



(11) **EP 2 335 561 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
22.06.2011 Bulletin 2011/25

(51) Int Cl.:
A61B 1/307 (2006.01) A61B 1/00 (2006.01)

(21) Application number: **09812672.5**

(86) International application number:
PCT/CN2009/073898

(22) Date of filing: **11.09.2009**

(87) International publication number:
WO 2010/028606 (18.03.2010 Gazette 2010/11)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
AL BA RS

(72) Inventors:
• **Xia, Shujie**
Hong Kou District
Shanghai 200080 (CN)
• **Zhao, Wej**
Hong Kou District
Shanghai 200080 (CN)

(30) Priority: **12.09.2008 CN 200820153056 U**
19.09.2008 CN 200820153290 U
19.09.2008 CN 200820153291 U

(74) Representative: **Denjean, Eric et al**
Cabinet Laurent & Charras
"Le Contemporain"
50, Chemin de la Bruyère
69574 Dardilly Cedex (FR)

(71) Applicant: **Shanghai First People's Hospital**
Shanghai 200080 (CN)

(54) **URETERAL ENDOSCOPE OF ADJUSTABLE SOFTNESS AND RIGIDITY**

(57) The utility model relates to medical apparatus, and in particular to a rigid/flexible adjustable ureteroscope which includes a body, an operation shank and a rigid/flexible adjustment support rod. A rigidity adjustment key controls the rigid/flexible adjustment support rod to be movable freely in the body so that the rigid/flexible adjustment support rod channel. Movement of the rigid/flexible adjustment support rod makes a part of the endoscope becomes rigid so as to have adequate rigidity to overcome resistance, avoiding the needs of hard sheath while entering a uterus. A front part of the

endoscope may become from rigid to flexible by movement of the support rod, and the flexible front part may vary in length to accomplish the operation flexibly. The support rod is able to be movable or be drawn out from a support rod channel to serve the support rod channel as a work channel. By adjustment of sizes, a rigid/flexible adjustment fibronephroscope is provided, and alternatively, a rigid/flexible adjustment fiber urethra cystoscope is provided. Compared with the prior art, the utility model overcomes defects of various urethra cystoscopes, raises surgical efficacy and economic merits, avoids hurt to tissues, and reduces apparatus acquisition cost.

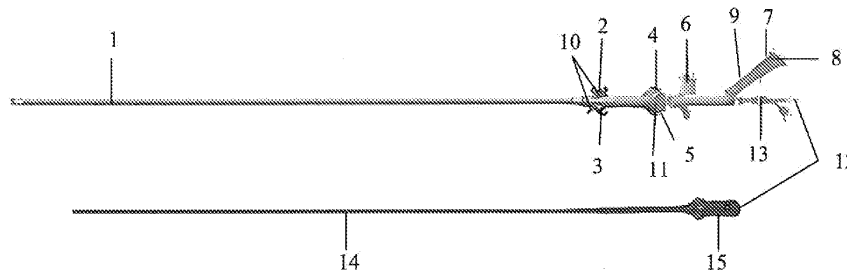


Figure 1

EP 2 335 561 A1

Description

Field of the Invention

[0001] The utility model relates to the field of medical surgery equipment, and relates to an endoscopy for treating ureteral disease, and in particular to rigid/flexible adjustable ureteroscope, which may serve as rigid/flexible adjustable fibronephroscope, or an adjustable fiber urethra cystoscope by means of adjusting sizes thereof.

Background of the Invention

[0002] Ureteroscopes are required in medical clinical diagnoses and treatment of ureteral disease. A conventional ureteroscope is classified as two types, rigid ureteroscope and flexible ureteroscope. The rigid ureteroscope is widely employed, but may hurt patients more seriously and producing complications due to material. Moreover, the rigid ureteroscope is an optical scopy, which typically has visual angles of 0 degree and five degrees, resulting in poor image quality of optical system. Continuous bladder wash is needed to guarantee distinct surgery visual field. The fiber urethra cystoscope, i.e. a flexible cystoscope, cannot enter a catheter unless assistance of hard sheath because of insufficient rigidity, incurring undesired restriction in operation. The flexible cystoscope has some deficiencies, such as lacking of adequate work path, a relatively limited visual field, and inconvenient manipulation owing to friction between the flexible cystoscope and tissue.

[0003] In medical clinical diagnoses and treatment of renal disease, especially nephrolith, catheter nephroscope is necessary. A conventional catheter nephroscope apparatus comprises two types, rigid catheter nephroscope and flexible catheter nephroscope. The rigid catheter nephroscope has limited operation scope, for example, operates on one or two renal pelvises each time. Especially, treatment of complicated kidney stone is not efficacious, and rigid catheter nephroscope tends to hurt kidney and produce various complications. The flexible catheter nephroscope, also called catheter flexible nephroscope, has relatively small and unclear operational visual field without adequate operation room, and thus ultrasound lithotripsy and laser lithotripsy and so on can not be performed. The flexible catheter nephroscope has a long and thin body with low rigidity, subjecting to friction between tissues, and therefore gives rise to inflexible operation and cumbersome positioning and retention. It has to take much time to learn how to operate the flexible catheter nephroscope.

[0004] Furthermore, cystoscopes are necessary for medical clinical diagnoses and treatment of ureteral and bladder disease. A conventional ureteral cystoscope is classified as two types, rigid ureteral cystoscope and flexible ureteral cystoscope. The rigid ureteral cystoscope is the most widely employed, and typically has visual angles of 0 degree, 30 degrees, 70 degrees and 90 degrees.

The visual angles are fixed and inadjustble, and visual field cuts are inevitable at least to some extent. The endoscopy with different visual angles needs to vary with different surgery operations, making operations more troublesome and increasing manufacture cost. The rigid ureteral cystoscope may hurt patients more seriously and produce comlications due to material. Moreover, the rigid ureteral cystoscope is an optical scopy, which has poor image quality of optical system, and thus continuous bladder wash is required to guarantee distinct surgery visual field. The fiber urethra cystoscope is a flexible cystoscope, and cannot enter a catheter or a bladder unless assistance of hard sheath because of insufficient rigidity, incurring undesired restriction in operation. The flexible urethra cystoscope has some deficiencies, such as lacking of adequate work path, a relatively limited visual field, and inconvenient manipulation.

Summary of the Invention

[0005] An object of the utility model is to overcome deficiencies of the ureteroscope, and to provide an endoscope for diagnoses and treatment of ureteral disease, in particular to a rigid/flexible adjustable ureteroscope.

