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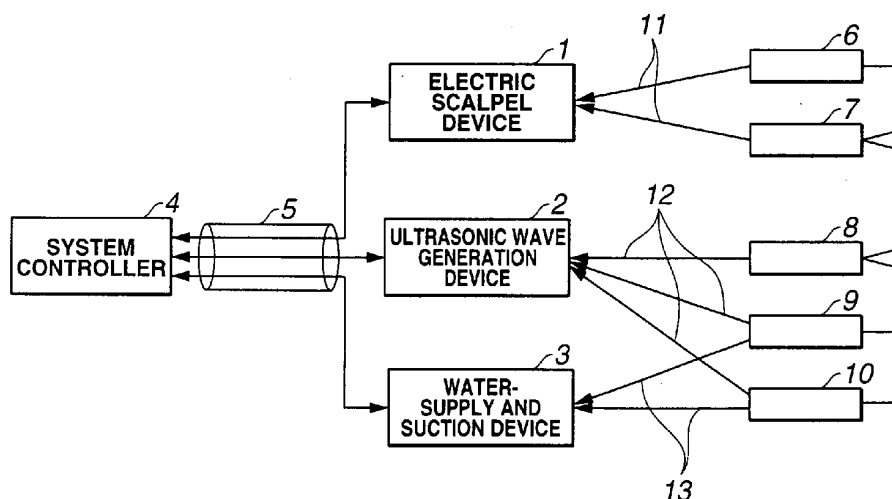
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(54) **ELECTRIC SURGERY SYSTEM**

(57) When a treatment instrument is connected to the corresponding device (electric scalpel device or ultrasonic wave generation device), the device (electric scalpel device or ultrasonic wave generation device) transmits information related to the type, mode, and setting of the treatment instrument to a system controller. Accordingly, if a new treatment instrument is used, the system controller can perform display information related to the new treatment instrument and control the new

treatment instrument. Even when the system controller is used in combination with newly-developed electric cautery knife and other treatment instruments, the system controller can obtain fixed information related to the respective medical instruments, thus increasing the operability. Even if wrong setting is performed outside the ratings of the instruments in the system controller, the instruments can be prevented from damage such as dielectric breakdown on the basis of the obtained fixed information.

**FIG.1**



## Description

### Technical Field

**[0001]** The present invention relates to an electric operation system for electric therapeutic treatment.

### Background Art

**[0002]** In recent years, electric treatment devices such as electric scalpel devices for supplying a high-frequency current for therapeutic treatment and ultrasonic treatment devices for therapeutic treatment using ultrasonic waves have been widespread.

**[0003]** For example, Japanese Unexamined Patent Application Publication No. 2000-254142 discloses an electric surgical operating apparatus. To prevent dielectric breakdown in each treatment instrument, the rated voltage of each instrument is input to the electric surgical operating apparatus so that an output voltage thereof is equal to or lower than the rated voltage of the instrument.

**[0004]** Japanese Unexamined Patent Application Publication No. 64-67286 discloses a method for generating ultrasonic waves with modulated frequency/amplitude. The method is suitable for ultrasonic operating apparatuses, particularly, a lithotripter.

**[0005]** Japanese Unexamined Patent Application Publication No. 2001-166958 discloses a system in which a program stored in a medical instrument can be rewritten or updated by an external remote-controlled computer through a communication line.

**[0006]** In a system controller connected to a plurality of medical devices in an electric surgical operating apparatus, treatment instruments are determined and, after that, the respective medical devices can be automatically set, thus increasing the operability. However, it is necessary to previously input fixed information related to the respective medical devices to the system controller. To make the respective medical devices compatible with new treatment instruments, or when various modes are added to the medical devices, the system controller requires a version upgrade as the occasion arises. Disadvantageously, known electric surgical operation systems always need maintenance.

**[0007]** The present invention is made in consideration of the above circumstances. It is an object of the present invention to provide a flexible and secure electric operation system. According to the system of the present invention, if newly-developed electric cautery knife and other treatment instruments are used in combination with a system controller of the system, the system controller can obtain fixed information related to respective medical devices, thus increasing the operability. When wrong setting is performed outside the rating of the respective treatment instruments in the system controller, the instruments can be prevented from damage such as dielectric breakdown on the basis of the ob-

tained fixed information.

### Disclosure of Invention

**[0008]** The present invention provides an electric operation system having one or a plurality of electric treatment instruments for treating tissue of a living body, an instrument driver connected to the electric treatment instruments, and a system controller for controlling the instrument driver, the system including: reading means for reading a plurality of operation parameters of the electric treatment instruments connected to the instrument driver; and control-parameter-range determining means for determining a control parameter range, where the instrument driver is controllable by the system controller, on the basis of the operation parameters read by the reading means.

**[0009]** Other features and advantages of the present invention will become more apparent from the following description.

### Brief Description of the Drawings

#### [0010]

Figs. 1 to 9 relate to an embodiment of the present invention; Fig. 1 shows the structure of an electric surgical operation system; Fig. 2 is a block diagram showing the structure of an electric scalpel device in Fig. 1; Fig. 3 is a block diagram of the structure of an ultrasonic wave generation device; Fig. 4 is a block diagram showing the structure of a water-supply and suction device in Fig. 1; Fig. 5 is a block diagram showing the structure of a system controller in Fig. 1; Fig. 6 is a first flowchart explaining the operation of the electric surgical operation system in Fig. 1; Fig. 7 is a diagram showing the structure of transmission data indicating the type of each treatment instrument connected to and determined by the electric scalpel device in Fig. 1; Fig. 8 is a diagram showing the structure of transmission data indicating the type of each treatment instrument connected to and determined by the ultrasonic wave generation device in Fig. 1; and Fig. 9 is a second flowchart explaining the operation of the electric surgical operation system in Fig. 1.

### Best Mode for Carrying Out the Invention

**[0011]** To describe the present invention in further detail, the present invention will now be explained with reference to the accompanying drawings.

