

[54] **SERVICING DESK FOR AN X-RAY
DIAGNOSING DEVICE**

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250/410, 411, 413, 416

[56] **References Cited**

UNITED STATES PATENTS

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Primary Examiner—James W. Lawrence

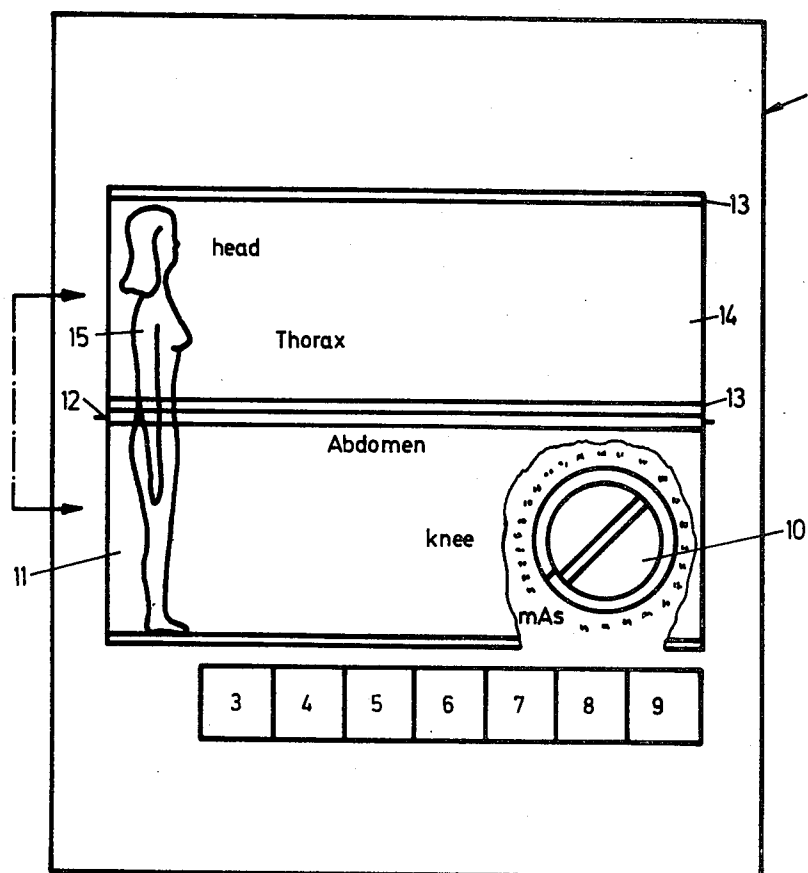
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[57] **ABSTRACT**

A servicing desk for an X-ray diagnosing device has functional keys for a programmed setting of operational values. The invention is particularly characterized, in that, in addition to the keys, at least one operating member is provided for a free setting of at least one operational value in a part of the servicing desk which can be covered by an adjustable cover. The cover operates switching means which, when the cover is open, switch on the operating member for free setting of the operational value at the X-ray apparatus feeding and operating the corresponding X-ray tube. The operating member is switched off when the cover is closed.