[0006] Another object of the utility model is to provide a rigid/flexible adjustable fibronephroscope.

[0007] A further object of the utility model is to provide an adjustable fiber urethra cystoscope.

[0008] The utility model combines a rigid ureteroscope and a flexible ureteroscope applied in the market or clinic to provide a rigid/flexible adjustable fiber ureteroscope for diagnoses and treatment of ureteral disease. The surgical operations are simplified, operation efficiency is raised, and manufacture cost is reduced. The ureteroscope is more economic and efficacious.

[0009] The utility model improves prior art fiber ureteroscope.

[0010] The utility model comprises a body, an operation shank and a rigid/flexible adjustment support rod.

[0011] The body 1 has a length of 50~150cm and an effective work diameter of 75~85 cm, and has a diameter of 5~18Fr, preferably 7~12Fr. The body may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree for facilitating surgeries. The fiber ureteroscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 6~11Fr for ease of entering ureter and for avoiding hurt to tissues. The body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the fiber ureteroscope body.

[0012] The operation shank connects with the body. A work channel 2 is defined in a joint portion between the operation shank and the body. The work channel is super smooth and has a diameter of 3~8Fr for appliance in laser fiber lithotripsy, ultrasound absorption lithotripsy and

electrohydraulic lithotripsy, and endovenous apparatus operation such as biopsy forceps, pyelostomy and so on. A switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 3~6Fr for ensuring adequate irrigation or assistance operation of other small endovenous apparatus. A switch key is provided on the water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 is formed between the work channel 2 and a light source interface 6. An operation control key 4 and a lock key 5 are respectively formed on opposite sides of the control shaft 11. The light source interface 6 is provided on a rear of the control shaft 11 and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 15~75 degree, preferably 45 degree, with respect to the operation shank. A focus button 7 is provided between the light source interface 6 and the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0013] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body and the rigidity adjustment key 12. The rigid/flexible adjustment support rod body 14 is round and solid, and has a length of 50~150cm and an effective work length of 75~85cm, and has a diameter of 1~5Fr, preferably 3Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel according to operation requirements, so that a front part of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod channel as a work channel. An operator can recognize the flexible length of the fiber ureteroscope body according to a rod scale 15 on the rigid/flexible adjustment support rod.

[0014] According to another embodiment, a body 1' of a rigid/flexible adjustment fibronephroscope has a length of 20~50cm and a diameter of 12~18Fr; the rigid/flexible adjustment support rod 14' has a length of 20~50cm.

[0015] Further, the body 1' has a length of 35~37cm and has a diameter of 16~18Fr. The body 1' may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree for facilitating surgeries. The fiber ureteroscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 142~16Fr.

[0016] The rigid/flexible adjustment support rod body

14' is round and solid, and has a length of 20~50cm and has a diameter of 1~5Fr.

[0017] The rigid/flexible adjustment support rod body 14', preferably, has a length of 35~37cm and has a diameter of 3Fr.

[0018] According to another embodiment, a body 1" of a rigid/flexible adjustment fiber urethra cystoscope has a length of 20~100cm and a diameter of 9~21Fr. The body 1" may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree. The body 1" has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 16~18Fr. The rigid/flexible adjustment support rod body 14" is round and solid, and has a length of 20~100cm and has a diameter of 1~5Fr.

[0019] The body 1" has a length of 42~45cm and has a diameter of 18Fr.

[0020] The rigid/flexible adjustment support rod body 14", preferably, has a length of 42~45cm and has a diameter of 3Fr.

[0021] The utility model is specific for ureteral disease. Compared with the prior art, the utility model apparently overcomes defects of conventional ureteroscopes and raises surgical efficacy and economical merits with reduced cost. The utility model has following advantages: the rigidity adjustment key controls the rigid/flexible adjustment support rod to be movable in the fiber ureteroscope body, so that the fiber ureteroscope body can become rigid to provide adequate rigidity to overcome resistance, avoiding needs of hard sheath during extension into a ureter. In diagnoses and treatment operation, movement of the rigid/flexible adjustment support rod makes a front part of the endoscope becomes flexible, and the flexible front part is variable in length for accommodating different cases. In order to meet different requirements, the rigid/flexible adjustment support rod can freely pass through the rigid/flexible adjustment support rod channel, and can be drawn out completely in such a way that the rigid/flexible adjustment support rod channel may serve as a work channel. The operator can recognize the length which converts from rigid to flexible or from flexible to rigid with a scale in the rigid/flexible adjustment support rod. The endoscope may become flexible to bend at a large angle, overcoming the defect of visual field cuts due to angle limitation. An outer diameter of fiber ureteroscope body may increase apparently without restriction of the outer sheath, and the number and size of work channels increase, which is combined with gripping tongs, biopsy forceps, basket manipulation and laser fiber for benefiting for various medical surgery and ensuring a large and clear enough surgical visual field, thereby simplifying fabrication of a flexible endoscope and avoiding hurt to tissues. The endoscope combines rigid endoscope and fiber flexible endoscope, so as to reduce apparatus acquisition cost and to promote medical diagnoses and treatment capability, achieving desired utility and market value.

[0022] The utility model provides a rigid/flexible adjustable fibronephroscope by virtue of scale adjustment of a support rod relative to a body. Compared with the prior art, the utility model overcomes defects of various nephrosopes, raises surgical efficacy and economic merits with reduced cost. Hard sheath is not needed while entering a kidney. In operation, movement of the rigid/flexible adjustment support rod makes a front part of the endoscope becomes flexible, and the flexible front part is variable in length for accommodating different cases. An outer diameter of the fibronephroscope body may increase apparently, and the number and size of work channels increase. The endoscope combines advantages of rigid fibronephroscope and flexible fibronephroscope.

[0023] The utility model provides a rigid/flexible adjustable fiber urethra cystoscope for diagnoses and treatment of ureter and bladder disease by virtue of scale adjustment of a support rod relative to a body. Hard sheath is not needed while entering a ureter or a bladder. In operation, movement of the rigid/flexible adjustment support rod makes a front part of the endoscope becomes flexible, and an operator can recognize the length of the flexible front part by a rod scale on the support rod. The endoscope combines advantages of rigid fibronephroscope and flexible fibronephroscope. Compared with the prior art, the utility model overcomes defects of various urethra cystoscopes, raises surgical efficacy and economic merits with reduced cost.