**[0012]** According to an embodiment of the present invention, referring to Fig. 1, an electric surgical operation system includes an electric scalpel device 1, an ultrasonic wave generation device 2, a water-supply and suction device 3, and a system controller 4. The electric scalpel device 1, the ultrasonic wave generation device

2, and the water-supply and suction device 3 are connected to the system controller 4 via a communication cable 5. Each device transmits and receives status information and control information to/from the system controller 4.

**[0013]** A monopolar treatment instrument 6 and a bipolar treatment instrument 7 are selectively connected to the electric scalpel device 1 via electric scalpel cords 11. The electric scalpel device 1 is used to incise and coagulate tissue by applying electric power to the tissue from the distal end of the treatment instrument.

**[0014]** A treatment instrument 8 for incision and coagulation, a treatment instrument 9 for ultrasonic wave suction, and a treatment instrument 10 for lithotripsy are selectively connected to the ultrasonic wave generation device 2 via ultrasonic cables 12. The ultrasonic wave generation device 2 is used to incise and coagulate tissue, emulsify tissue and suck the emulsified tissue, or crush a stone into pieces and suck the pieces by generating ultrasonic waves from the distal end of the treatment instrument.

**[0015]** The treatment instrument 9 for ultrasonic wave suction and the treatment instrument 10 for lithotripsy are selectively connected to the water-supply and suction device 3 via water-supply and suction tubes 13. The water-supply and suction device 3 allows the distal end of the treatment instrument to supply wash water. In addition, the water-supply and suction device 3 is used to suck the emulsified tissue or the crushed stone pieces.

**[0016]** Referring to Fig. 2, the electric scalpel device 1 includes: a connector 25 which is connected to an electric cord 14 of the monopolar treatment instrument 6 or the bipolar treatment instrument 7; an instrument-ID detection unit 24 for detecting ID assigned to the treatment instrument connected to the connector 25; an output unit 23 for supplying a high-frequency current for treatment to the treatment instrument through the connector 25; a control unit 22 for controlling the high-frequency current generated from the output unit 23; and a data transmission and reception unit 21 used for communication between the control unit 22 and the system controller 4, namely, for transmitting instrument-ID information generated from the instrument-ID detection unit 24 and control information of the output unit 23.

**[0017]** Referring to Fig. 3, the ultrasonic wave generation device 2 includes: a connector 35 which is connected to the ultrasonic cable 12 of the treatment instrument 8 for incision and coagulation, the treatment instrument 9 for ultrasonic wave suction, or the treatment instrument 10 for lithotripsy; an instrument-ID detection unit 34 for detecting ID assigned to the treatment instrument connected to the connector 35; an output unit 33 for generating a drive signal to an ultrasonic vibrator provided for the treatment instrument through the connector 35; a control unit 32 for controlling the drive signal generated by the output unit 33; and a data transmission and reception unit 31 used for communication between the control unit 32 and the system controller 4, namely,

for transmitting instrument-ID information generated from the instrument-ID detection unit 34 and control information of the output unit 23.

**[0018]** Referring to Fig. 4, the water-supply and suction device 3 includes: a connector 45 which is connected to the water-supply and suction tube 13 of the treatment instrument 9 for ultrasonic wave suction or the treatment instrument 10 for lithotripsy; a water supply unit 43 for supplying water to the treatment instrument through the connector 45; a suction unit 44 for allowing the treatment instrument to perform suction via the connector 45; a control unit 42 for controlling the water supply unit 43 and the suction unit 44; and a data transmission and reception unit 41 used for communication between the control unit 42 and the system controller 4, namely, for transmitting control information of the water supply unit 43 and the suction unit 44.

**[0019]** Referring to Fig. 5, the system controller 4 includes: an operation display unit 53 for displaying an operation screen to operate the electric scalpel device 1, the ultrasonic wave generation device 2, and the water-supply and suction device 3, the unit 53 having a touch panel function through which operation instruction information can be entered on the displayed operation screen; a memory unit 54 for storing data such as operation parameters of the electric scalpel device 1, the ultrasonic wave generation device 2, and the water-supply and suction device 3 and control commands and a control program; a control unit 52 for centrally controlling the respective devices by executing the stored control program; and a data transmission and reception unit 51 for communicating with the data transmission and reception units 21, 31, and 41. The system controller 4 permits the operation display unit 53 to display the operation, mode, and a programmed output of each of the electric scalpel device 1, the ultrasonic wave generation device 2, and the water-supply and suction device 3.

**[0020]** Features according to the present embodiment will now be described below. As endoscopic surgery recently becomes more advanced, precise treatment instruments are developed. The structures of the instruments are precise. In the use of the treatment instruments, therefore, it is necessary to set lower power of the electric scalpel device and the ultrasonic wave generation device than the rated values of the respective devices. If the power is set higher than the rating and is then generated from the corresponding treatment instrument, the instrument may be damaged.

**[0021]** To overcome the above-mentioned disadvantage, conventionally, each device determines the type of treatment instrument and then defines an output mode suited to the instrument and the upper limit of set output. This situation is not shown.

**[0022]** However, since any known controller can operate respective devices, the types of treatment instruments are previously stored in a memory of the controller. When any treatment instrument is connected to any device, set information corresponding to the treatment

instrument can be read from the memory and be displayed. Thus, the connected instrument can be controlled.

**[0023]** When a treatment instrument is newly developed after the system controller is developed, therefore, it is necessary to upgrade the memory of the system controller to a recent version because the type of the corresponding treatment instrument and set information thereof are not stored in the memory.

**[0024]** According to the features of the present embodiment, when a treatment instrument is connected to the device (electric scalpel device 1 or ultrasonic wave generation device 2), the device (electric scalpel device 1 or ultrasonic wave generation device 2) transmits the type of treatment instrument, the mode, and set information thereof to the system controller 4. Thus, the system controller 4 can permit display of the set information and control the new treatment instrument.

