for flow of fluid therebetween. The further the piston is depressed within the valve chamber, the greater the flow of fluid therethrough.

The improved irrigation control valve illustrated and described herein above is but representative of the preferred embodiments of this invention and not intended as delineating the scope thereof, which is set forth in the following claims.

FIG. 6 illustrates, in cross-section, a composite probe (50) of this invention installed on the trumpet valve of Fig. 1. In brief, each of the probe mounts (30), on the body of the irrigation valve are initially exposed. The outer or suction barrel (60)` of the composite probe is installed first. The position of the suction barrel on the valve body is determined by clinician

preference; more specifically, the preference of the clinician for right handed or left handed operation. Once the outer or suction barrel of the composite probe is installed, the inner or irrigation barrel (62) is thereafter put in place. Unlike the traditional mounting of a probe on the valve body, the orientation of the inner or irrigation barrel, relative to the valve body (12), is determined by the orientation of the outer or suction barrel. As illustrated in Fig. 6, the inner or irrigation barrel is mounted so as to pass through the valve body (12) and extend down the outer barrel of (60) the composite probe (50), with the tip (64) of the inner probe (62) extending through a port (64) in the distal end of the outer barrel designed to accommodate it. The inner probe is provided with a fitting (70) to seal the mount at the proximal end of the probe to the mount on the valve body. The side wall of the inner barrel is provided with a slot or opening (72) which is in approximate alignment with the opening in the valve chamber operatively connected to a pressurized source of irrigation fluid. In order to effectively isolate each of the valve chambers from one another and maintain separate and distinct functions for each of the outer barrel and inner barrel of the composite probe, an additional flexible seal, in the form of an "O" ring (74), is positioned and fixably mounted on the inner barrel approximately equidistant between each of the valve chambers so as to separate each of the chambers from one another. Thus, upon activation of either the suction or irrigation piston or the concurrent activation of both, each of the valve chambers are operatively connected to only one of the functional components of the composite probe. More specifically, upon simply the depression of the piston (76) associated with the suction chamber (78) as illustrated in Fig. 7, negative pressure is exerted at the distal end of the outer barrel of the composite probe thereby effecting suction of fluid through the perforation in the distal end of the outer barrel causing evacuation of fluid from the operative field. Similarly, where only the piston (80) associated with the irrigation valve chamber (82) is depressed, the pressurized fluid will flow from the chamber into the so-called "common channel" (86) and through the slot (72) in the side wall of the inner barrel (62) thus causing pressurized fluid to be directed onto the operative field through the distal end (64) of the irrigation probe.

Where both of the pistons (76, 80) associated with the suction (78) and irrigation (82) chambers are depressed so as to have both of the functions associated with each valve chamber operative at the same time, negative pressure will be exerted upon the distal end of the outer barrel concurrent

with the flow of fluid through the distal end of the irrigation probe. The sealing (74) of the so-called "common channel" (86) between each of these chambers (78, 82) permits the concurrent operation of each of these pistons and the functional isolation of each of the respective valve chambers from one another.

FIG. 8. illustrates in greater detail the inner barrel (62) of the composite probe. More specifically, the proximal end (90) of such probe is provided with means for attachment to the valve body in the form of a treaded fitting (92). As noted above, a slotted opening (72) is provided in the side wall to allow for infusion of fluid through the side wall into the common channel (86) of the irrigation probe. In the preferred embodiments of this invention, the slotted opening provides a orifice through the valve to allow for infusion of fluid from either side of the barrel. In the configuration of probe tip illustrated in Fig. 6, a raised collar (94) is machined into the probe tip to provide a means for support and retention of a flexible seal. The positioning of this raised collar is such as to effectively locate this seal between each of the chambers of the valve body so as to isolate one chamber from the other in the event either one or both pistons are depressed. The illustration shown in Fig. 6 depicts the composite probe positioned on the valve body for right handed operation. As is apparent, because of the symmetry of the valve, that the composite probe can be mounted in the opposite direction to facilitate a clinician preference for left handed operation.