Brief Description of the Drawings

[0024] Figure 1 is a schematic diagram of a rigid/flexible adjustable ureteroscope,

[0025] wherein 1 denotes body, 2 denotes work channel, 3 denotes a water inlet/outlet channel, 4 denotes operation control key, 5 denotes lock key, 6 denotes light source interface, 7 denotes focus button, 8 denotes ocular, 9 denotes focus scale, 10 denotes switch key, 11 denotes control shaft, 12 denotes rigidity adjustment key, 13 denotes support rod switch key, 14 denotes support rod, 15 denotes scale;

[0026] Figure 2 schematically shows movement of the rigid/flexible adjustment support rod under control of rigidity adjustment key making a front part of the endoscope becomes from rigid to flexible,

[0027] wherein 1 denotes body, 2 denotes work channel, 3 denotes a water inlet/outlet channel, 4 denotes operation control key, 5 denotes lock key, 6 denotes light source interface, 7 denotes focus button, 8 denotes ocular, 9 denotes focus scale, 10 denotes switch key, 11 denotes control shaft, 12 denotes rigidity adjustment key, 13 denotes support rod switch key, 16 denotes flexible front part;

[0028] Figure 3 is a schematic diagram of a rigid/flexible adjustable fibronephroscope,

[0029] wherein 1' denotes body, 14' denotes support rod, and other reference numerals are identical to those

in Figures 1 and 2;

[0030] Figure 4 is a schematic diagram of a rigid/flexible adjustable fiber urethra cystoscope,

[0031] wherein 1" denotes body, 14" denotes support rod, and other reference numerals are identical to those in Figures 1 and 2.

Detailed Description of the Invention

[0032] The utility model is further described in combination with the drawings.

[0033] Embodiment 1

[0034] Referring to Figures 1 and 2, the utility model improves flexible ureteroscopes and rigid ureteroscopes to make a rigid/flexible adjustable fiber ureteroscope for diagnoses and treatment of ureteral disease. The rigid/flexible adjustable fiber ureteroscope comprises a fiber ureteroscope body, an operation shank and a rigid/flexible adjustment support rod.

[0035] The fiber ureteroscope body 1 has a length of 50cm and a diameter of 5Fr, and may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree. The fiber ureteroscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 6Fr. The fiber ureteroscope body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the fiber ureteroscope body.

[0036] The operation shank connects with the fiber ureteroscope body. A work channel 2 is defined in a joint portion between the operation shank and the fiber ureteroscope body. The work channel is super smooth and has a diameter of 3Fr. The switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 3Fr. A switch key is provided on the water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 is formed between the work channel 2 and a light source interface 6. An operation control key 4 is formed on one side of the control shaft 11, and a lock key 5 is formed on another side opposite to the operation control key 4. The light source interface 6 is provided on a rear of the control shaft and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 15 degree with respect to the operation shank. A focus button 7 is provided between the light source interface 6 and the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation

shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0037] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body 14 and the rigidity adjustment key 12. The rigid/flexible adjustment support rod body 14 is round and solid, and has an effective work length of 50cm and a diameter of 1Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel according to operation requirements, so that a front part 16 of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod channel as a work channel. An operator can recognize the flexible length of the fiber ureteroscope body according to a rod scale 15 on the rigid/flexible adjustment support rod.

[0038] The utility model is specific for ureteral disease, and has following advantages: the rigidity adjustment key controls the rigid/flexible adjustment support rod to be movable in the fiber ureteroscope body, so that the fiber ureteroscope body can become rigid to provide adequate rigidity to overcome resistance, avoiding needs of hard sheath during extension into a ureter; in operation, movement of the rigid/flexible adjustment support rod makes a front part of the endoscope becomes flexible, and the flexible front part is variable in length for accommodating different cases. In order to meet different requirements, the rigid/flexible adjustment support rod can freely pass through the rigid/flexible adjustment support rod channel, and can be drawn out completely in such a way that the rigid/flexible adjustment support rod channel may serve as a work channel. The operator can recognize the length which converts from rigid to flexible or from flexible to rigid with a scale in the rigid/flexible adjustment support rod. The endoscope may become flexible to bend at a large angle, overcoming the defect of visual field cuts due to angle limitation. An outer diameter of fiber ureteroscope body may increase apparently without restriction of the outer sheath, and the number and size of work channels increase, which is combined with gripping tongs, biopsy forceps, basket manipulation and laser fiber for benefiting for various medical surgery and ensuring a large and clear enough surgical visual field, thereby simplifying fabrication of a flexible endoscope and avoiding hurt to tissues.

[0039] Embodiment 2

[0040] Referring to Figures 1 and 2, the utility model improves flexible ureteroscopes and rigid ureteroscopes to make a rigid/flexible adjustable fiber ureteroscope for diagnoses and treatment of ureteral disease. The rigid/flexible adjustable fiber ureteroscope comprises a fiber ureteroscope body, an operation shank and a rigid/flexible adjustment support rod.

[0041] The fiber ureteroscope body 1 has a length of 150cm and a diameter of 18Fr, and may be flexible respectively at an upward angle of 180 degree, at a down-

ward angle of 180 degree, and at a second downward angle of 130 degree. The fiber ureteroscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 11Fr. The fiber ureteroscope body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the fiber ureteroscope body.

[0042] The operation shank connects with the fiber ureteroscope body. A work channel 2 is defined in a joint portion between the operation shank and the fiber ureteroscope body. The work channel is super smooth and has a diameter of 8Fr. The switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 6Fr. A switch key is provided on the water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 I is formed between the work channel 2 and a light source interface 6. An operation control key 4 is formed on one side of the control shaft 11, and a lock key 5 is formed on another side opposite to the operation control key 4. The light source interface 6 is provided on a rear of the control shaft and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 75 degree with respect to the operation shank. A focus button 7 is provided between the light source interface 6 and the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0043] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body 14 and the rigidity adjustment key 12. The rigid/flexible adjustment support rod body 14 is round and solid, and has an effective work length of 150cm and a diameter of 5Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel according to operation requirements, so that a front part 16 of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod channel as a work channel. An operator can recognize the flexible length of the fiber ureteroscope body according to a rod scale 15 on the rigid/flexible adjustment support rod.

[0044] Compared with the prior art, the utility model apparently overcomes defects of conventional ureteroscope and raises surgical efficacy and economical merits with reduced cost.