4 Claims, 3 Drawing Figures



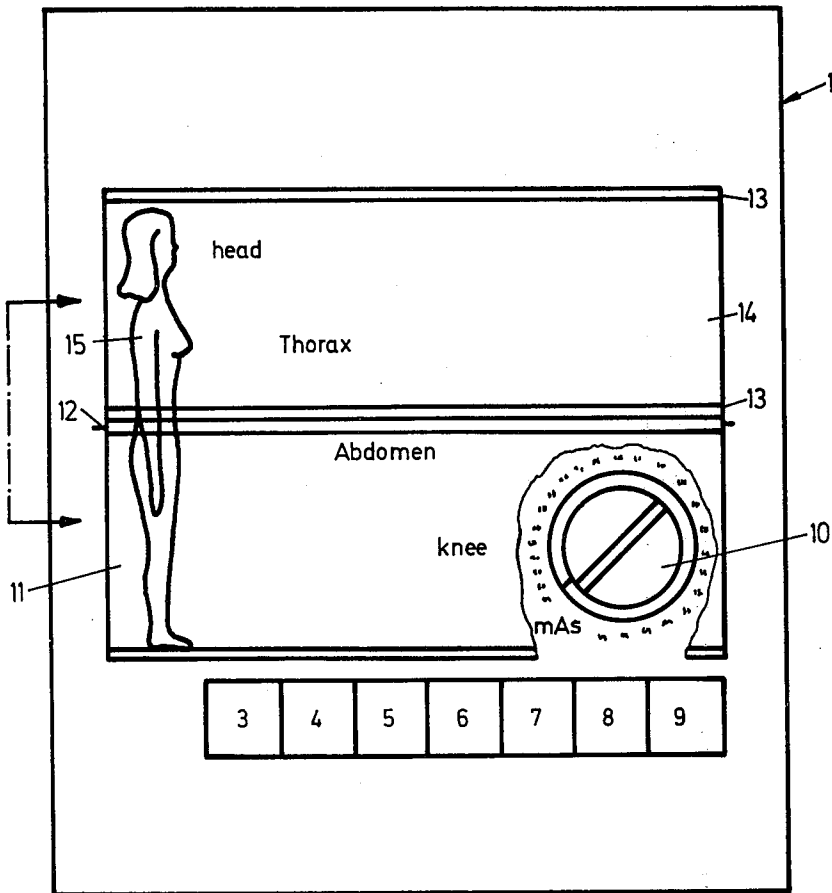


Fig.1

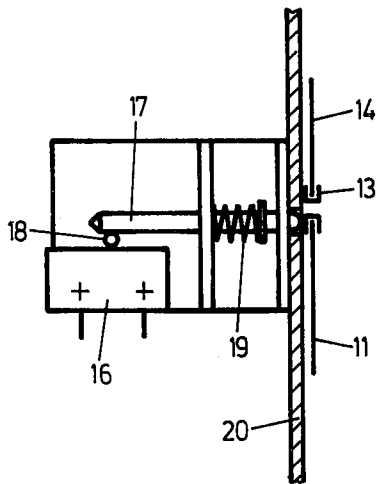
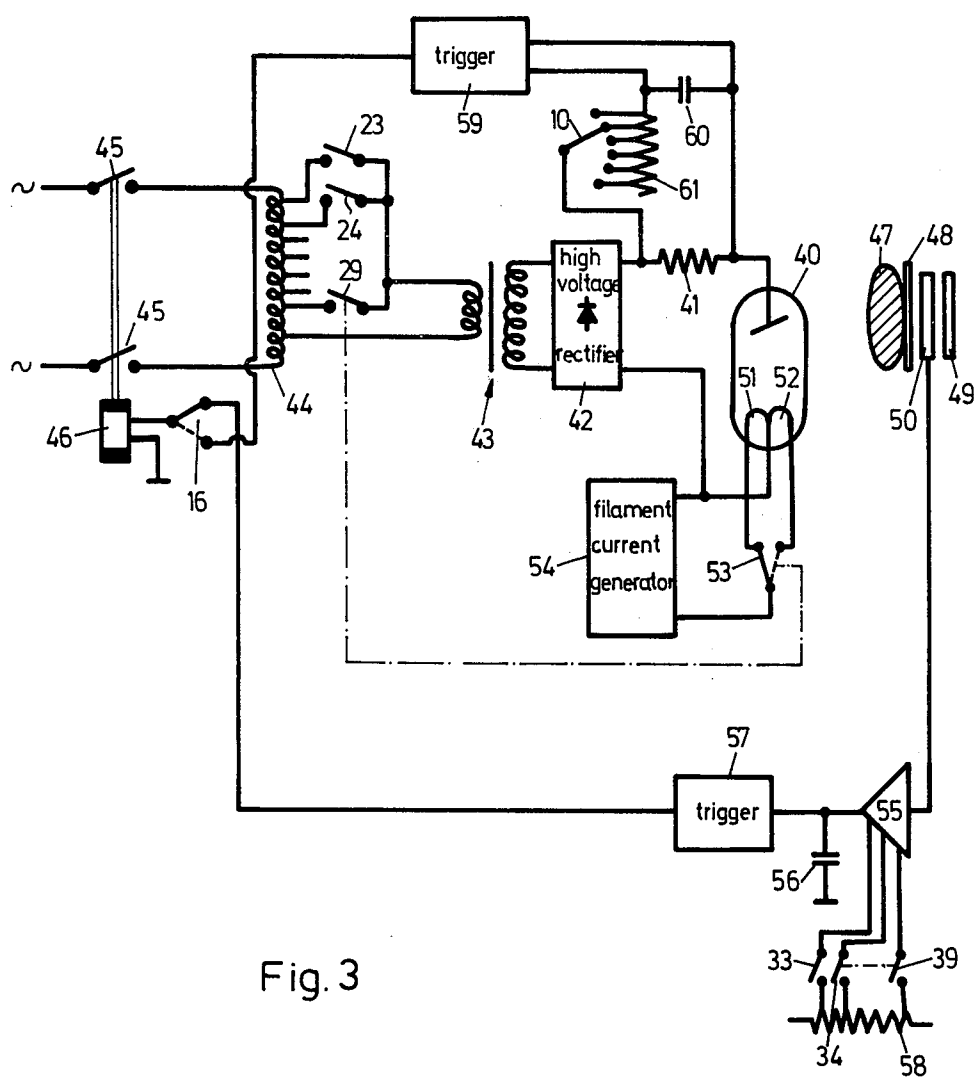