WHAT IS CLAIMED IS:

1. In a hydrodissection apparatus including a symmetrical valve body characterized by a pair of piston activated trumpet valve chambers connected to one another through a common linear channel, a pair of fittings on the valve body, each of which is operatively associated with one of said chambers and adapted for connection to either a source of negative pressure or to a source of pressurized fluid and a pair of diametrically positioned probe mounts in fluid communication with the common channel which runs through the valve body, wherein the improvement comprises:

a probe tip of composite construction for releasably mounting to the symmetrical valve body including:

(i) an outer barrel having a proximal and a distal end, said proximal end adapted for releasably mounting to one of the probe mounts on the valve body and the distal end having a plurality of openings of sufficient size for passage of fluid and a central opening of sufficient size to accommodate the distal end of an inner irrigation barrel;

(ii) an inner barrel having a proximal and a distal end, said proximal end adapted for releasably mounting to the other of the two probe mounts on the valve body so as to allow for orientation of the inner barrel in the same direction as the outer barrel on said valve body by passing through the common linear channel within the valve body;

said outer barrel being further characterized as having a defined length of less than the defined length of the inner barrel and an interior chamber of sufficient diameter to accommodate both the inner barrel and a sufficient fluid flow to permit the effective and rapid aspiration of fluid through perforations in the distal end thereof upon the imposition of negative pressure to the trumpet valve activated chamber to which said barrel is operatively connected;

said inner irrigation barrel being further characterized as having the defined length of greater than the combined length of the outer barrel and the common conduit through the valve body, to allow for passage of said inner barrel through the common conduit of the valve body and the interior chamber of the other barrel so as to extend from the outer barrel into the operative field, said inner barrel having an opening in the sidewall thereof toward its proximal end which, upon mounting to the valve body coincides with the valve chamber thereof which is operatively connected to a source of pressurized fluid; and

(iii) a flexible seal fixedly attached to the inner barrel and positioned thereon between the proximal end of the inner barrel and the chamber of the valve body operatively connected to a source of negative pressure, so as to effectively seal the common linear channel within the valve body and thereby isolate each of the chambers operatively associated with with a source of negative pressure from the chamber operatively associated with the source of pressurized fluid.

2. The improved apparatus of Claim 1 wherein the symmetrical valve body includes at least one pair of pistons having an elongate opening in the body thereof to effect progressive flow of fluid and/or exertion of negative pressure upon depression of each of said pistons within their respective valve chambers.

3. The improved apparatus of Claim 1 wherein the composite probe tip is interchangeable on the valve body.

4. The improved apparatus of Claim 1 wherein the composite probe tip can be mounted on the valve body in either one of two available positions, based upon clinician preference.

5. The improved apparatus of Claim 1 wherein the composite probe tip can have a pressurized source of irrigation fluid delivered to the operative field through the outer barrel of the composite tip and a source of negative pressure operatively connected to the inner barrel, depending upon the

relative operative association of each of the valve chambers to a pressurized source of irrigation fluid and to a source of negative pressure.

6. In a hydrodissection apparatus including a symmetrical valve body characterized by a pair of piston activated trumpet valve chambers connected to one another through a common linear channel, a pair of fittings on the valve body, each of which is operatively associated with one of said chambers and adapted for connection to either a source of negative pressure or to a source of pressurized fluid and a pair of diametrically positioned probe mounts in fluid communication with the common channel which runs through the valve body, wherein the improvement comprises:

a probe tip of composite construction for releasably mounting to the symmetrical valve body including:

(i) an outer barrel having a proximal and a distal end, said proximal end adapted for releasably mounting to one of the probe mounts on the valve body and the distal end having a plurality of openings of sufficient size for passage of fluid and a central opening of sufficient size to accommodate the distal end of an inner irrigation barrel;

(ii) an inner barrel having a proximal and a distal end, said proximal end adapted for releasably mounting to the other of the two probe mounts on the valve body so as to allow for orientation of the inner barrel in the same direction as the outer barrel on said valve body by passing through the common linear channel within the valve body;

said outer barrel being further characterized as having a defined length of less than the defined length of the inner barrel and an interior chamber of sufficient diameter to accommodate both the inner barrel and a sufficient fluid flow to permit the effective and rapid infusion or aspiration of fluid through perforations in the distal end thereof upon activation of the chamber to which said barrel is operatively connected;

said inner irrigation barrel being further characterized as having the defined length of greater than the combined length of the outer barrel and the common conduit through the valve body, to allow for passage of said inner barrel through the common conduit of the valve body and the interior chamber of the other barrel so as to extend from the outer barrel into the operative field, said inner barrel having an opening in the sidewall thereof toward its proximal end which, upon mounting to the valve body coincides with the valve chamber thereof which is operatively connected to a source of pressurized fluid or the source of negative pressure; and

(iii) a flexible seal fixedly attached to the inner barrel and positioned thereon between the proximal end of the inner barrel and the chamber of the valve body operatively connected to a source of negative pressure, so as to effectively seal the common linear channel within the valve body and thereby isolate each of the chambers operatively associated with with a source of negative pressure from the chamber operatively associated with the source of pressurized fluid.