[0045] Embodiment 3

[0046] The rigid/flexible adjustable fiber ureteroscope of the utility model comprises a fiber ureteroscope body, an operation shank and a rigid/flexible adjustment support rod.

[0047] The fiber ureteroscope body 1 has a length of 85cm and a diameter of 12Fr, and may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree for facilitating surgeries. The fiber ureteroscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 11Fr for ease of entering a ureter without hurting tissues. The fiber ureteroscope body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the fiber ureteroscope body.

[0048] The operation shank connects with the fiber ureteroscope body. A work channel 2 is defined in a joint portion between the operation shank and the fiber ureteroscope body. The work channel is super smooth and has a diameter of 8Fr for appliance in laser fiber lithotripsy, ultrasound absorption lithotripsy and electrohydraulic lithotripsy, and endovenous apparatus operation such as biopsy forceps, pyelostomy and so on. The switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 6Fr for ensuring adequate irrigation or assistance operation of other small endovenous apparatus. A switch key is provided on the water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 is formed between the work channel 2 and a light source interface 6. An operation control key 4 is formed on one side of the control shaft 11, and a lock key 5 is formed on another side opposite to the operation control key 4. The light source interface 6 is provided on a rear of the control shaft and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 45 degree with respect to the operation shank. A focus button 7 is provided between the light source interface 6 and the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0049] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body 14 and the rigidity adjustment key 12. The rigid/flexible adjustment support rod body 14 is round and solid, and has a

length of 85cm and a diameter of 3Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel under control of the support rod switch key according to operation requirements, so that a front part 16 of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod channel as a work channel. An operator can recognize the flexible length of the fiber ureteroscope body according to a rod scale 15 on the rigid/flexible adjustment support rod.

[0050] The utility model is specific for ureteral disease. Compared with the prior art, the utility model apparently overcomes defects of conventional ureteroscope, raises surgical efficacy and capability of diagnosis and treat, avoids to hurt tissues, and reduces apparatus acquisition cost.

[0051] Embodiment 4

[0052] Referring to Figure 3, the utility model improves flexible catheter nephroscopes and rigid catheter nephroscopes to make a rigid/flexible adjustable fibronephroscope. The rigid/flexible adjustable fibronephroscope comprises a fibronephroscope body, an operation shank and a rigid/flexible adjustment support rod.

[0053] The fibronephroscope body 1' has a length of 20cm and a diameter of 12Fr, and may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree for facilitating surgeries. The fibronephroscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 14Fr. The fiber ureteroscope body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the fibronephroscope body.

[0054] The operation shank connects with the fibronephroscope body 1'. A work channel 2 is defined in a joint portion between the operation shank and the fibronephroscope body 1'. The work channel is super smooth and has a diameter of 3Fr. A switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 3Fr. A switch key is provided on the water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 is formed between the work channel 2 and a light source interface 6. An operation control key 4 is formed on one side of the control shaft 11, and a lock key 5 is formed on another side opposite to the operation control key 4. The light source interface 6 is provided on a rear of the control shaft and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 15 degree with respect to the operation shank. A focus but-

ton 7 is provided between the light source interface 6 and the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0055] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body 14' and the rigidity adjustment key 12. The rigid/flexible adjustment support rod body 14' is round and solid, and has a length of 20cm and a diameter of 1Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel under control of the support rod switch key according to operation requirements, so that a front part 16 of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod channel as a work channel. An operator can recognize the flexible length of the fibronephroscope body according to a rod scale 15 on the rigid/flexible adjustment support rod.

[0056] The utility model can overcome defects of prior art nephroscope apparently, for example, the rigidity adjustment key controls the rigid/flexible adjustment support rod to be movable in the fibronephroscope body, so that the fibronephroscope body can become rigid to provide adequate rigidity to overcome resistance, avoiding needs of hard sheath during operation. Movement of the rigid/flexible adjustment support rod makes a front part of the endoscope becomes flexible, and the flexible front part is variable in length for accommodating different cases. In order to meet different requirements, the rigid/flexible adjustment support rod can freely pass through the rigid/flexible adjustment support rod channel, and can be drawn out completely in such a way that the rigid/flexible adjustment support rod channel may serve as a work channel. The operator can recognize the length which converts from rigid to flexible or from flexible to rigid with a rod scale in the rigid/flexible adjustment support rod. The front part of the endoscope may become flexible to bend at a large angle, overcoming the defect of visual field cuts due to angle limitation. An outer diameter of the fibronephroscope body may increase apparently, and the number and size of work channels increase, which is combined with gripping tongs, biopsy forceps, basket manipulation, laser fiber and so on for benefiting for various medical surgery and ensuring a large and clear enough surgical visual field, thereby simplifying fabrication of a flexible endoscope and avoiding hurt to tissues.

[0057] Embodiment 5

[0058] The utility model improves flexible catheter nephroscopes and rigid catheter nephroscopes to make a rigid/flexible adjustable fibronephroscope. The rigid/flexible adjustable fibronephroscope comprises a fi-

bronephroscope body 1', an operation shank and a rigid/flexible adjustment support rod 14'.

[0059] The fibronephroscope body 1' has a length of 50cm and a diameter of 18Fr, and may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree for facilitating surgeries. The fibronephroscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 16Fr for ease of entering renal fistula and for avoiding hurt to tissues. The fibronephroscope body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the fibronephroscope body.

[0060] The operation shank connects with the fibronephroscope body 1'. A work channel 2 is defined in a joint portion between the operation shank and the fibronephroscope body. The work channel is super smooth and has a diameter of 8Fr. A switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 6Fr. A switch key is provided on the water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 is formed between the work channel 2 and a light source interface 6. An operation control key 4 is formed on one side of the control shaft 11, and a lock key 5 is formed on another side opposite to the operation control key 4. The light source interface 6 is provided on a rear of the control shaft and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 75 degree with respect to the operation shank. A focus button 7 is provided between the light source interface 6 and the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod 14' to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0061] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body 14' and the rigidity adjustment key 12. The rigid/flexible adjustment support rod body 14' is round and solid, and has a length of 50cm and a diameter of 5Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel according to operation requirements, so that a front part 16 of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod channel as a work channel. An operator can recognize the flexible

length of the fibronephroscope body according to a rod scale 15 on the rigid/flexible adjustment support rod.

[0062] The utility model is specific for renal disease. Compared with the prior art, the utility model apparently overcomes defects of conventional nephroscope and raises surgical efficacy and economical merits with reduced cost.