**[0025]** For details, referring to Fig. 6, in step S1, communication lines are established between the respective devices (the electric scalpel device 1 and the ultrasonic wave generation device 2) and the system controller 4. In step S2, each of the devices (electric scalpel device 1 and ultrasonic wave generation device 2) generates data related to the type (ID), mode, and set range of each treatment instrument. In step S3, the data related to the type (ID), mode, and set range of each treatment instrument connected to each of the devices (electric scalpel device 1 and ultrasonic wave generation device 2) is transmitted to the system controller 4 from each of the devices (electric scalpel device 1 and ultrasonic wave generation device 2). In step S4, the transmission data is stored to the memory unit 54 in the system controller 4, thus initializing a set output value of each of the devices (electric scalpel device 1 and ultrasonic wave generation device 2). In step S5, the system controller 4 accepts mode setting and output setting related to the devices (electric scalpel device 1 and ultrasonic wave generation device 2) entered by a user and then starts the control of the devices (electric scalpel device 1 and ultrasonic wave generation device 2). Then, the process terminates.

#### (1) Case of electric scalpel device 1

**[0026]** For example, a newly-developed monopolar treatment instrument 6 or bipolar treatment instrument 7 is connected to the electric scalpel device 1.

**[0027]** The electric scalpel device 1 determines the type of the connected treatment instrument and then transmits data to the system controller 4. For example, referring to Fig. 7, the transmission data includes instrument-ID data used to determine the type of treatment instrument, monopolar/bipolar type data, permissible-mode (incision/coagulation) data, and data indicating an allowable output range.

**[0028]** To take the case of Fig. 7 as an example, when the monopolar treatment instrument 6 is connected to

the electric scalpel device 1, the following transmission data is transmitted.

#### (1-1) Monopolar treatment instrument 6:

**[0029]** Instrument-ID data = treatment instrument ID, monopolar/bipolar type data = monopolar, permissible-mode (incision/coagulation) data = incision and coagulation, allowable-output-range data = incision at 0 to 150 W and coagulation at 0 to 80 W.

#### (1-2) Bipolar treatment instrument 7:

**[0030]** Instrument-ID data = treatment instrument ID, monopolar/bipolar type data = bipolar, permissible-mode (incision/coagulation) data = coagulation, allowable-output-range data = coagulation at 0 to 100 W.

#### (2) Case of ultrasonic wave generation device 2

**[0031]** The ultrasonic wave generation device 2 is operatively associated with the water-supply and suction device 3 depending on a treatment instrument that is used.

**[0032]** For example, a newly-developed treatment instrument 8 for incision and coagulation, treatment instrument 9 for ultrasonic wave suction, or treatment instrument 10 for lithotripsy is connected to the ultrasonic wave generation device 2.

**[0033]** The ultrasonic wave generation device 2 determines the type of treatment instrument connected thereto and then transmits data to the system controller 4. For example, referring to Fig. 8, the transmission data includes instrument-ID data used to determine the type of treatment instrument, monopolar/bipolar type data, output mode data, association/non-association data indicating whether the present device is operatively associated with the water-supply and suction device 3 or not, data indicating the set range of ultrasonic output, data indicating the set range of water supply, and data indicating the set range of suction.

**[0034]** To take the case of Fig. 8 as an example, when the treatment instrument 8 for incision and coagulation is connected to the ultrasonic wave generation device 2, the following transmission data is transmitted.

**[0035]** The upper limit of set output of each treatment instrument connected to the ultrasonic wave generation device 2 is determined on the basis of the shape of the distal end of the instrument and the amplitude at the distal end thereof. For example, when the treatment instrument is narrow, stress strain caused by ultrasonic vibration at the distal end of the instrument is large. Thus, allowable amplitude is small.

#### (2-1) Treatment instrument 8 for incision and coagulation:

**[0036]** Instrument-ID data = treatment instrument ID,

output mode data = sine wave output, data indicating the association/non-association with the water-supply and suction device 3 = non-association, ultrasonic-output set range data = ultrasonic output from 0 to 100%.

(2-2) Treatment instrument 9 for ultrasonic wave suction:

**[0037]** Instrument-ID data = treatment instrument ID, output mode data = sine wave output, data indicating the association/non-association with the water-supply and suction device 3 = association, ultrasonic-output set range data = ultrasonic output from 0 to 80%, water-supply set range data = water supply from 30 to 100%, and suction set range data = suction from 0 to 100%.

**[0038]** In this instance, in the treatment instrument 9 for ultrasonic wave suction, water supply is performed not only for washing tissue but also for lowering heat generated by ultrasonic vibration of the treatment instrument. Therefore, the settable rate of water supply is not from 0%.

**[0039]** Accordingly, the lowest allowable rate of water supply is defined depending on ultrasonic setting. Control is performed so that the rate of water supply is not set equal to or lower than the lowest rate.

**[0040]** In other words, referring to Fig. 9, in the ultrasonic wave generation device 2, the type of treatment instrument connected thereto is detected in step S11. In step S12, whether the connected treatment instrument is the treatment instrument 9 for ultrasonic wave suction or not is determined. If it is the treatment instrument 9 for ultrasonic wave suction, in step S13, the lower-limit set value of water supply is set to the lowest value of water supply calculated on the basis of the set value of ultrasonic output. In step S14, the set range of water supply is set from the lower-limit water-supply set value (%) to 100(%). Then, the process terminates. When it is determined in step S12 that the treatment instrument is not the treatment instrument 9 for ultrasonic wave suction, in step S15, water-supply setting is disabled. The range of water supply is set from 0(%) to 100 (%). Then, the process terminates.

**[0041]** Prior to setting the rate of water supply of the water-supply and suction device, this process gives higher priority to the parameter indicating the lowest rate of water supply of the treatment instrument 9 for ultrasonic wave suction. The rate of water supply must be set so as to satisfy the lowest rate. The above-mentioned case, where high priority is given to a predetermined operation parameter, is not peculiar to the present embodiment.

**[0042]** When the treatment instrument 9 for ultrasonic wave suction is used as mentioned above, the set range of the water-supply and suction device 3 is restricted due to setting (the set value of ultrasonic output) of another device (ultrasonic wave generation device 2).