FIG 2

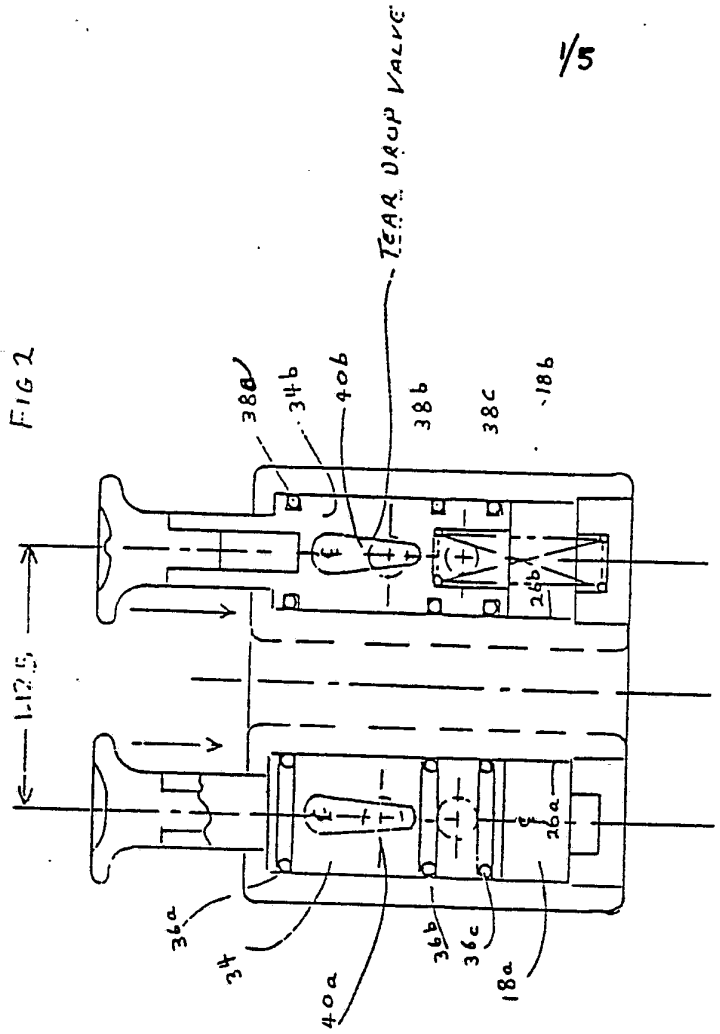

TEAR DROP VALVE
38a
34b
40b
38b
38c
18b
1.125
26b
26a
36a
34
40a
36b
36c
18a

FIG 1

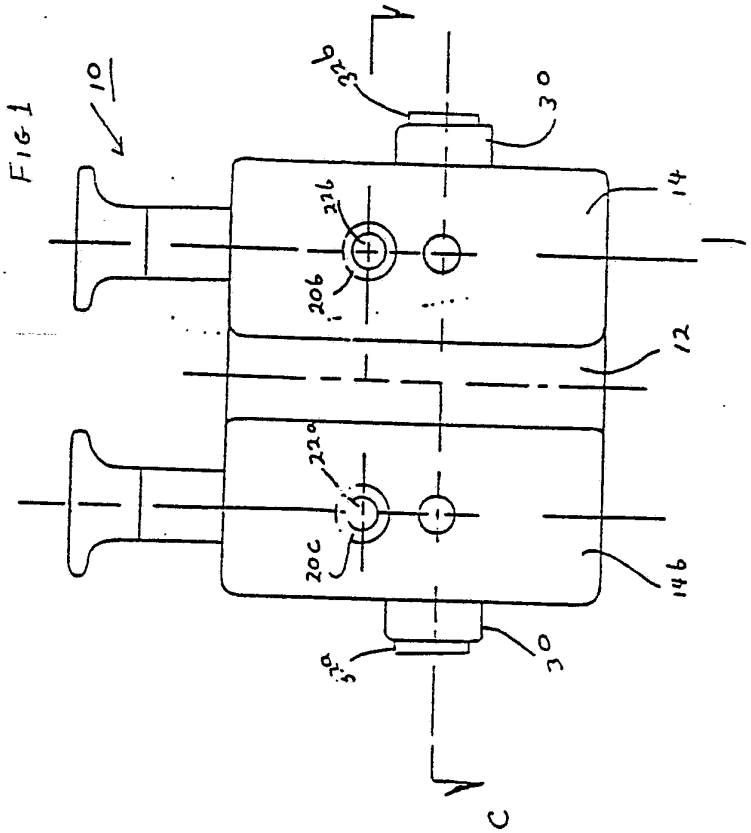

10
32b
30
14
22b
20b
12
22a
20c
14b
32a
30
C

FIG 4

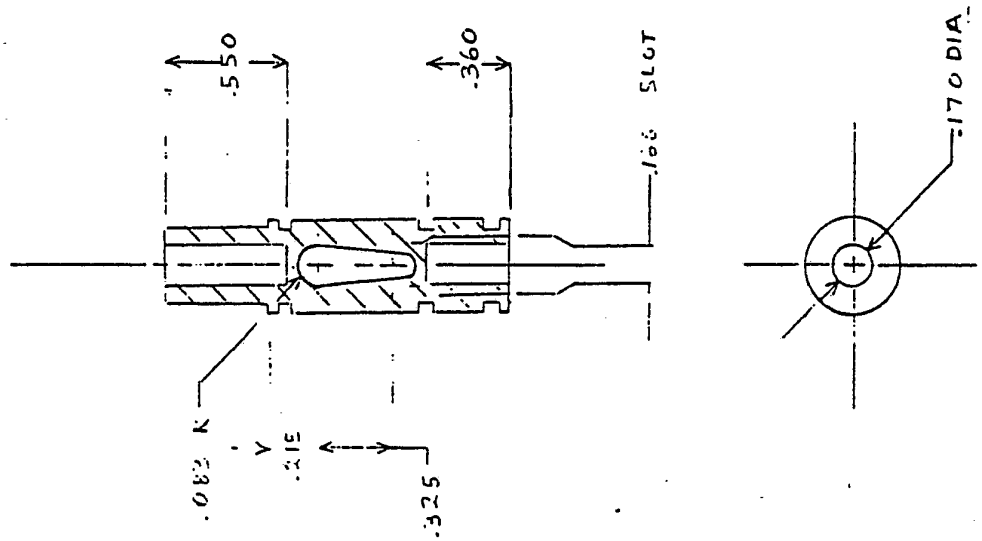

.550
.360