Fig.2



SERVICING DESK FOR AN X-RAY DIAGNOSING DEVICE

This invention relates to a servicing desk for an X-ray diagnosing device having functional keys for a programmed setting of operational values.

Servicing desks of this type are described, for example, in the German publication "Elektromedica" 3, 1971, pages 83 to 86. Some users, in addition to functional keys, require servicing members for the free setting of data, as, for example, film blackening or mAs product. These additional servicing members are only rarely used during the operation. However, their mounting upon servicing desks increases the number of servicing members to such an extent that the operation of the X-ray diagnosing device becomes unclear due to the large number of keys and switches.

An object of the present invention is the provision of a servicing desk of the described type which, despite the use of servicing members, is simple and clear in operation.

Other objects of the present invention will become apparent in the course of the following specification.

In accomplishing the objectives of the present invention, it was found desirable to provide, in addition to the functional keys, at least one operating member in a part of the servicing desk which can be covered by an adjustable cover for a free setting of at least one operational value. The cover operates switching means which, when the cover is open, switch on the operating member for the free setting of the operational value at the X-ray apparatus feeding and operating the corresponding X-ray tube and for switching it off when the cover is closed.

In accordance with the present invention, only those operating members which are continuously actuated during the operation are visible at the servicing desk. Thus, the operation is simple and clearly visible. If the user desires a free setting of the X-ray diagnosing device, which is comparatively seldom the case, he must adjust the cover in such manner that those operating members which are located under the cover will be available. Then these operating members are automatically switched on to the X-ray apparatus. In addition to the opening of the cover, the user does not have to carry out any manual operations for connecting the operating members covered by the cover to the X-ray apparatus. In most cases, these operating members are not used, so that they lie covered in the servicing desk and do not disturb the user.

If the present invention should use a mAs selector for free setting of operational values, then it is automatically switched on to the corresponding mAs relay when the cover is opened. Thus, the change from an illuminated automatized operation with closed cover to an operation with mAs relay with open cover takes place automatically, and cannot be forgotten.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing, by way of example only, a preferred embodiment of the invented idea.

