

United States Patent

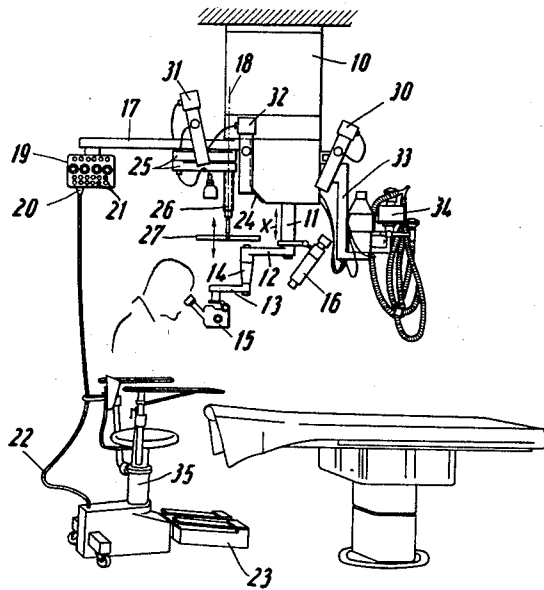
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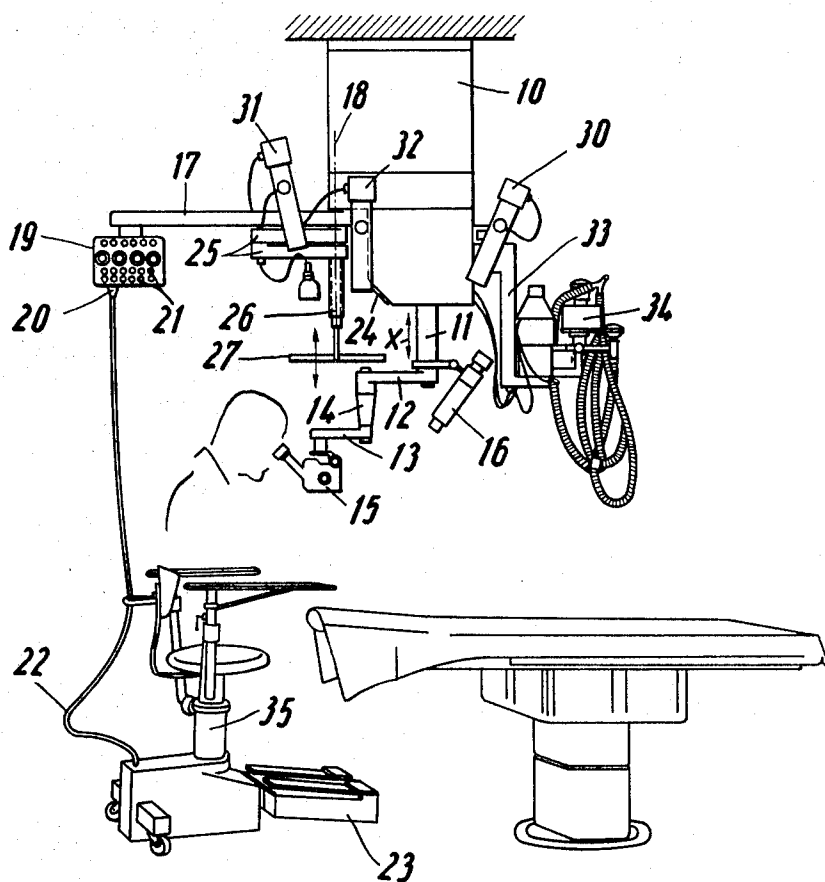
- [54] **MICROSURGICAL OPERATING UNIT**
5 Claims, 1 Drawing Fig.
- [52] U.S. Cl. 128/303.1,
128/172
- [51] Int. Cl. A61b 17/36
- [50] Field of Search. 128/303,
303.1, 172, 1

ABSTRACT: A microsurgical operating unit which is mounted on the ceiling of an operating theater. This unit serves to combine all of the apparatus necessary for carrying out a microsurgical operation, such as a microscope, the illuminating light sources, the electrical and pneumatical operating instruments, the anaesthetizing apparatus, and is provided with suitable fittings and connectors for the operating instruments. All of the equipment can be remote-controlled by the operating surgeon himself.



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MICROSURGICAL OPERATING UNIT

DESCRIPTION OF THE INVENTION

This invention relates to surgical equipment and, more particularly to a novel microsurgical operating unit.