(2-3) Treatment instrument 10 for lithotripsy:

**[0043]** Instrument-ID data = treatment instrument ID, output mode data = modulated output, data indicating the association/non-association with the water-supply and suction device 3 = association, ultrasonic-output set range data = ultrasonic output from 0 to 50%, water-supply set range data = water supply from 0 to 100%, and suction set range data = suction from 0 to 100%.

**[0044]** In this instance, for the output mode data included in transmission data, in the case of using the treatment instrument 8 for incision and coagulation and the treatment instrument 9 for suction, the output mode is set to sine wave output. Subsequent to the operation for tissue, generally, continuous ultrasonic power is applied to the tissue. Thus, desired effects can be obtained. On the other hand, when the treatment instrument 10 for lithotripsy is used, the output mode data is set to modulated output, thus transversely vibrating the distal end of the treatment instrument. It has been shown that the transverse vibration results in an increase in capability of breaking a stone. Generally, modulated ultrasonic power is sent to the treatment instrument, so that longitudinal and transverse vibrations are applied to a stone. Thus, desired effects can be obtained.

**[0045]** For the association/non-association with the water-supply and suction device 3, when the treatment instrument 9 for ultrasonic wave suction is used, generally, emulsified tissue and blood are sucked while tissue is being washed. Accordingly, water-supply and suction are operatively associated with ultrasonic wave generation. Thus, the treatment instrument 9 for ultrasonic wave suction is operatively associated with the device 3. In the use of the treatment instrument 10 for lithotripsy, a urinary tract or a renal cavity is filled with washing water, a stone is crushed into fragments, and the fragments are sucked. Accordingly, the treatment instrument 10 for lithotripsy is also operatively associated with the water-supply and suction device 3. The water-supply and suction device 3 sets the rate of supply of the washing water and the rate of suction.

**[0046]** Since the present system has the above-mentioned structure and operation, if the system controller is used in combination with newly-developed electric cautery knife and other treatment instruments, the present system is flexibly compatible with the newly-developed instruments, thus increasing the operability. If wrong setting is performed outside the ratings of the treatment instruments in the system controller, the treatment instruments can be prevented from damage such as dielectric breakdown.

**[0047]** In the above-mentioned structure, after each treatment instrument is connected to each corresponding device, each device determines the type of treatment instrument connected thereto and then transmits permissible mode and output range on the basis of the type to the system controller. Recent memories are re-

duced in size. Accordingly, the following configuration may be used: A memory is mounted on the treatment instrument and the data is written in the memory. The treatment instrument transmits the data to the corresponding device and the system controller. Control can be performed on the basis of the data. In this case, as for the change in the entire configuration, the memory is placed in each treatment instrument as different from the foregoing case where each device determines the type of treatment instrument and stores various parameters.

[0048] The present invention is not limited to the above-mentioned embodiment but many modifications and variations are possible within the purview of the invention without departing from the spirit of the invention.

[0049] In the present invention, it will be apparent that a wide range of different embodiments can be formed based on this invention without departing from the spirit and scope of this invention. This invention will be restricted to the appended claims but not be limited to any particular embodiment.

#### Industrial Applicability

[0050] As mentioned above, the electric operation system according to the present invention is useful as a system for treating tissue of a living body using electric treatment instruments.

#### Claims

1. An electric operation system having one or a plurality of electric treatment instruments for therapeutically treating tissue of a living body, an instrument driver connected to the electric treatment instruments, and a system controller for controlling the instrument driver, the system comprising:
  - reading means for reading a plurality of operation parameters of the electric treatment instruments connected to the instrument driver; and
  - control-parameter-range determining means for determining a control parameter range, where the instrument driver is controllable by the system controller, on the basis of a plurality of the operation parameters read by the reading means.
2. The electric operation system according to Claim 1, wherein the control-parameter-range determining means assigns priorities to a plurality of the operation parameters.
3. The electric operation system according to Claim 1 or 2, wherein the instrument driver includes an electric scalpel device.
4. The electric operation system according to Claim 3, wherein the electric treatment instrument includes a monopolar treatment instrument.
5. The electric operation system according to Claim 3, wherein the electric treatment instrument includes a bipolar treatment instrument.
6. The electric operation system according to Claim 1 or 2, wherein the instrument driver includes an ultrasonic wave generation device.
7. The electric operation system according to Claim 6, wherein the electric treatment instrument includes a treatment instrument for incision and coagulation.
8. The electric operation system according to Claim 6, wherein the electric treatment instrument includes a treatment instrument for lithotripsy.
9. The electric operation system according to Claim 6, wherein the electric treatment instrument includes a treatment instrument for ultrasonic wave suction.
10. The electric operation system according to Claim 8 or 9, further comprising:
  - a water-supply and suction device.
11. A method for controlling an electric operation system having one or a plurality of electric treatment instruments for therapeutically treating tissue of a living body, an instrument driver connected to the electric treatment instruments, and a system controller for controlling the instrument driver, the method comprising:
  - a line establishing step of establishing lines between the respective electric treatment instruments and the system controller 4;
  - an information transmitting step of transmitting type information and setting information of each of the accessories connected to the electric treatment instruments from the electric treatment instruments to the system controller; and
  - an initializing step of initializing a set output value of each of the electric treatment instruments on the basis of the type information and the setting information in the system controller 4.
12. The electric operation system control method according to Claim 11, wherein the electric treatment instrument includes an electric scalpel device.
13. The electric operation system control method according to Claim 11, wherein the electric treatment instrument includes an ultrasonic wave generation device.

14. The electric operation system control method according to Claim 11, wherein the electric treatment instrument includes a water-supply and suction device.

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15. An electric operation system having one or a plurality of electric treatment instruments for therapeutically treating tissue of a living body, an instrument driver connected to the electric treatment instruments, and a system controller for controlling the instrument driver, the system comprising:

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line establishing means for establishing lines between the electric treatment instruments and the system controller 4;

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information transmitting means for transmitting type information and setting information of each of accessories connected to the electric treatment instruments from the electric treatment instruments to the system controller; and

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initializing means for initializing a set output value of each of the electric treatment instruments on the basis of the type information and the setting information in the system controller 4.