[0063] Embodiment 6

[0064] The utility model improves flexible catheter nephroscopes and rigid catheter nephroscopes to make a rigid/flexible adjustable fibronephroscope. The rigid/flexible adjustable fibronephroscope comprises a fibronephroscope body, an operation shank and a rigid/flexible adjustment support rod.

[0065] The fibronephroscope body 1' has a length of 35cm and a diameter of 16Fr, and may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree for facilitating surgeries. The fibronephroscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 16Fr for ease of entering renal fistula and for avoiding hurt of tissues. The fibronephroscope body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the fibronephroscope body.

[0066] The operation shank connects with the fibronephroscope body 1'. A work channel 2 is defined in a joint portion between the operation shank and the fibronephroscope body. The work channel is super smooth and has a diameter of 8Fr. A switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 6Fr. A switch key is provided on the water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 is formed between the work channel 2 and a light source interface 6. An operation control key 4 is formed on one side of the control shaft 11, and a lock key 5 is formed on another side opposite to the operation control key 4. The light source interface 6 is provided on a rear of the control shaft and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 75 degree with respect to the operation shank. A focus button 7 is provided between the light source interface 6 and the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod 14' to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0067] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body 14' and the rigidity adjustment key 12. The rigid/flexible adjustment support rod body 14' is round and solid, and has a length of 35cm and a diameter of 3Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel according to operation requirements, so that a front part 16 of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod channel as a work channel. An operator can recognize the flexible length of the fibronephroscope body according to a rod scale 15 on the rigid/flexible adjustment support rod.

[0068] Compared with the prior art, the utility model apparently overcomes defects of conventional nephroscope and raises surgical efficacy and economical merits with reduced cost.

[0069] Embodiment 7

[0070] Referring to Figure 4, the utility model improves conventional flexible urethra cystoscopes and rigid urethra cystoscopes to make a rigid/flexible adjustable urethra cystoscope. The rigid/flexible adjustable urethra cystoscope comprises a urethra cystoscope body, an operation shank and a rigid/flexible adjustment support rod.

[0071] The urethra cystoscope body 1" has a length of 20cm and a diameter of 9Fr, and may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree. The urethra cystoscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 16Fr. The urethra cystoscope body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the urethra cystoscope body.

[0072] The operation shank connects with the urethra cystoscope body. A work channel 2 is defined in a joint portion between the operation shank and the urethra cystoscope body. The work channel is super smooth and has a diameter of 3Fr. The switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 3Fr. A switch key is provided on the water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 is formed between the work channel 2 and a light source interface 6. An operation control key 4 is formed on one side of the control shaft 11, and a lock key 5 is formed on another side opposite to the operation control key 4. The light source interface 6 is provided on a rear of the control shaft and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 15 degree with respect to the operation shank. A focus button 7 is provided between the light source interface 6 and

the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0073] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body 14", a rod scale and the rigidity adjustment key 12. The rigid/flexible adjustment support rod body 14" is round and solid, and has a length of 20cm and a diameter of 1Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel according to operation requirements, so that a front part of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod channel as a work channel. An operator can recognize the flexible length of the urethra cystoscope body according to the rod scale 15 on the rigid/flexible adjustment support rod.

[0074] The utility model has the rigidity adjustment key for controlling the rigid/flexible adjustment support rod to be movable in the urethra cystoscope body, so that the urethra cystoscope body can become rigid to provide adequate rigidity to overcome resistance, avoiding needs of hard sheath during extension into a ureter or a bladder; in operation, movement of the rigid/flexible adjustment support rod makes a front part of the endoscope becomes flexible, and the flexible front part is variable in length for accomplishing required operations. In order to meet different requirements, the rigid/flexible adjustment support rod can freely pass through the rigid/flexible adjustment support rod channel, and can be drawn out completely in such a way that the rigid/flexible adjustment support rod channel may serve as a work channel. The operator can recognize the length which converts from rigid to flexible or from flexible to rigid with the rod scale in the rigid/flexible adjustment support rod. The endoscope may become flexible to bend at a large angle, overcoming the defect of visual field cuts due to angle limitation. An outer diameter of urethra cystoscope body may increase apparently without restriction of the outer sheath, and the number and size of work channels increase, which is combined with gripping tongs, biopsy forceps, basket manipulation and laser fiber for benefiting for various medical surgeries and ensuring a large and clear enough surgical visual field, thereby simplifying fabrication of a flexible endoscope and avoiding hurt to tissues. Compared with the prior art, the utility model apparently overcomes defects of conventional urethra cystoscope and raises surgical efficacy and economical merits with reduced cost.

[0075] Embodiment 8

[0076] The utility model improves conventional flexible

urethra cystoscopes and rigid urethra cystoscopes to make a rigid/flexible adjustable urethra cystoscope. The rigid/flexible adjustable urethra cystoscope comprises a urethra cystoscope body, an operation shank and a rigid/flexible adjustment support rod.

[0077] The urethra cystoscope body 1" has a length of 100cm and a diameter of 21Fr, and may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree. The urethra cystoscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 18Fr. The urethra cystoscope body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the urethra cystoscope body.

[0078] The operation shank connects with the urethra cystoscope body. A work channel 2 is defined in a joint portion between the operation shank and the urethra cystoscope body. The work channel is super smooth and has a diameter of 8Fr. A switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 6Fr. A switch key is provided on the water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 is formed between the work channel 2 and a light source interface 6. An operation control key 4 is formed on one side of the control shaft 11, and a lock key 5 is formed on another side opposite to the operation control key 4. The light source interface 6 is provided on a rear of the control shaft and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 75 degree with respect to the operation shank. A focus button 7 is provided between the light source interface 6 and the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0079] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body 14", a rod scale and the rigidity adjustment key 12. The rigid/flexible adjustment support rod body 14" is round and solid, and has a length of 100cm and a diameter of 5Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel according to operation requirements, so that a front part of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod chan-

nel as a work channel. An operator can recognize the flexible length of the urethra cystoscope body according to the rod scale 15 on the rigid/flexible adjustment support rod.