In the drawings:

FIG. 1 is a front view of a servicing desk of the present invention.

FIG. 2 is a section through a part of the desk shown in FIG. 1.

FIG. 3 is a circuit diagram illustrating the connection of an X-ray diagnosing device with the servicing desk shown in FIGS. 1 and 2.

The servicing desk 1 shown in FIG. 1 has upon its upper side eight functional keys 3 to 9 used for setting photographing data for a specific photographing or a specific photographing series in a programmed manner. Each of the functional keys 3 to 9 is coordinated with a specific body part or organ or a series of body parts or organs, and permits the setting of photographing data by key pressure. The functional keys 3 to 9 permit the setting of X-ray tube voltage, the focus of the X-ray tube, the measuring area of the measuring chamber of an illuminating automat and the sensibility of the illuminating automat.

Sometimes, it is desired to replace the illuminating automat with an mAs relay for determining film blackening. For that purpose a mAs selector 10 is provided in a deepened part of the upper surface of the servicing desk 1, which can be covered by a swingable cover 11. The cover 11 is swingable about an axle 12. Upon its upper illustrated side, it carries jointly with the plate 14 held in supports 13, inscriptions for the functional keys 3 to 9. To make it easier to find human organs to which the keys 3 to 9 pertain, an outline of a human body 15 is shown at the edge of the indicating areas of the plate 14 and the cover 11.

If operation with illuminating automat is to be changed to operation with the mAs relay, the cover 11 is swung upwardly about the axle 12 until the mAs selector 10 is freed, so that the setting of the desired mAs product is possible. A switch 16 is used for connecting the mAs selector 10 to the mAs relay and for switching off the illumination automat. The switch 16 is actuated by a pin 17 which can be shifted by the cover 11 in its longitudinal direction in the manner illustrated in FIG. 2. FIG. 2 shows the position of the pin 17 and of the actuating member 18 of the switch 16 when the mAs selector 10 is covered. If the cover 11 is swung upwardly about the axle 12 until it lies upon the plate 14, then the pin 17 is moved outwardly by the spring 19 through the covering plate 20 of the servicing desk 1 until the actuating member 18 can snap outwardly out of the casing of the switch 16.

FIG. 3 shows contacts 23 to 29 and 33 to 39 which are actuated by keys 3 to 9. The key 3 operates the contacts 23 and 33; the key 4 operates the contacts 24 and 34, and so on. The contacts 23 to 29 are used for the programmed setting of high voltage at an X-ray tube 40, which is connected by a measuring resistance 41 to a high voltage rectifier 42. The high voltage rectifier 42 is fed from a high voltage transformer 43, the primary winding of which is connected to the outlet of a regulating transformer 44. The transformer 44 can be connected to the network through contacts 45 of a relay 46. The X-ray tube 40 transmits rays through a patient 47 who lies upon a support 48, and it produces X-ray picture, upon an X-ray film provided in a holder 49. A measuring chamber 50 is located between the support 48 and the film holder 49 for measuring the intensity of X-rays. The X-ray tube 40 has two focuses which are selected, in that one of the heating wires 51 and 52 can be connected by a contact 53 to a heating current generator 54. The contact 53 is switched through the closing of the contact 29. An amplifier 55 for the ionisation current is connected behind the ionisation chamber 50, and is used for charging an integra-

tion condenser 56. A tipping member 57 is tipped over when a predetermined condenser voltage is reached, and switches off the X-ray tube 40 by means of the relay 46. The strengthening of the amplifier 55, and thus of the ray dose, after which the switching off takes place, is determined by the rated value giver 58.