SLOT
.170 DIA.
.325

FIG 3

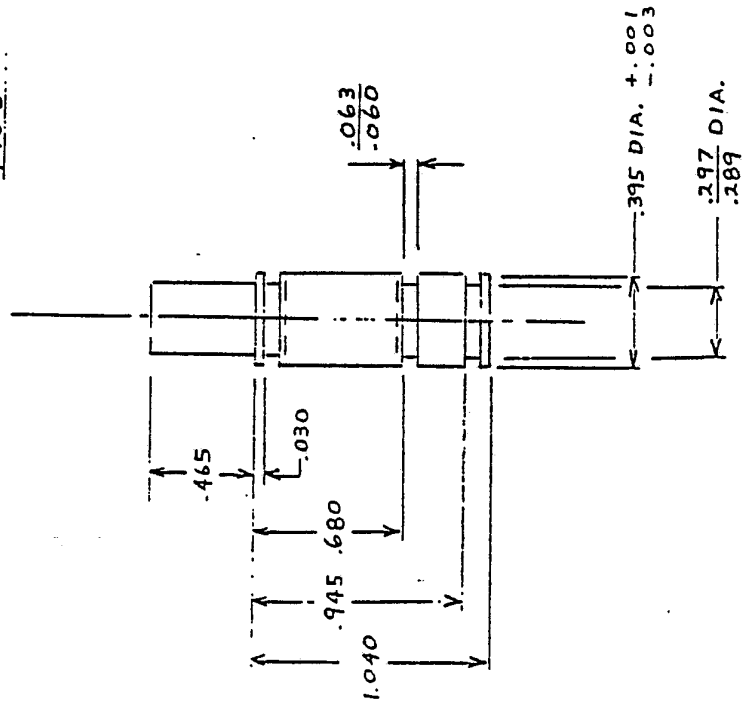
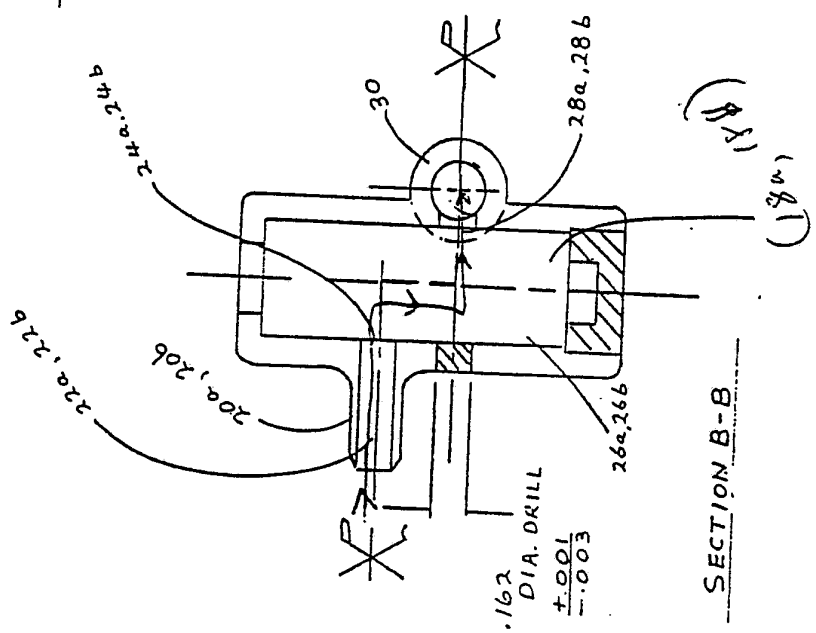

.063
.060
.395 DIA. +.001 -.003
.297
.289 DIA.
.465
.030
.680
.945
1.040

FIG 5


30
28a, 28b
24a, 24b
20a, 20b
22a, 22b
26a, 26b
.162 DIA. DRILL
+.001
-.003
SECTION B-B

