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TUBE CHANGING DEVICE

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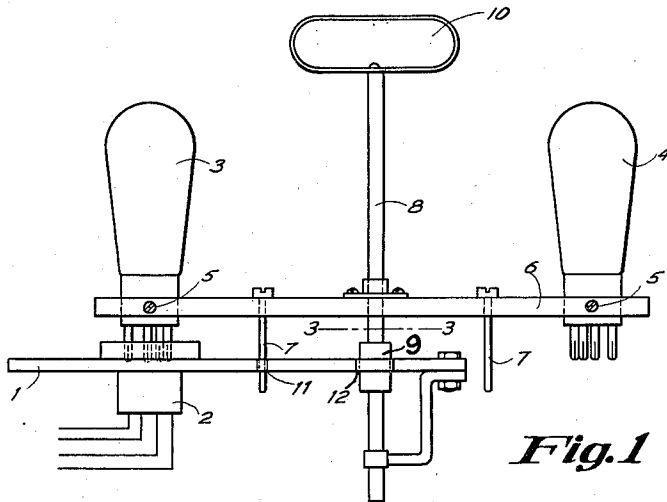


*Fig. 1*

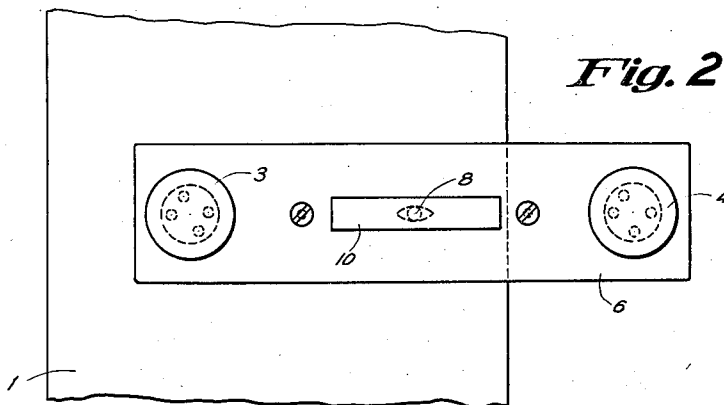


*Fig. 2*



*Fig. 3*

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## TUBE CHANGING DEVICE

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2 Claims. (Cl. 250—27.5)

In many cases it has been found necessary to provide spare or standby tubes in devices equipped with electron tubes in such a way that inside the briefest possible time, and, optionally, without necessitating any changes in the circuit of the device, will thus be rendered capable of taking over the work of other tubes. It has been suggested for this purpose to fixedly build the sockets for the two tubes into the set and to provide a switch whereby the standby tube may be cut in the circuit in lieu of the one previously in operation. Quite apart from the difficulties liable to result from the use of switches because of defective contact-making, switches of this kind are rather complicated and therefore also rather costly especially when they are called upon to change the connections of more than one tube at the same time. There exists this further drawback that the use of such a circuit organization requires wiring and the disposition of leads likely to conduce to disturbances for reasons of spurious and undesired couplings.

Hence, it is an object of this invention to secure the two tubes or tube groups in a part which is capable of being actuated by a handle, knob, or the like in such a manner that the tubes acting as spare tubes may be introduced in lieu of the previous ones into the socket or sockets fixedly associated with the receiver assembly.

It is a further object of this invention to permit a tube located within a closed casing to be removed from its socket and quickly replaced by another tube of the same type from a position external to the casing and without opening it. Other objects will be apparent to those skilled in the art as the description thereof proceeds. For a better understanding of the invention reference is made to the accompanying drawing, in which:

Fig. 1 is a front view of a tube changing device made according to my invention,

Fig. 2 is a top view of the device of Fig. 1, and

Fig. 3 is a sectional view through the lines 3—3 of Fig. 1.

Referring to the drawing, 1 denotes the mounting or base plate of the set into which the tube socket 2 is recessed. Tubes 3 and 4 which are intended for being mutually substituted are secured by the aid of terminal screws 5 in recesses of a plate 6. Arranged on this plate are also guide pins 7 and a spindle 8 of preferably circular cross-section, the latter at the same time serving the purpose of moving the tube-supporting plate 6. A part 9 of the spindle 8 is of non-circular cross-sectional shape, but preferably formed in a way as indicated sectionally in Fig. 3. The said

part 9 is guided by a suitably formed recess in the base plate 1 and is so disposed on the spindle 8 that turning of the plate 6 is impossible as long as the prongs of the plug of one of the two tubes 3, 4, are in the holes of the socket. Indeed, it is only when the plate 6 carrying the tubes has been sufficiently raised by the aid of the handle 10 that a rotation through an angle of 180 degrees and thus substitution of tube 4 will be practicable. The pins 7 engage in a corresponding opening 11 of the mounting board and thus afford safer guidance.

What may be particularly pointed out is that the exemplified embodiment hereinbefore described is to serve merely as an illustration to explain the basic idea of the invention, and that the same by no means is confined to the use in connection with the described arrangement. In fact, the arrangement may be readily so designed that instead of one tube 3 an entire group or bank of tubes may be replaced by standby tubes. The supporting of the mounting plate 6 and the movement thereof will then be capable of a great many modifications. For instance, the rotation need not be just 180 degrees, in fact, the pivot may be so placed that the movement of the plate will be small and merely be governed by the size of the tubes.

The movement after the lifting out of the tube socket by no means needs to be rotary in nature, for, as a matter of fact, it could also be translational or shifting.

The use of the basic idea of the invention is of importance even when the point is to insure the replacement of tubes inside a closed casing without any manipulation in the latter and without even opening the case. A problem of this kind is involved, for instance, when a tube stage is accommodated inside a thermostat, and if substitution of a tube is then to be accomplished without an incidental alteration of the working conditions. In this instance, spindle 8 is brought out across the thermostat by the aid of a heat-insulating and packing stuffing box or gland. The guide pins 7 could then be disposed outside the case and could be provided with marks or means indicating which particular tube is in the circuit at a given instant after a circuit-change has been effected.

It is moreover not necessary to insure a tube substitution manually; indeed, it may be effected by tele-control or tele-mechanic means through the agency or relays or automatically, and independence upon a characteristic operat-

ing quantity of the tube which happens to be in circuit.

For use in an arrangement of the kind here disclosed are suited nearly all types of tube. If  
5 an electrode has been brought out at the top end, then this particular electrode will in both tubes be united permanently by a movable cable with the circuits.

I claim:

- 10 1. In combination, a stationary tube socket, a base plate, a shaft mounted for rotation and endwise movement, an arm carried by said shaft, a plurality of tubes carried by said arm and having their bases adapted to register with said socket,  
15 an operating handle secured to said shaft, said base plate being provided with a non-circular aperture, a member secured to said shaft and shaped to conform to said aperture and enter the

same when one of said tube bases is in engagement with said socket and additional means carried by said arm arranged to align one of said tube bases with said socket before engagement  
5 of said base and socket.

2. In combination, a stationary tube socket, a base plate having an aperture therein, a shaft mounted for rotation and endwise movement, an arm carried by said shaft, a plurality of tubes carried by said arm and having their bases adapted  
10 to register with said socket, an operating handle carried by said shaft and at least one pin projecting from said arm parallel to said shaft and arranged to enter the aperture in said base plate before a tube enters said socket, said pin and  
15 aperture being arranged to guide the tube into the socket.

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