The switch 16 is illustrated as such in FIG. 3. It assumes the position shown in full lines when the cover 11 has its illustrated position in which it covers the mAs selector 10. In that case, the illustrated X-ray diagnosing apparatus operates with automatized illumination. When one of the functional keys 3 to 9 is pressed down, the contacts 23 to 29 select the corresponding X-ray tube voltage, and the contacts 33 to 39 select the amplification of the amplifier 55, so that the film blackening is automatically selected. The relay 46 is attracted at the beginning of the photographing and closes the contacts 45. When a predetermined ray dose fixed by the closed contacts 33 to 39 has been reached, the tipping member 57 tips over, causes the dropping of the relay 46, and thus interrupts the photographing.

In the illustrated embodiment, the focus pertaining to the heating wire 51 is automatically selected when one of keys 3 to 8 is actuated while, when the key 9 is actuated, the focus pertaining to the heating wire 52 is selected corresponding to the closing of the contact 29. When the key 9 is actuated, the contact 53 is moved to its position shown by broken lines.

When the cover 11 is swung upwardly, the switch 16 is moved into its position shown by broken lines, in which the relay 46 is connected to the outlet of a tipping member 59. The tipping member 59, along with a condenser 60, the measuring resistance 41 and a rated value giver 61 constitute a mAs relay. The mAs product can be set by the illustrated mAs selector 10. The condenser 60 integrates the X-ray tube current, and the tipping member 59 causes the drop-out of the relay 46 when a predetermined integral of the X-ray tube current and thus a predetermined mAs product have been reached. The mAs selector 10 changes the charge resistance of the condenser 60.

It is apparent that in the illustrated construction, the change from an illumination automatic operation to an operation with free adjustment possibility of the mAs product takes place completely automatically, so that this switching over cannot be overlooked, and the user does not have to exert any special attention.

The selection of the X-ray tube voltage and of the focuses of the X-ray tube 40 can also take place during operation with the mAs relay, namely, when the switch 16 is located in its position shown by broken lines by operating the functional keys 3 to 9.

The back side of the cover 11 of the servicing desk shown in FIG. 1, which is directed toward the user when the cover lies upon the plate 14, can also be provided with inscriptions pertaining to the keys 3 to 9,

which are effective when the mAs selector 10 is being operated. The arrangement of the inscribing surface upon the back side of the cover 11 can be similar to that upon the front side of the cover 11 and the plate 14, including the representation of the body 15.

The present invention has been described in combination with an mAs selector for setting the mAs product. However, within the scope of the present invention, it is also possible, when using servicing members for a free setting of at least one operating value, to provide the switching in the closed section of the servicing desk 1, namely, to provide the connection of the servicing members for the free setting and their switching off automatically by the cover 11.

What is claimed is:

1. A control desk for an X-ray diagnosing device having an X-ray power supply and an X-ray tube connected with said X-ray power supply, said desk comprising a cover swingable from an open position to a closed position and vice versa, a plurality of keys carried by said desk for setting programmed operational values including the X-ray tube high voltage and an X-ray exposure time, at least one control for an individual setting of at least one operational value, first switching means connected with said keys, said control and said X-ray power supply for setting of the operational values, second switching means actuatable by said cover for switching on said control for an individual setting of an operational value at said X-ray power supply when it is in its open position and for switching on all contacts of said keys when it is in its closed position, said second switching means switching off said control when said cover is in its closed position and switching off at least a part of the contacts of said keys when said cover is in its open position, said cover being adapted to cover the control in its closed position.

2. A control desk according to claim 1, said desk being used with an automatic exposure timer in said X-ray power supply, said first switching means being connected with said exposure timer, the desk further comprising an mAs selector adapted to be covered by said cover, said second switching means being selectively connected with said automatic exposure timer and said mAs selector for connecting the automatic exposure timer or the mAs selector with a switch-off device of the X-ray power supply.

3. A control desk according to claim 1, wherein said cover has an outer surface visible when the cover is closed, said surface carrying inscription pertaining to the operation of said keys.

4. A control desk according to claim 1, wherein said control is located in a recess of said desk and is concealed by said swingable cover when the cover is closed.

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