[0080] The utility model has the rigidity adjustment key for controlling the rigid/flexible adjustment support rod to be movable in the urethra cystoscope body, so that the urethra cystoscope body can become rigid to provide adequate rigidity to overcome resistance, avoiding needs of hard sheath during extension into a ureter or a bladder; in operation, movement of the rigid/flexible adjustment support rod makes a front part of the endoscope becomes flexible, and the flexible front part is variable in length for accomplishing required operations. In order to meet different requirements, the rigid/flexible adjustment support rod can freely pass through the rigid/flexible adjustment support rod channel, and can be drawn out completely in such a way that the rigid/flexible adjustment support rod channel may serve as a work channel. The operator can recognize the length which converts from rigid to flexible or from flexible to rigid with the rod scale in the rigid/flexible adjustment support rod. The endoscope may become flexible to bend at a large angle, overcoming the defect of visual field cuts due to angle limitation. An outer diameter of urethra cystoscope body may increase apparently without restriction of the outer sheath, and the number and size of work channels increase, benefiting for various medical surgeries and ensuring a large and clear enough surgical visual field, thereby avoiding hurt to tissues.

[0081] Embodiment 9

[0082] The utility model improves conventional flexible urethra cystoscopes and rigid urethra cystoscopes to make a rigid/flexible adjustable urethra cystoscope. The rigid/flexible adjustable urethra cystoscope comprises a urethra cystoscope body, an operation shank and a rigid/flexible adjustment support rod.

[0083] The urethra cystoscope body 1" has a length of 42-45cm and a diameter of 18Fr, and may be flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree. The urethra cystoscope body has a front part with an inclined surface. The inclined surface defines a hole with a diameter of 18Fr. The urethra cystoscope body includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel. The rigid/flexible adjustment support rod channel is located in vicinity of a center of the urethra cystoscope body.

[0084] The operation shank connects with the urethra cystoscope body. A work channel 2 is defined in a joint portion between the operation shank and the urethra cystoscope body. The work channel is super smooth and has a diameter of 8Fr. A switch key 10 controls the work channel 2 to be opened or closed. A water inlet/outlet channel 3 is defined in the operation shank and opposite to the work channel 2. The water inlet/outlet channel 3 has a diameter of 6Fr. A switch key is provided on the

water inlet/outlet channel 3 for controlling the water inlet/outlet channel 3. A control shaft 11 is formed between the work channel 2 and a light source interface 6. An operation control key 4 is formed on one side of the control shaft 11, and a lock key 5 is formed on another side opposite to the operation control key 4. The light source interface 6 is provided on a rear of the control shaft and forms an angle of 90 degree with respect to the operation shank. An ocular 8 is provided on a rear of the light source interface 6 and forms an angle of 45 degree with respect to the operation shank. A focus button 7 is provided between the light source interface 6 and the ocular 8. A focus scale 9 is formed on the focus button 7. A rigidity adjustment key 12 is provided on a rear end of the operation shank for allowing the rigid/flexible adjustment support rod to be movable freely in the rigid/flexible adjustment support rod channel. A support rod switch key 13 is provided on a distal end of the operation shank for controlling and stabilizing the rigid/flexible adjustment support rod, and preventing reflux of irrigating solutions during operation.

[0085] The rigid/flexible adjustment support rod comprises a rigid/flexible adjustment support rod body 14", a rod scale and the rigidity adjustment key. The rigid/flexible adjustment support rod body 14" is round and solid, and has a length of 42-45cm and a diameter of 3Fr. The rigid/flexible adjustment support rod is movable freely in the rigid/flexible adjustment support rod channel according to operation requirements, so that a front part of the endoscope becomes flexible to bend until the rigid/flexible adjustment support rod is drawn out completely for serving the rigid/flexible adjustment support rod channel as a work channel. An operator can recognize the flexible length of the urethra cystoscope body according to the rod scale 15 on the rigid/flexible adjustment support rod.

[0086] The utility model has the rigidity adjustment key for controlling the rigid/flexible adjustment support rod to be movable in the urethra cystoscope body, so that the urethra cystoscope body can become rigid to provide adequate rigidity to overcome resistance, avoiding needs of hard sheath during extension into a ureter or a bladder; in operation, movement of the rigid/flexible adjustment support rod makes a front part of the endoscope becomes flexible, and the flexible front part is variable in length for accomplishing required operations. In order to meet different requirements, the rigid/flexible adjustment support rod can freely pass through the rigid/flexible adjustment support rod channel, and can be drawn out completely in such a way that the rigid/flexible adjustment support rod channel may serve as a work channel. The operator can recognize the length which converts from rigid to flexible or from flexible to rigid with the rod scale in the rigid/flexible adjustment support rod. The endoscope may become flexible to bend at a large angle, overcoming the defect of visual field cuts due to angle limitation. An outer diameter of urethra cystoscope body may increase apparently without restriction of the outer sheath, and the

number and size of work channels increase, benefiting for various medical surgeries and ensuring a large and clear enough surgical visual field, thereby avoiding hurt to tissues.

Claims

1. A rigid/flexible adjustable ureteroscope comprising a body, an operation shank and a rigid/flexible adjustment support rod, and **characterized in that**, the body (1) includes a work channel, a water inlet/outlet channel, a fiber channel, a light source channel, and a rigid/flexible adjustment support rod channel which is located in vicinity of a center of the body, wherein the operation shank connects with the body (1), a work channel (2) is defined in a joint portion between the operation shank and the body, the switch key (10) is provided to opened or close the work channel (2), the water inlet/outlet channel (3) is defined in the operation shank and opposite to the work channel (2), a control shaft (11) is provided between the work channel and a light source interface (6), an operation control key (4) and a lock key (5) are respectively formed on opposite sides of the control shaft (11), the light source interface (6) is provided on a rear of the control shaft and forming an angle of 90 degree with respect to the operation shank, an ocular (8) is provided on a rear of the light source interface (6) and forms an angle ranged of 15~75 degree with respect to the operation shank, a focus button (7) is provided between the light source interface (6) and the ocular (8), a focus scale (9) is formed on the focus button, a rigidity adjustment key (12) is provided on a rear end of the operation shank, a support rod switch key (13) is provided on a distal end of the operation shank; and wherein the rigidity adjustment support rod comprises a rigid/flexible adjustment support rod body (14) and the rigidity adjustment key (12), and a rod scale (15) is provided on the support rod.
2. The rigid/flexible adjustable ureteroscope according to claim 1, **characterized in that** the body (1) has a length of 50~150cm and a diameter of 5~18Fr, and the rigid/flexible adjustment support rod has a length of 50~150cm.
3. The rigid/flexible adjustable ureteroscope according to claim 2, **characterized in that** the rigid/flexible adjustment support rod body (14) has a length of 75~85cm and a diameter of 7~12Fr, and the body is flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree, and the body has a front part with an inclined surface, the inclined surface defining a hole with a diameter of 6~11Fr.

