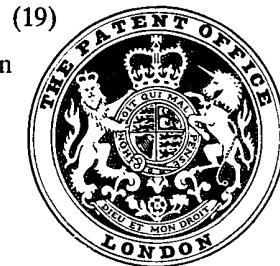


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(54) IMPROVEMENTS IN OR RELATING TO
 REMOTE CONTROL DEVICES

(71) I, OLE SIMON PETERSEN, of Peder Paarsvej 12, DK-9000 Aalborg, Denmark, a Danish subject, do hereby declare the invention, for which I pray that a patent 5 may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:-

10 The invention relates to manually actuatable remote control devices for adjusting tuning elements in radio transmitters, the output and aerial matching circuits of which are located far from control units.

15 Matching an aerial to a transmitter is usually performed by adjusting a tuning element, i.e. a condenser or a variometer, and simultaneously watching an aerial current meter. The tuning element is adjusted for maximum deflection of the meter. There 20 is a relationship between the closeness to the maximum deflection and the speed with which the operator turns the tuning knob. A skilled operator is able to perform the tuning quickly through a feeling for this 25 relationship.

30 In transmitters constructed with separated stages as mentioned above, there is a need for remotely adjusting the tuning element. Known solutions to this are a position servo mechanism, a flexible shaft, and a set of push-buttons for turning-on a motor in opposite directions.

35 None of these solutions has much to offer in respect of ease and comfort of tuning. The first is a position control device with the side effect of a time constant in its reaction which results in overshoot when the input device is stopped upon observation of maximum deflection of the meter. Furthermore, 40 a servo mechanism is rather delicate, using a number of elements subject to wear. The second is impractical because of mechanical losses and because the inherent springiness of a flexible shaft makes instantaneous stopping virtually impossible. On the other

hand this device is rather rugged.

45 The third solution is impractical because it will turn the tuning element at a constant speed, whereas a gradually reduced speed is required close to maximum deflection of the meter.

50 According to the invention, there is provided a manually actuatable adjusting device for remote adjusting of a tuning element in a radio communication apparatus by transmitting a signal representing the instantaneous speed and direction of rotation, the device comprising a manually operable knob connected to a permanently magnetized d.c. dynamo by means of a step-up gearing, a pair of conductors for carrying a current that is dependent on the speed and direction of the rotation of the knob, a permanently magnetized d.c. motor connected to the pair of conductors at the remote end, the d.c. motor being responsive to the magnitude and direction of the current generated through turning the knob, and a tuning element connected to the output shaft of the d.c. motor through a step-down gearing.

55 A preferred device may be used for remote tuning of a tuning element according to the deflection on a meter.

60 A preferred device provides a simple means for limiting the rotation of the shaft of a tuning element in order to give an easily noticeable difference in the resistance to turning of the tuning knob.

65 In a preferred device, the tuning knob is connected to the d.c. dynamo through the step-up gear, the tuning element is connected to the d.c. motor through the step-down gear, and the connection between a control unit and a remotely located aerial matching circuit is effected by a pair of conductors. Turning the tuning knob makes the dynamo generate a current, the magnitude and direction of which is related to the speed and direction of the rotation of the tuning knob. The d.c. motor is run from this

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current and the tuning element is turned in accordance with the turning of the tuning knob.

5 In a preferred device, diodes are switched into circuit at the limit of travel of the tuning element shaft. The diodes short-circuit only the direction of current that would continue the rotating movement and the short-circuit is felt more clearly at the tuning knob end than the mere stalling of the motor.

The invention will be further described, by way of example, with reference to the accompanying drawing, which shows a preferred adjusting device.

15 With reference to the accompanying drawing, there is shown a tuning knob I, a gear 1', a permanently magnetized d.c. dynamo 1, and a pair of conductors 2 leading to a remotely positioned tuning element C. The conductors 2 are connected to a permanently magnetized d.c. motor 3 having associated step-down gearing 3', an output shaft U of which is connected to a shaft of the tuning element C. Also shown are diodes D

20 which are brought into circuit at the extreme clockwise and extreme anti-clockwise positions of the shaft U respectively by switch means A actuated by cams K. The short-circuiting action of the diodes is unidirectional so that turning the tuning knob I in the opposite direction to that which effected the short-circuit is not influenced.

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WHAT I CLAIM IS:-

35 1. A manually actuatable adjusting device for remote adjusting of a tuning element in a radio communication apparatus by transmitting a signal representing the instantaneous speed and direction of rotation, the device comprising a manually operable knob connected to a permanently magnetized d.c. dynamo by means of a step-up gearing, a pair of conductors for carrying a current that is dependent on the speed and direction of the rotation of the knob, a permanently magnetized d.c. motor connected to the pair of conductors at the remote end, the d.c. motor being responsive to the magnitude and direction of the current generated through turning the knob, and a tuning element connected to the output shaft of the d.c. motor through a step-down gearing.

2. An adjusting device as claimed in claim 1, in which the shaft of the adjustable tuning element is supplied with limits for its travel, which limits are constructed as cams arranged to operate electrical switches for short-circuiting the pair of conductors by means of diodes in such a way that only continuation of rotation in the same direction is prevented.

65 3. A manually actuatable adjusting device for remote adjusting of a tuning element in a radio communication apparatus, substantially as hereinbefore described with reference to the accompanying drawing.

4. A radio communication apparatus including an adjusting device as claimed in any one of the preceding claims.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of
the Original on a reduced scale*