For suspending the microscope which is used by the surgeon in microsurgical operations, it is already known to attach the microscope to a support in the form of a stand, and to set up this stand by the side of the surgeon and the patient. The stands used for this purpose are usually provided with lateral swivel arms, the vertical extension of which may be adjusted to bring the microscope into a position overlying the operation area.

It is further known to use a suspension device for microscopes which is mounted on the ceiling of the operating theater and includes a vertically adjustable supporting tube to which are attached swivel arms adapted to vertically and horizontally adjust the microscope position.

These conventional suspension means are adapted to support only a microscope. The additional apparatus and equipment which are required for a surgical operation such as high frequency diathermy apparatus, cautery apparatus, low voltage appliances, thermocautery apparatus and anaesthetizing apparatus are usually mounted on mobile stands or on trolleys which will be grouped around the operating surgeon and the patient. For controlling this equipment, additional assistants are required. The various apparatus take up much room and clutter the space around the operation area. The various cables, hose lines and the like which extend along the floor may even prove to be a serious handicap for the operating surgeon and the assisting personnel.

Having the foregoing in mind, it is, therefore, a primary object of the present invention to provide a new and novel microsurgical operating unit.

It is a further object of the present invention to provide a new and novel microsurgical operating unit which allows the operating surgeon to control in a clearly arranged manner, by remote control, at least the most important functions of the various apparatus employed in a surgical operation, thereby avoiding any inconveniences during the operation.

By means of the new operating unit the operating surgeon will be enabled to fully concentrate his attention onto the operation and he will be more independent from his attendants or assistants.

The microsurgical operating unit of the invention is characterized by the combination of:

- a. a boxlike housing mounted on the ceiling of the operating theater, the housing comprising drive means for a support column mounted in the housing and being vertically adjustable, a swivel arm mounted on the support column and carrying a microscope, the swivel arm being adapted to vertically and horizontally adjust the position of the microscope;
- b. a motor-driven horizontal swivel arm mounted on one side of the housing and supporting, at its free end, a terminal box including the fittings for various operating apparatus and operating instruments such as a cautery, a mirror, a suction apparatus and the like;
- c. an instrument table mounted on a vertically adjustable extension of the horizontal swivel arm;
- d. a light source mounted on the adjustable support column,
- e. a plurality of light sources mounted on the housing and/or the horizontal swivel arm,
- f. an anaesthetizing apparatus mounted on a supporting arm, the supporting arm being supported by said housing;
- g. a surgeon's chair having a foot control switch means attached, the foot control switch means being connected by a control line to the terminal box and serving to control the various operating apparatus and the movement of the swivel arm.

A preferred embodiment of the invention which is illustrated in the appended drawing will be discussed in details in the following.

As shown in the drawing, a microsurgical operating unit according to the present invention comprises a boxlike housing 10 which may be provided with fittings adapted to mount the housing on the ceiling of an operating theater. Within the housing 10 are arranged guide means and electrical and/or manual drive means for vertically adjusting the position of a support column 11 slidingly mounted within the housing 10. The support column 11 is adjustable in the direction of the arrow X shown in the drawing. Horizontal upper and lower swivel arms 12 and 13, respectively, are mounted on the free lower end of the support column 11, the upper swivel arm 12 being rotatably mounted on the support column 11 and carrying, at its free end, an intermediate vertical arm 14, on the lower end of which a lower swivel arm 13 is rotatably mounted in a spaced relationship to the upper swivel arm 12. A conventional microscope 15 is attached to the free end of the lower horizontal swivel arm 13. An operating lamp 16 is likewise mounted on the support column 11.

The housing 10 mounts the support column 11 and further comprises power supply means, together with the terminals thereof, as well as an apparatus for high frequency diathermy, a low voltage power supply, gas supply fittings for the anaesthetizing apparatus, means for effecting washouts and for removing of fluids by suction and, if desired, further apparatus used in connection with the surgical treatment. A further horizontal swivel arm 17 is mounted on the housing 10 in such a manner that the vertical pivot axis of the arm 17 which is indicated in the drawing by the reference numeral 18 is disposed above the intermediate position of the horizontal range of adjustment of the microscope 15, as may be seen in the drawing. The horizontal swivel arm 17 is of tubular configuration and mounts, at its free end, a terminal box 19 which comprises connectors 20 for control lines and connectors 21 for hand-held operating instruments such as a cautery, a mirror, a suction cup or another instrument. The connecting hose lines and conductors for the terminal box 19 run along the interior of the tubular swivel arm 17. The terminal box 19 is electrically coupled through the connectors 20 and the control line 22 with a foot control switch 23. The foot control switch 23 is mobile or may be attached to the likewise mobile surgeon's chair 35. Instead of one foot control switch, several foot switches 23 may be provided. The foot control switch 23 may be adapted to control for example the vertical adjustment of the microscope 15, the operation of a cautery, a diathermy apparatus, an endoscope apparatus, a tape recorder and a microphone, a shutter control means of a photographic camera, TV equipment and the illuminating light sources. The height of the seat of the surgeon's chair 35 may likewise be adjusted by means of the foot control switch 23.