4. The rigid/flexible adjustable ureteroscope according to claim 2, **characterized in that** the work channel is super smooth and has a diameter of 3~8Fr, and the water inlet/outlet channel has a diameter of 3~6Fr.
5. The rigid/flexible adjustable ureteroscope according to claim 1, **characterized in that** the ocular forms an angle of 45 degree with respect to the operation shank.
6. The rigid/flexible adjustable ureteroscope according to claim 1, **characterized in that** the rigid/flexible adjustment support rod body is round and solid, and has a length of 50~150cm and a diameter of 1~5Fr.
7. The rigid/flexible adjustable ureteroscope according to claim 2, **characterized in that** the rigid/flexible adjustment support rod body has a length of 75~85cm and a diameter of 3Fr.
8. The rigid/flexible adjustable ureteroscope according to claim 1, **characterized in that** the rigid/flexible adjustment support rod body is movable in and is able to be drawn out from the rigid/flexible adjustment support rod channel for serving the rigid/flexible adjustment support rod channel as the work channel.
9. The rigid/flexible adjustable ureteroscope according to claim 1, **characterized in that** the body comprises a rigid/flexible adjustable fibronephroscope body (1') which has a length of 20~50cm and a diameter of 12~18Fr; and the rigid/flexible adjustment support rod body (14') has a length of 20~50cm.
10. The rigid/flexible adjustable ureteroscope according to claim 9, **characterized in that** the rigid/flexible adjustable fibronephroscope body (1') has a length of 35~37cm and a diameter of 16~18Fr, and the body is flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree, and the body has a front part with an inclined surface, the inclined surface defining a hole with a diameter of 14~16Fr.
11. The rigid/flexible adjustable ureteroscope according to claim 9, **characterized in that** the rigid/flexible adjustment support rod body (14') is round and solid, and has a length of 20~50cm and a diameter of 1~5Fr.
12. The rigid/flexible adjustable ureteroscope according to claim 11, **characterized in that** the rigid/flexible adjustment support rod body (14') has a length of 35~37cm and a diameter of 3Fr.
13. The rigid/flexible adjustable ureteroscope according

to claim 1, **characterized in that** the body comprises a rigid/flexible adjustment fiber urethra cystoscope body (1") which has a length of 20~100cm and a diameter of 9~21Fr, the body is flexible respectively at an upward angle of 180 degree, at a downward angle of 180 degree, and at a second downward angle of 130 degree, the body has a front part with an inclined surface, the inclined surface defining a hole with a diameter of 14~16Fr, and the rigid/flexible adjustment support rod body (14') is round and solid and has a length of 20~100cm and a diameter of 1~5Fr.

5

10

14. The rigid/flexible adjustable ureteroscope according to claim 13, **characterized in that** the body (1") has a length of 42~45cm and a diameter of 18Fr.

15

15. The rigid/flexible adjustable ureteroscope according to claim 15, **characterized in that** the body (14") has a length of 42~45cm and a diameter of 3Fr.