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16. The electric operation system according to Claim 15, wherein the electric treatment instrument includes an electric scalpel device.

17. The electric operation system according to Claim 15, wherein the electric treatment instrument includes an ultrasonic wave generation device.

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18. The electric operation system according to Claim 15, wherein the electric treatment instrument includes a water-supply and suction device.

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19. A method for controlling a process of a water-supply and suction device for supplying water to tissue of a living body and performing suction when the tissue is treated using an ultrasonic treatment instrument, the method comprising:

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a detecting step of detecting the type of a treatment instrument connected to the system;

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an instrument determining step of determining whether the detected treatment instrument is a treatment instrument for ultrasonic wave suction; and

a water-supply range setting step of setting a water supply range of the water-supply and suction device on the basis of the result of determination in the instrument determining step.

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20. A water-supply and suction device for supplying water to tissue of a living body and performing suction when the tissue is treated using an ultrasonic treatment instrument, the device comprising:

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detecting means for detecting the type of a treatment instrument connected to the device; instrument determining means for determining whether the detected treatment instrument is a treatment instrument for ultrasonic wave suction; and

water-supply range setting means for setting a water supply range of the water-supply and suction device on the basis of the result of determination in the instrument determining step.

FIG.1

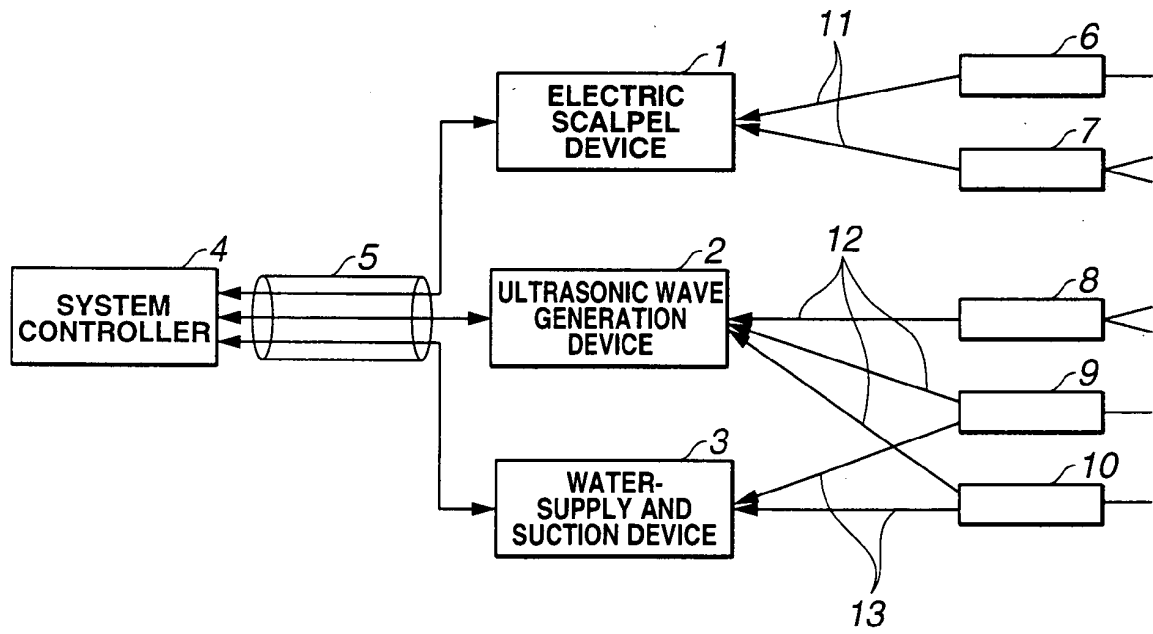




FIG.2

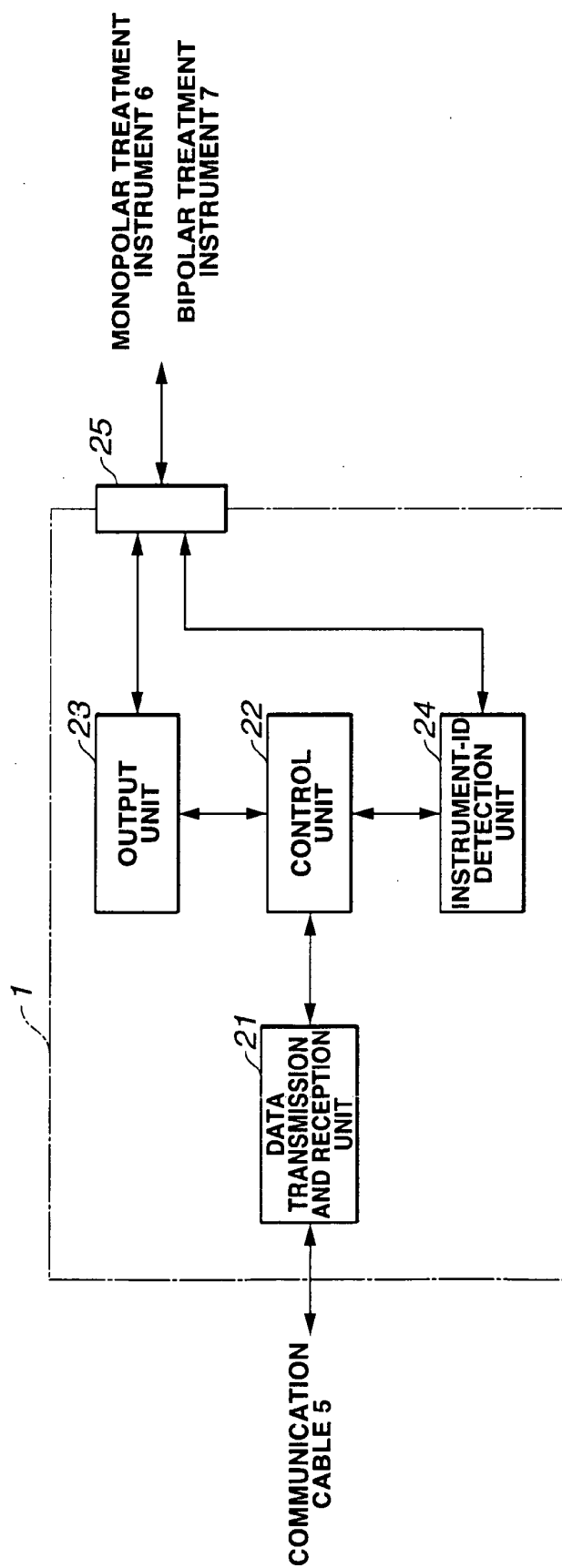


FIG.3

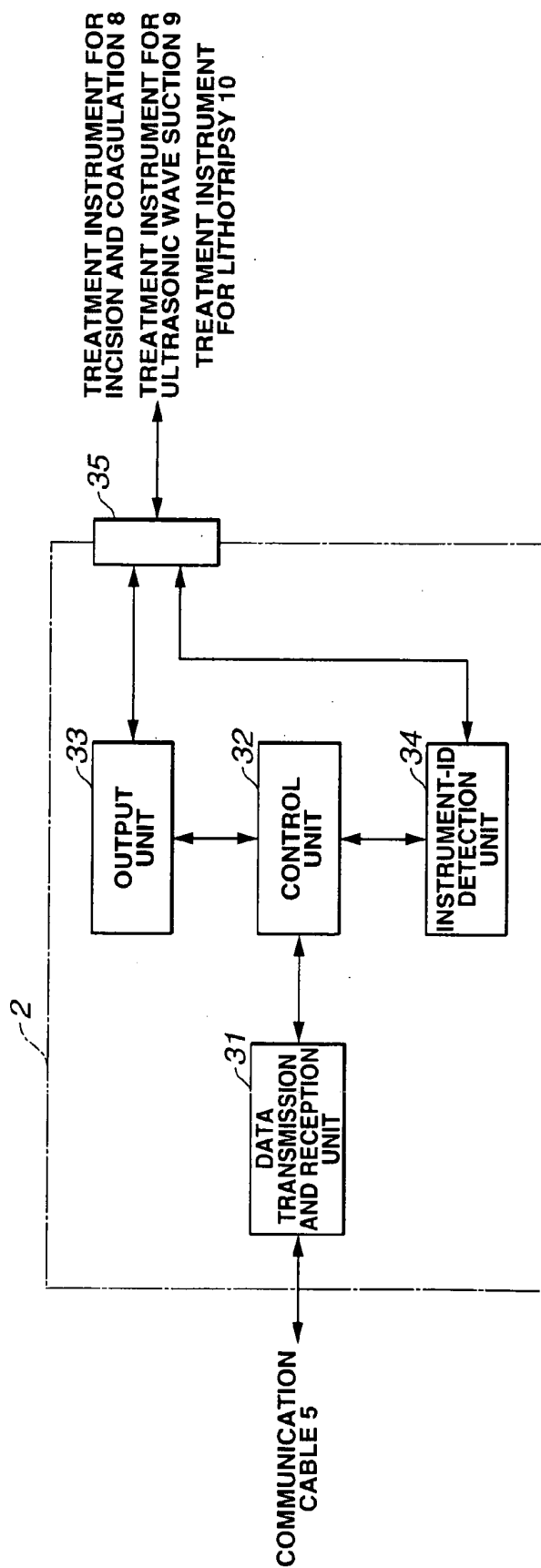
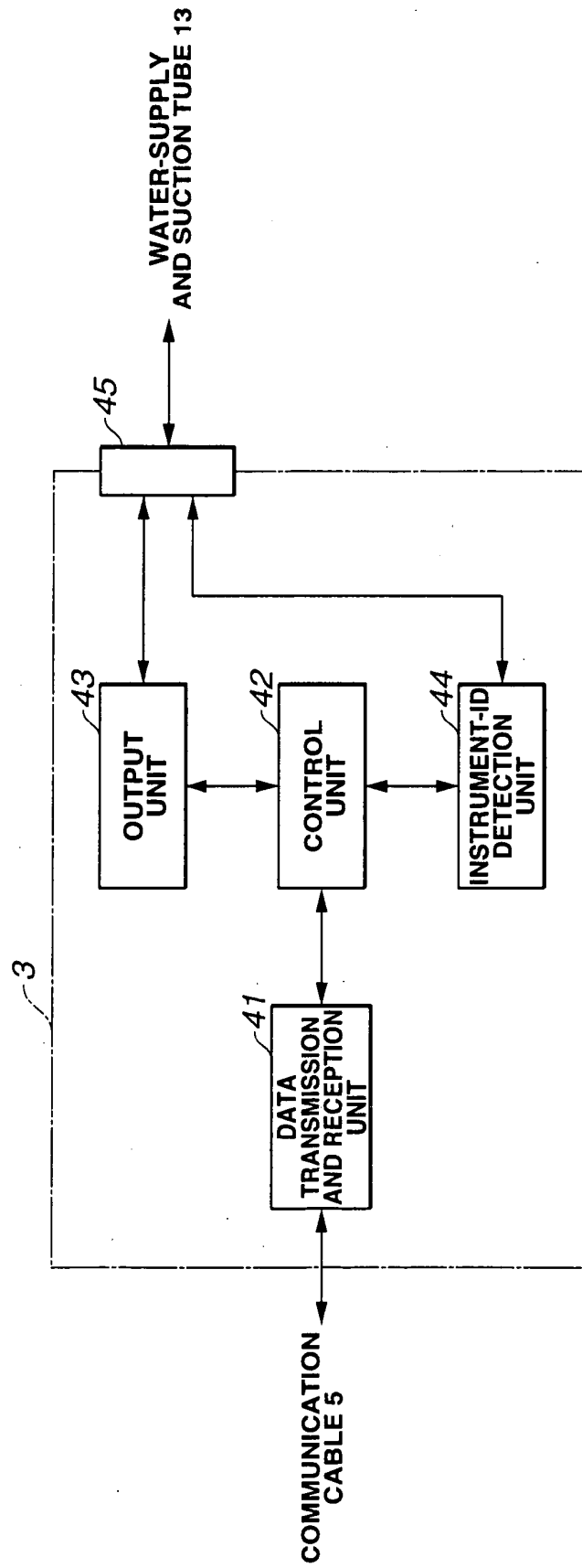
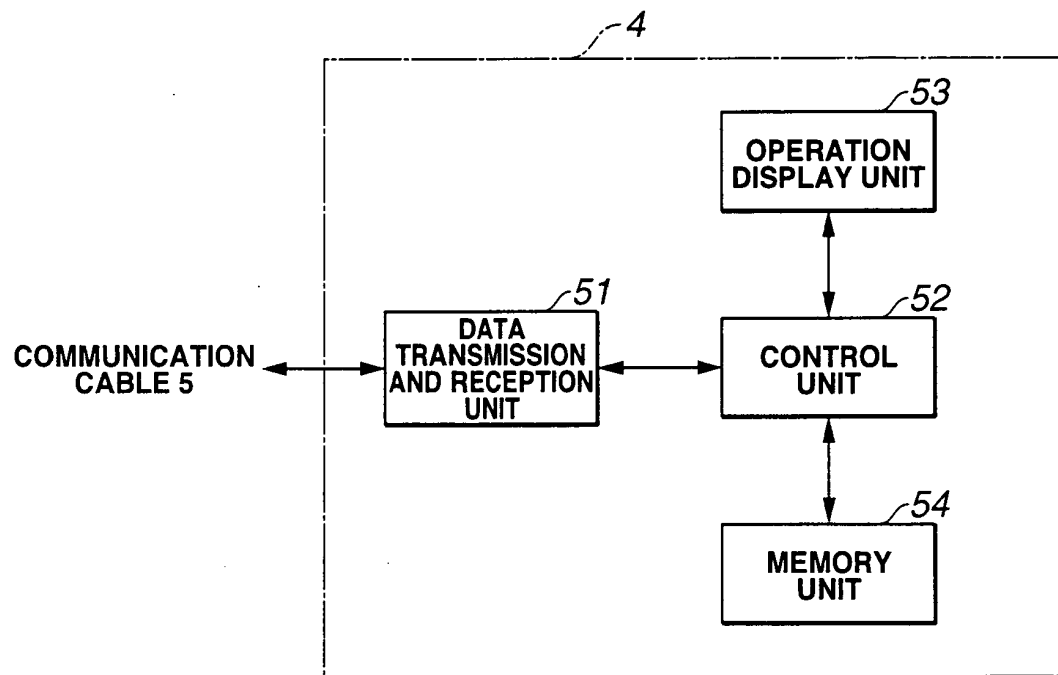


