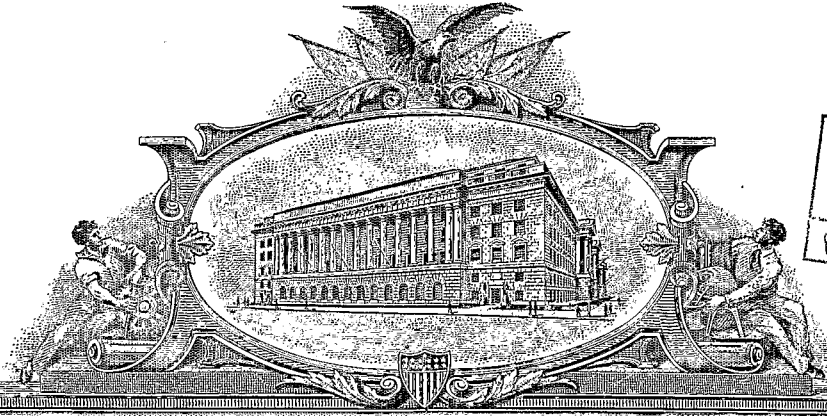


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Request for filing a Provisional Application under 37 CFR §1.53(b)(2).

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60/234897  
09/22/00

**TITLE OF THE INVENTION (280 characters max)**

ENDOSCOPIC SUCTION-IRRIGATION INSTRUMENT FOR SURGERY

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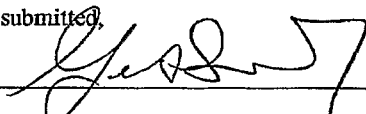
**ENCLOSED APPLICATION PARTS (check all that apply)**

<input checked="" type="checkbox"/> Specification	No. of pages	<u>8</u>	
<input checked="" type="checkbox"/> Drawing(s)	No. of pages	<u>1</u>	<input checked="" type="checkbox"/> Other (specify) <u>2</u> pages of claims <u>1</u> page of abstract

**METHOD OF PAYMENT (check one)**

<input checked="" type="checkbox"/> A check or money order is enclosed to cover the Provisional filing fees	Provisional Filing Fee Amount (\$)
<input type="checkbox"/> The Commissioner is hereby authorized to charge filing fees and credit Deposit Account Number: 08-3040	
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.  
 No  
 Yes, the name of the U. S. Government agency and the government contract number are:

Respectfully submitted,  
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Date September 22, 2000  
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ENDOSCOPIC SUCTION-IRRIGATION INSTRUMENT FOR SURGERY

Summary of the Invention

5 This invention relates generally to surgery and more particularly to improvements in instruments used for suction, irrigation, or both in surgical procedures, for example sinus surgery.

10 Sinus surgery is typically carried out with the aid of an endoscope which includes a telescope sheath. The sheath is inserted through a patient's nostril, and an optical telescope is inserted through the sheath into the patient's nasopharynx in order to enable the surgeon to observe the surgical field on a monitor connected to a television camera coupled to the telescope. It is important to keep the surgical field clear of blood and debris. Typically, this is accomplished by incorporating a suction/irrigation feature into the endoscope.

15 The patient is normally under general anaesthesia and supine, and the telescope sheath is typically inserted at an angle with the range of 20° to 40° relative the the vertical. A conventional endoscope is handled by the surgeon using a tight finger grip in order to enable the surgeon to control  
20 the position of the tip of the instrument despite the forces exerted on the instrument by the various tubes and cables

connected to it, including the camera cable, a fiber optic light carrier, and irrigation and suction tubes. The tight finger grip does not afford the surgeon the ability to exercise fine control over the position of the tip of the instrument. Handling of the conventional endoscopes has been found to cause fatigue, especially since the surgeon is required to hold the instrument for 1.5 hours or more in a typical operation. Moreover, the tubes and cables tended to get in the surgeon's way.

Other problems encountered with conventional endoscopes include space limitations, especially since the conventional endoscopes tend to get in the way of other instrumentation.

Foot-operated controls were generally used to control suction and irrigation, but surgeon was required to move his or her body to operate them. Controls mounted on the instrument itself, if easily operated by a surgeon situated on one side of the patient, were difficult to operate if the surgeon were to move to the other side.

It is an object of this invention to address the aforementioned problems, and it is a general object of this invention to provide an ergonomically superior endoscope, suitable for use in sinus surgery and in other surgical operations where irrigation and/or suction are required.

A preferred endoscopic instrument in accordance with the invention comprises a tubular sheath extending along a sheath axis, the sheath having an internal passage for receiving a telescope, the internal passage extending from a proximal, telescope-receiving opening to a distal tip, and a port for connection to suction and irrigation lines; a handle having a manually graspable external surface; a suction valve within the handle, the suction valve being connectible to a suction line and openable to provide communication between said port and the suction line; an irrigation valve within the handle, the irrigation valve being connectible to a suction line and openable to provide communication between said port and the irrigation line; manually operable controls on the handle for selectably opening the suction and irrigation valves; and a coupling rigidly connecting the handle to the sheath at an intermediate location along the length of the sheath between the proximal opening and the distal tip; wherein the handle is elongated along a handle axis and oblique relative to the sheath, the handle forming an acute angle relative to the portion of the sheath between the proximal end and said intermediate location, the angle between the handle axis and the sheath axis being approximately 30 degrees.

Other objects, details and advantages of the invention will be apparent from the following detailed description when read in conjunction with the drawings.

5 Brief Description of the Drawings

The single figure is an exploded perspective view of an endoscopic instrument in accordance with a preferred embodiment of the invention.