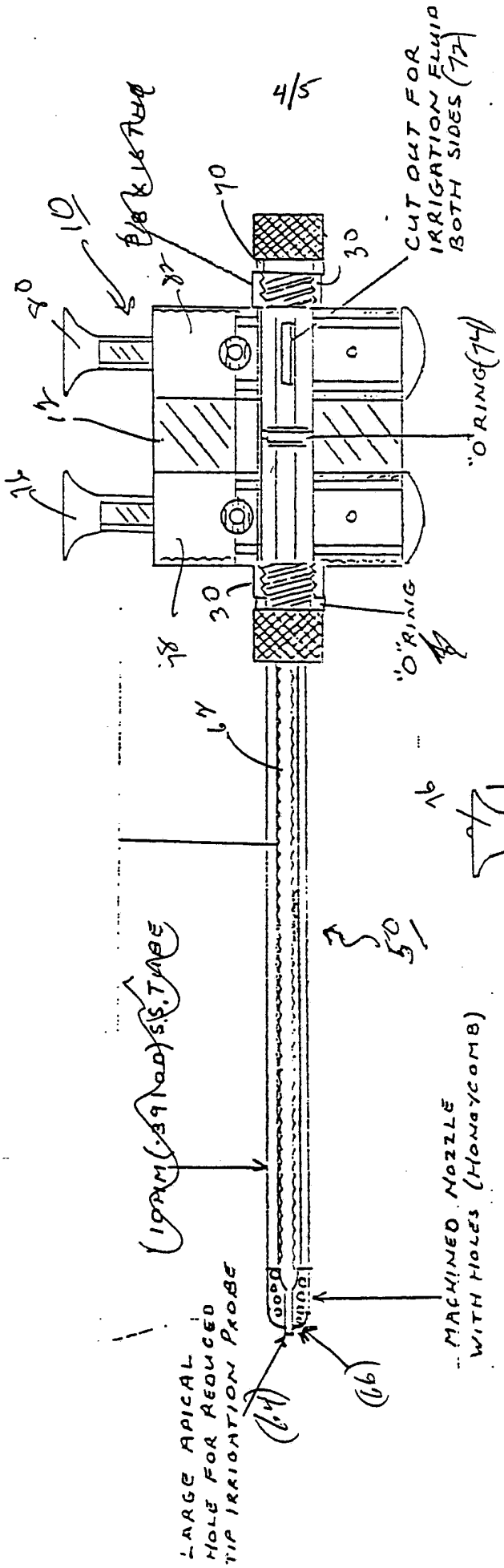

CUT OUT FOR IRRIGATION FLUID BOTH SIDES (72)
O'RING (74)
O'RING
SUCTION PROBE WITH INNER IRRIGATION TUBE INSTALLED IN TRUMPET VALVE
LARGE APICAL HOLE FOR REDUCED TIP IRRIGATION PROBE
MACHINED NOZZLE WITH HOLES (HONEYCOMB)
SECTIONAL VIEW OF TRUMPET VALVE
NOT TO SCALE

FIG 6

FIG. 7

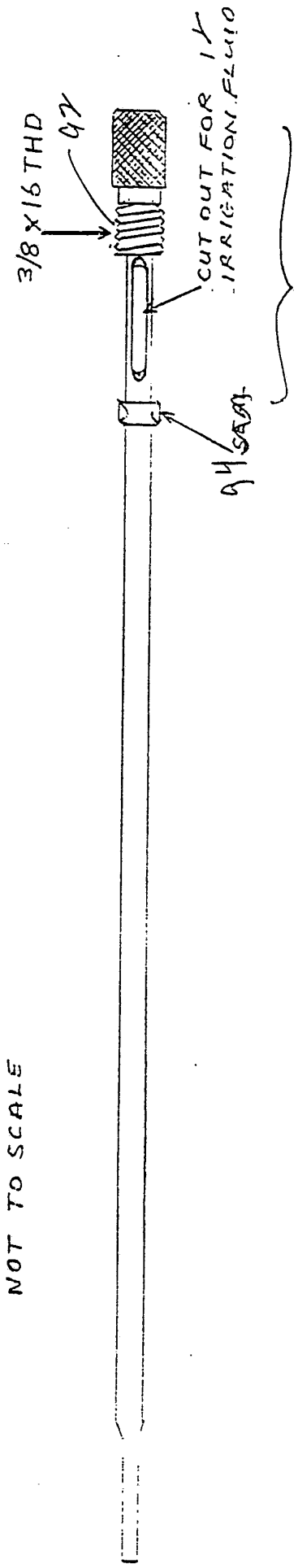
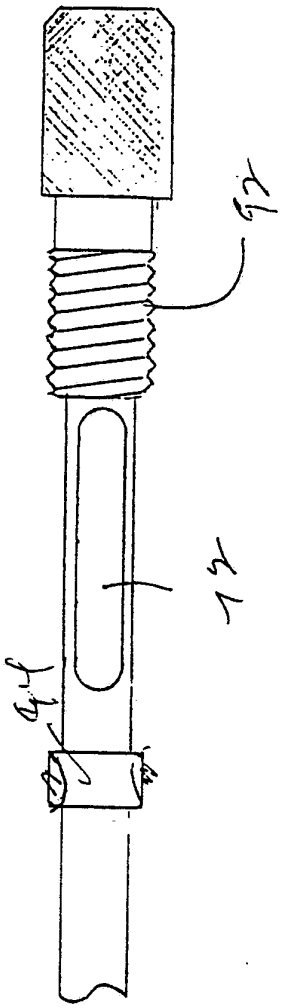


FIG 8A

NOT TO SCALE



EXPLODED VIEW OF INNER IRRIGATION TUBE

FIG 8B

NOT TO SCALE

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US93/02221

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :A61M 3/00
US CL :604/43

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 604/35,37,41,42,43,40,27,902,249 604/246,33

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

none

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US,A, 5,037,386 (Marcus et al.) 06 August 1991 See entire document.	1-6
Y	US,A, 4,504,264 (Kelman) 12 March 1985 note flexible seal 20.	1-6
Y	US,A, 4,666,426 (Aigner) 19 May 1987 note inner and outer tube postions.	1-6

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 19 APRIL 1993	Date of mailing of the international search report 07 JUN 1993
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. NOT APPLICABLE	Authorized officer MARK BUCKELMAN Telephone No. (703) 308-2112

Form PCT/ISA/210 (second sheet)(July 1992)*