FIG.4



**FIG.5**



**FIG.6**

TRANSMISSION DATA FROM ELECTRIC SCALPEL DEVICE				
	TYPE OF TREATMENT INSTRUMENT	MONOPOLAR/ BIPOLAR	PERMISSIBLE MODE (INCISION/ COAGULATION)	ALLOWABLE OUTPUT RANGE
MONOPOLAR TREATMENT INSTRUMENT	INSTRUMENT ID	MONOPOLAR	INCISION AND COAGULATION	INCISION: 0~150W COAGULATION: 0~80W
BIPOLAR TREATMENT INSTRUMENT	INSTRUMENT ID	BIPOLAR	COAGULATION	COAGULATION: 0~100W

FIG.7

TRANSMISSION DATA FROM ULTRASONIC WAVE GENERATION DEVICE						
	TYPE OF TREATMENT INSTRUMENT	OUTPUT MODE	ASSOCIATION/NON-ASSOCIATION WITH WATER-SUPPLY AND SUCTION DEVICE	SET RANGE OF ULTRASONIC WAVE OUTPUT	SET RANGE OF WATER SUPPLY	SET RANGE OF SUCTION
TREATMENT INSTRUMENT FOR INCISION AND COAGULATION	INSTRUMENT ID	SINE WAVE OUTPUT	NON-ASSOCIATION	0~100%	—	—
TREATMENT INSTRUMENT FOR ULTRASONIC WAVE SUCTION	INSTRUMENT ID	SINE WAVE OUTPUT	ASSOCIATION	0~80%	30~100%	0~100%
TREATMENT INSTRUMENT FOR LITHOTRIPSY	INSTRUMENT ID	MODULATED OUTPUT	ASSOCIATION	0~50%	0~100%	0~100%