10 Detailed Description

The instrument 10 comprises a telescope sheath 12, which is held in a receiver 14 connected to the lower end of an elongated handle 16.

The telescope sheath 12 includes an elongated, hollow  
15 tube 18 having an opening at its distal end 20, and having, at its proximal end, a fitting 22 with an opening 24 into which a telescope (not shown) can be inserted. The telescope used with this instrument typically comprises a miniature television camera, a shaft with a system of lenses arranged to  
20 focus onto the television camera a magnified image of the surgical field adjacent the distal end 20, and a fiber optic light carrier in the shaft for illuminating the surgical field.

The telescope shaft fits into the tube 18, extending almost to the opening at the distal end of the tube. An annular clearance between the telescope shaft and the distal end of the tube allows for the flow of irrigation fluid (usually saline solution) outward from the tip of the tube and for the return of fluid along with blood and debris, drawn into the tube by suction. The interior of the tube 18 at its distal end 20 is preferably shaped to direct irrigation fluid inwardly over the end of the telescope to wash away any accumulated materials that might obstruct the surgeon's view through the telescope or interfere with illumination by the fiber optic light carrier.

Near the proximal end of tube 18, just below the fitting 22, is a nut 26, which is rotatable, but restrained against axial movement along the tube. The nut is engageable with threads 28 on receiver 14, allowing the tube to be removed for replacement. Below the nut, a tapered element 30 is provided on the tube. The tapered element mates in fluid-tight relationship with a tapered hole (not shown) inside the receiver 14. A slot 32 provides fluid communication between the interior of tube 18 and a fluid channel (not shown) inside arm 34, which connects receiver 14 to the lower end of the handle.

The handle 16 is elongated and preferably has a generally oval-shaped, symmetrical, cross-section transverse to its direction of elongation, so that the handle has flat, or nearly flat, long sides and arcuate short sides. The arm 34  
5 extends laterally in perpendicular relation to the axis of elongation of the handle and also perpendicular to the long sides of the handle. Preferably, the oval shape of the handle is symmetrical, and the arm 34 is located centrally between the narrow sides of the handle.

10 The fluid channel within arm 34 is in communication with a manifold 36, which is connected to valves 38 and 40, which are operated respectively by push-buttons 42 and 44 at the top of the handle through internal push-rods (not shown). Port 46, on valve 38, is connectible to an irrigation fluid tube,  
15 while port 48, on valve 40, is connectible to a suction tube. The portions of the valves on which the ports are located are preferably rotatable about axes parallel to the direction of elongation of the handle so that the suction and irrigation tubes can be moved out of the surgeon's way and so that the  
20 instrument itself can be moved more easily.

The exterior surface of the handle preferably has gripping ribs 50 on both short sides and thumb-placement



depressions 52 on the short sides near the upper end of the handle.

A hook 54, molded as part of the handle, extends from the upper end of the long side of the handle opposite the long  
5 side from which the arm 34 extends. The hook rests on the surgeon's hand, normally just above the second metacarpal.

The receiver 14 is configured so that the axis of the tube 18, when the tube is in the receiver, is disposed at an angle of approximately 30 degrees relative to the long axis of  
10 the handle. Thus, since the tube 18 will normally be at an angle of between 20 and 40 degrees from the vertical when the instrument is in use, the handle will be nearly vertical, i.e. in a neutral position for optimum comfort to the surgeon. The symmetry of the handle permits it to be grasped and held with  
15 equal facility by the left hand of a surgeon situated to the patient's right, or by the right hand of a surgeon situated to the patient's left. The irrigation and suction buttons 42 and 44 can be easily operated with the thumb without changing the surgeon's grasp on the handle. The hook allows the instrument  
20 to rest on the surgeons hand to minimize fatigue. Moreover, the handle is positioned relative to the tube so that the instrument can be used while the surgeon's arms and/or hands

are supported by suitable rests provided on the operating table rails.

Various modifications can be made to the apparatus described. For example, provision can be made for an  
5 additional receiver, corresponding to receiver 14, on the opposite side of the handle. Alternatively, receivers can be positioned at either or both ends of manifold 36. The instrument can, of course be used in operations other than sinus surgery, and can be modified in various respects  
10 depending on its application. Thus other modifications may be made to the apparatus and method described above without departing from the scope of the invention as defined in the following claims.

Claims

1. An endoscopic instrument for surgery comprising:
  - a tubular sheath extending along a sheath axis, the sheath having an internal passage for receiving a telescope, the internal passage extending from a proximal, telescope-receiving opening to a distal tip, and a port for connection to suction and irrigation lines;
  - a handle having a manually graspable external surface;
  - a suction valve within the handle, the suction valve being connectible to a suction line and openable to provide communication between said port and the suction line;
  - an irrigation valve within the handle, the irrigation valve being connectible to a suction line and openable to provide communication between said port and the irrigation line;
  - manually operable controls on the handle for selectably opening the suction and irrigation valves; and
  - a coupling rigidly connecting the handle to the sheath at an intermediate location along the length of the sheath between the proximal opening and the distal tip;

wherein the handle is elongated along a handle axis and oblique relative to the sheath, the handle forming an acute angle relative to the portion of the sheath between the proximal end and said intermediate location, the angle between the handle axis and the sheath axis being approximately 30 degrees.

## ENDOSCOPIC SUCTION-IRRIGATION INSTRUMENT FOR SURGERY

### Abstract of the Disclosure

An ergonomically superior endoscopic suction-irrigation instrument for surgery comprises a telescope sheath connected at an angle of approximately 30° to a vertically elongated handle having thumb-operated irrigation and suction valves. The instrument is especially suited for sinus surgery.