For monitoring, controlling and, if need be, rapidly altering the most important settings of the various operating apparatus a control panel 24 in the form of a desk is provided below the housing 10, on the side facing the operating surgeon. This control panel 24 houses a plurality of switches, control buttons and indicating instruments, the former being arranged within easy reach of the surgeon and the latter being easily observable. Preferably the mounting of the control panel 24 may be adapted to rotate jointly with the vertical support column 11 on a common vertical pivot axis, thus enabling the surgeon to easily observe the control panel 24 when the microscope 15 is swiveled sideways. The control panel 24 is adapted to monitor various important settings such as electrical currents, the vacuum of the suction apparatus as well as other desired parameters. The control panel 24 may also serve to control additional apparatus.

A still further swivel arm 25 is rotatably mounted adjacent to the horizontal swivel arm 17 and is connected at its free end to a vertical support rod 26 serving to support an instrument table 27. The swivel arm 25 may also be designed as an articulated arm comprising two arm portions. The support rod 26 includes several rod portions which fit telescopically into each other.

Lamps 30, 31 and 32 for illuminating the operation area are adjustably mounted on the housing 10 and on the horizontal

swivel arm 17, respectively. Furthermore, a supporting arm 33 for supporting the anaesthetizing apparatus 34 is attached to the housing 10.

As will have become apparent from the foregoing description, the microsurgical operating unit of the present invention combines all of the apparatus necessary for carrying out a microsurgical operation, such as a microscope, the illuminating light sources, the electrical, pneumatical and other operating instruments, the connectors for the anaesthetizing apparatus and similar apparatus. All of the equipment can be remote-controlled by the operating surgeon himself by means of the foot control switch 23, thus reducing the number of assistants required. Additionally, the operating surgeon does not need to give instructions to the assisting personnel, as compared to conventional arrangements which for example necessitated that the surgeon gave commands for switching on or switching off the various apparatus. These commands may lead to misunderstandings or even cause inconveniences. With the new operating unit the operating surgeon may control all of the various operating apparatus himself in keeping with the immediate requirements of the case. A further advantage will be gained in that no space is taken up by the operating apparatus.

We claim:

1. A microsurgical operating unit comprising, in combination, a boxlike housing adapted to be mounted on the ceiling of an operating theater, a support column mounted in said housing and being vertically adjustable, said housing comprising a drive means for said support column, a swivel arm mounted on said support column and carrying a microscope, said swivel arm being adapted to adjust the position of the microscope vertically and horizontally, a motor-driven horizontal swivel arm mounted on one side of said housing, a

terminal box supported on the free end of said swivel arm and said terminal box including fittings for various operating apparatus and operating instruments such as a cautery, a mirror, and suction apparatus, a vertically adjustable extension disposed on said horizontal swivel arm, an instrument table mounted on said vertically adjustable extension, a light source mounted on said adjustable support column, a plurality of light sources adjustably mounted on at least one of said housing and said horizontal swivel arm, a supporting arm supported on said housing, and an anaesthetizing apparatus mounted on said supporting arm, a surgeon's chair, a foot control switch means connected to said surgeon's chair, and a control line connected to said foot control switch means and to said terminal box and serving to control the various operating apparatus and movement of said swivel arms.

2. A microsurgical operating unit as defined in claim 1, characterized in that said vertically adjustable extension of said horizontal swivel arm on which said instrument table is mounted is a telescopically movable supporting rod.

3. A microsurgical operating unit as defined in claim 1, characterized in that electrical conductors are positioned within said terminal box and extend within said swivel arm.

4. A microsurgical operating unit as defined in claim 1 characterized in that the seat of said surgeon's chair is adjustable in the vertical direction by means of a drive motor controlled by said foot control switch means.

5. A microsurgical operating unit as defined in claim 1 characterized in that said swivel arm for vertically and horizontally adjusting said microscope consists of several arm portions mutually interconnected by drive motors which are controlled by means of said foot control switch means.

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