**FIG.8**

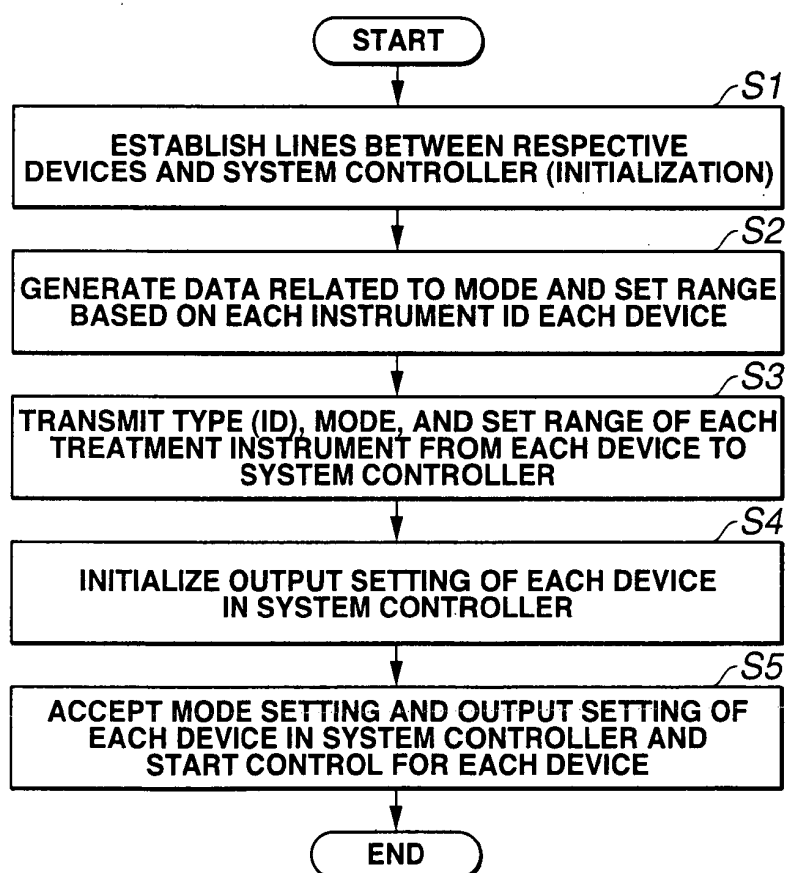
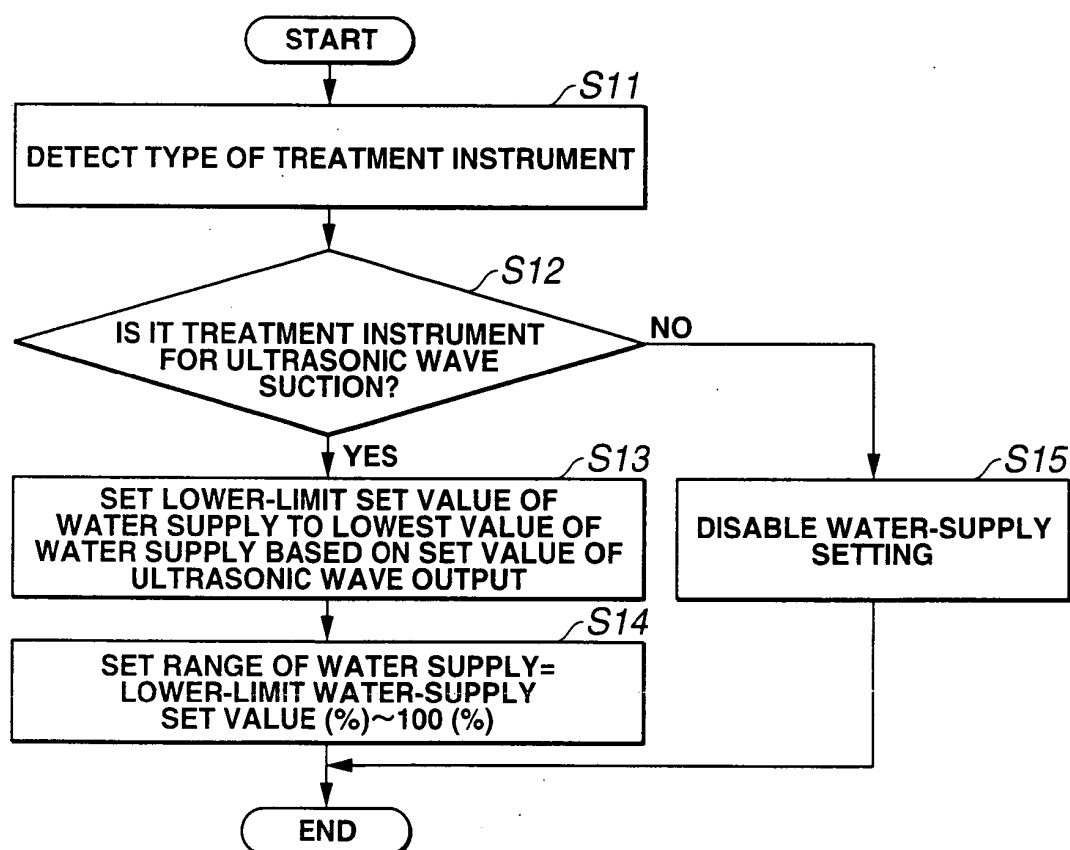


FIG.9





## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/13466

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> Int.Cl <sup>7</sup> A61B19/00, 18/12, 18/26		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) Int.Cl <sup>7</sup> A61B17/00-19/00		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1926-1996 Toroku Jitsuyo Shinan Koho 1994-2004 Kokai Jitsuyo Shinan Koho 1971-2004 Jitsuyo Shinan Toroku Koho 1996-2004		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2001-178734 A (Olympus Optical Co., Ltd.),	1, 3-20
Y	03 July, 2001 (03.07.01), Column 20, line 2 to column 27, line 10; Fig. 11 (Family: none)	2
Y	JP 09-248308 A (Olympus Optical Co., Ltd.), 22 September, 1997 (22.09.97), Column 3, line 50 to column 4, line 14 (Family: none)	2
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input 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 document 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 20 January, 2004 (20.01.04)	Date of mailing of the international search report 03 February, 2004 (03.02.04)	
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer	
Facsimile No.	Telephone No.	

Form PCT/ISA/210 (second sheet) (July 1998)

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP03/13466

**Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

Claims 1-18 relate to an electric surgery system or a control method of the electric surgery system.

Claims 19, 20 relate to an ultrasonic treatment device or a treatment control method of the ultrasonic treatment device.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

**Remark on Protest** ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

专利名称(译)	电外科系统		
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申请(专利权)人(译)	OLYMPUS CORPORATION		
当前申请(专利权)人(译)	OLYMPUS CORPORATION		
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优先权	2002308691 2002-10-23 JP		
其他公开文献	EP1557133A1		
外部链接	<a href="#">Espacenet</a>		

#### 摘要(译)

当治疗仪连接到相应的设备(电手术刀设备或超声波生成设备)时,该设备(电手术刀设备或超声波生成设备)将与治疗仪的类型,模式和设置有关的信息传输到系统控制器。因此,如果使用新的治疗仪,则系统控制器可以执行与新的治疗仪有关的显示信息并控制新的治疗仪。即使当系统控制器与新开发的电灼刀和其他治疗器械结合使用时,系统控制器也可以获得与各个医疗器械有关的固定信息,从而提高了可操作性。即使在系统控制器中超出仪器额定值的地方进行了错误的设置,也可以根据获得的固定信息防止仪器损坏,例如电介质击穿。