20

25

30

35

40

45

50

55

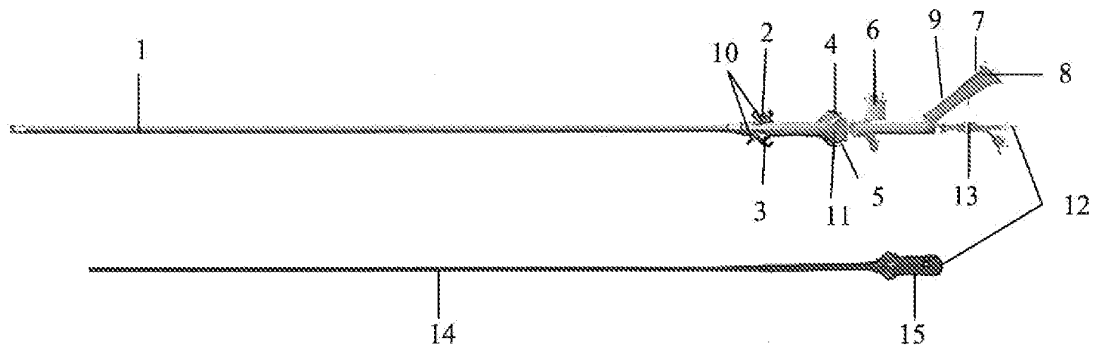


Figure 1

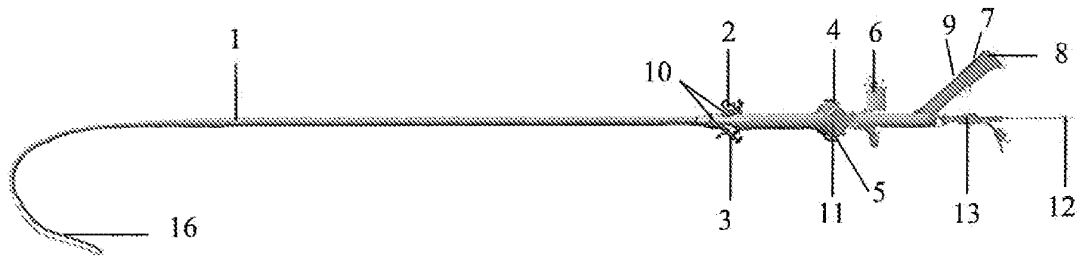


Figure 2

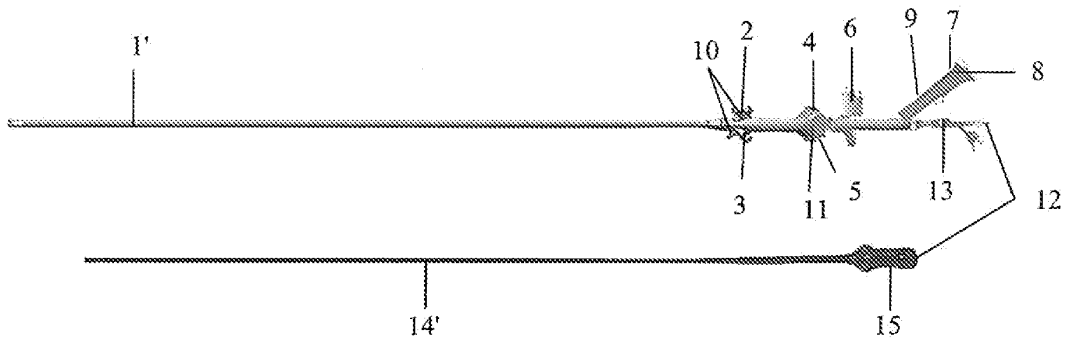


Figure 3

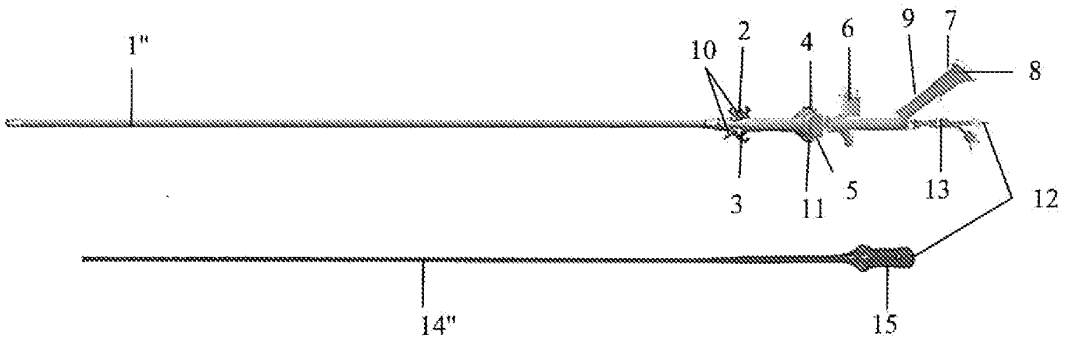


Figure 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2009/073898

A. CLASSIFICATION OF SUBJECT MATTER		
See extra sheet		
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)		
IPC: A61B		
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)		
CNPAT WPI EPODOC speculum?,endoscope?,adjust+,regulat+,chang+,control+,soft,flexibl+,rigid+,hard,strong+,pole?		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN201271239Y (XIA, Shujie et al), 15 Jul.2009 (15.07.2009), pages 3-6 in the specification, figures 1,2.	1-15
PX	CN201271240Y (XIA, Shujie et al), 15 Jul.2009 (15.07.2009), pages 3-6 in the specification, figures 1,2.	1-15
Y	US4899733A (BLACKSTONE ULTRASONIC INC), 13 Feb.1990 (13.02.1990), column 1 line 45 to column 3 line 6 in the specification, figures 1-4.	1-15
Y	JP2003-260018A (OLYMPUS OPTICAL CO), 16 Sept.2003 (16.09.2003), paragraphs [0002]-[0020] in the specification, figures 1,7.	1-15
A	JP2003-52618A (PENTAX CORP), 25 Feb.2003 (25.02.2003), the whole document.	1-15
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.		<input checked="" type="checkbox"/> 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 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 application or patent but 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	Date of mailing of the international search report	
03 Nov.2009 (03.11.2009)	26 Nov. 2009 (26.11.2009)	
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer WANG Yang Telephone No. (86-10)62085641	

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2009/073898

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP2002-330924A (OLYMPUS OPTICAL CO), 19 Nov.2002 (19.11.2002), the whole document.	1-15
A	CN101019756A (CHEN, Zhiqiang et al), 22 Aug.2007 (22.08.2007), the whole document.	1-15
A	CN2285630Y (HangZhou Hawk Optical Electronic instruments Co.,Ltd), 08 Jul.1998 (08.07.1998), the whole document.	1-15

Form PCT/ISA /210 (continuation of second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No. PCT/CN2009/073898
--

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN201271239Y	15.07.2009	None	
CN201271240Y	15.07.2009	None	
US4899733A	13.02.1990	None	
JP2003-260018A	16.09.2003	JP3739746B2	25.01.2006
JP2003-52618A	25.02.2003	None	
JP2002-330924A	19.11.2002	None	
CN101019756A	22.08.2007	WO2008019607A1	21.02.2008
CN2285630Y	08.07.1998	None	

Form PCT/ISA /210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2009/073898

CLASSIFICATION OF SUBJECT MATTER:

A61B 1/307 (2006.01) i

A61B 1/00 (2006.01) i

专利名称(译)	输尿管内窥镜可调节柔软度和刚度		
公开(公告)号	EP2335561A4	公开(公告)日	2014-01-15
申请号	EP2009812672	申请日	2009-09-11
[标]申请(专利权)人(译)	上海市第一人民医院		
申请(专利权)人(译)	上海市第一人民医院		
当前申请(专利权)人(译)	上海市第一人民医院		
[标]发明人	XIA SHUJIE ZHAO WEJ		
发明人	XIA, SHUJIE ZHAO, WEJ		
IPC分类号	A61B1/307 A61B1/00 A61B1/005 A61B1/012 A61B1/015 A61B1/018 A61B1/06 A61B1/07 A61B1/12		
CPC分类号	A61B1/307 A61B1/00078 A61B1/00188 A61B1/0051 A61B1/012 A61B1/015 A61B1/018 A61B1/0669 A61B1/126		
代理机构(译)	DENJEAN, ERIC		
优先权	200820153056.0 2008-09-12 CN 200820153291.8 2008-09-19 CN 200820153290.3 2008-09-19 CN		
其他公开文献	EP2335561A1		
外部链接	Espacenet		

摘要(译)

本实用新型涉及医疗器械，尤其涉及一种刚性/柔性可调输尿管镜，包括主体，操作柄和刚性/柔性调节支撑杆。刚性调节键控制刚性/柔性调节支撑杆可在体内自由移动，从而使刚性/柔性调节支撑杆通道。刚性/柔性调节支撑杆的运动使得内窥镜的一部分变得刚性，从而具有足够的刚性以克服阻力，避免在进入输尿管时需要硬护套。通过支撑杆的移动，内窥镜的前部可以从刚性变为柔性，并且柔性前部的长度可以变化以灵活地完成操作。支撑杆能够从支撑杆通道移动或拉出，以将支撑杆通道用作工作通道。通过调整尺寸，提供刚性/柔性调节纤维观察镜，或者，提供刚性/柔性调节纤维尿道膀胱镜。与现有技术相比，本实用新型克服了各种尿道膀胱镜的缺陷，提高了手术效果和经济价值，避免了对组织的伤害，降低了设备购置成本。