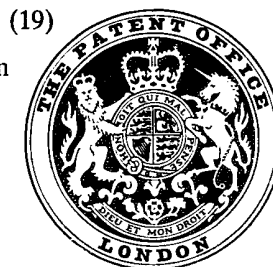


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(54) IMPROVEMENTS IN OR RELATING TO
 REMOTE CONTROL DEVICES

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

10 The invention relates to manually actu-
 able 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 cur-
 rent 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.

In transmitters constructed with sepa-
 rated stages as mentioned above, there is a
 need for remotely adjusting the tuning
 element. Known solutions to this are a
 30 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 max-
 imum 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 springyness
 of a flexible shaft makes instantaneous
 45 stopping virtually impossible. On the other

hand this device is rather rugged.

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
 50 meter.

According to the invention, there is pro-
 vided a manually actuatable adjusting device
 for remote adjusting of a tuning element in a
 radio communication apparatus by transmit-
 ting a signal representing the instantaneous
 55 speed and direction of rotation, the device
 comprising a manually operable knob con-
 nected 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.
 60 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.
 65

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

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

In a preferred device, the tuning knob is
 connected to the d.c. dynamo through the
 step-up gear, the tuning element is con-
 nected 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
 80 conductors. Turning the tuning knob makes
 the dynamo generate a current, the mag-
 nitude 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
 85 90

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.

10 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
20 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
25 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
30 opposite direction to that which effected the short-circuit is not influenced.

WHAT I CLAIM IS:-

35 1. A manually actuable 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.
40 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
45 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
50 element connected to the output shaft of the d.c. motor through a step-down gearing.

55 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
60 continuation of rotation in the same direction is prevented.

65 3. A manually actuable 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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