

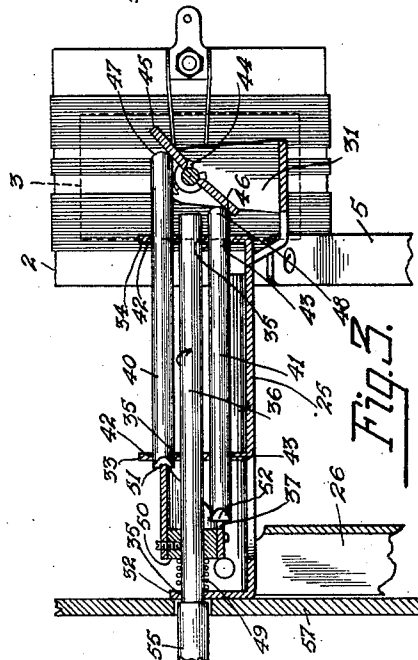
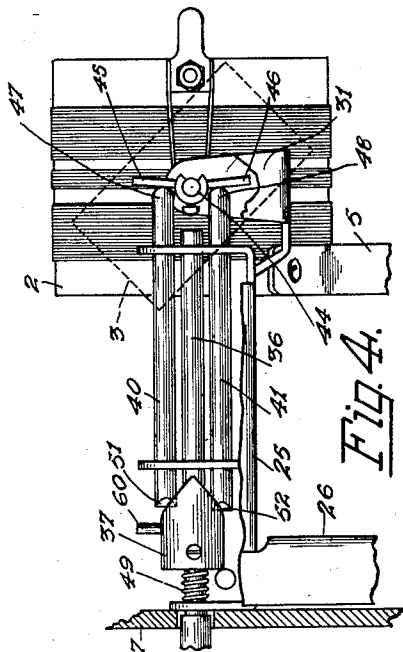
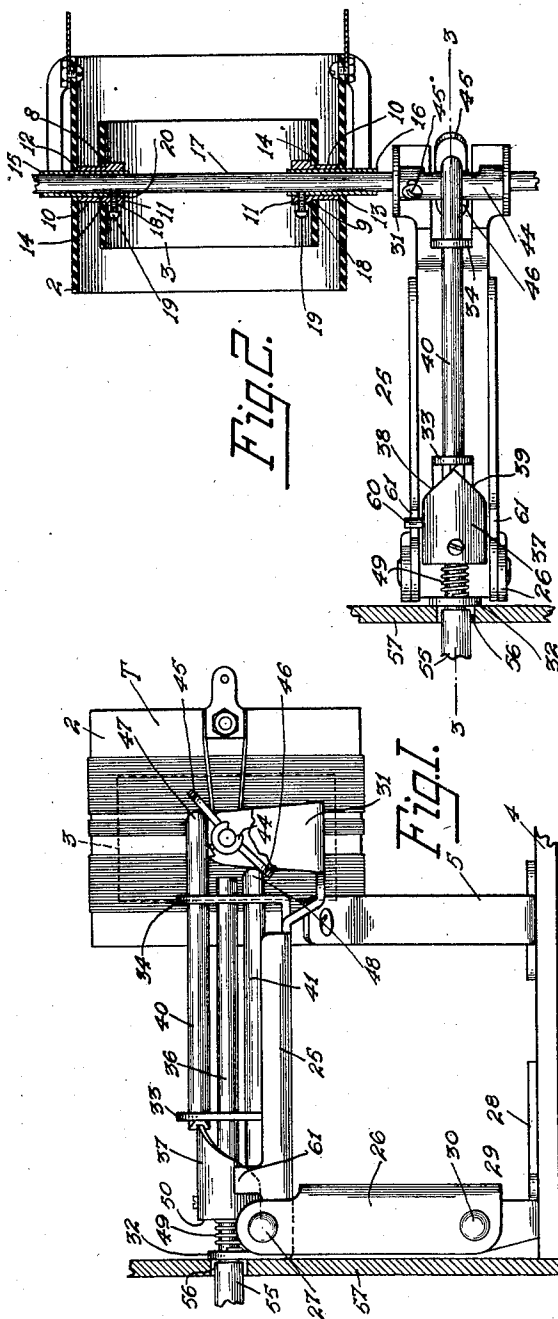
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M. B. GROUT

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CONTROL DEVICE

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UNITED STATES PATENT OFFICE

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CONTROL DEVICE

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My invention relates to control devices and has to do more particularly with multiple control devices such as are used for controlling the simultaneous movement of the rotor elements of a plurality of tuning couplers or condensers, as are used in broadcast receiving sets; and an object of my invention resides in the novel method of construction and operation of the same.

Previous to my invention it has been customary to use beveled gears, or the like, to control a gang of couplers or condensers. This method has had drawbacks, such as the play in the gears, etc.; to overcome these difficulties I have provided a device that works smoothly and is not subject to the disadvantages of the prior devices. While I have shown my invention operating in connection with gang controlled couplers, it is obvious, that it may be used to control a gang of condensers or other gang controlled tuning devices.

A feature of my invention is the provision of a rotatable shaft supporting a cam member provided with a pair of helical cam faces which cooperate with a pair of reciprocating rods which actuate means secured to a shaft supporting the rotor elements of a plurality of tuning couplers or transformers to rotate the said shaft so as to angularly displace the said rotor elements simultaneously relative to their associated stator elements.

Another feature of my invention is the provision of a double wing member secured to the shaft supporting the rotor elements which are acted upon by the reciprocating rods to bring about the rotation of the rotor elements of the transformers for either loose or close coupling relative to the stator element.

The above features as well as others not specifically pointed out will be more fully described and explained in the following specification and for a more complete understanding of my invention reference may be had to the accompanying drawing in which like reference characters in the several views denote like parts, and in which:

Fig. 1 is a side elevation of the control member for controlling the movement of the rotor element of a transformer.

Fig. 2 is a plan view of Fig. 1 with the transformer shown in section to clearly illustrate the method of securing the rotor element of the transformer to the shaft associated with the control element.

Fig. 3 is a sectional view on the line 3—3 of Fig. 2, and

Fig. 4 is a side elevation of the control member in an intermediate position to clearly illustrate how the movement of the rotor elements of the transformers is accomplished.

Referring now more in detail to the control member of my invention I illustrate the same operating in connection with a transformer T comprising a stator tube 2 and mounted within the stator tube 2 is a rotatable rotor tube 3, shown most clearly in Fig. 2. The stator tube 2 is mounted upon a base board 4 by a bracket 5 provided with suitable legs to which the stator tube 2 is secured by suitable fastening means, the said bracket 5 being in turn secured to the base board 4 by means of suitable screws.

The rotor element 3 is provided with a pair of orifices 8 and 9 diametrically opposite which are adapted to receive the sleeve extensions 10 of a pair of bushings 11 secured to the inner circumferential face of the rotor tube 3 by suitable means. The stator tube 2 is provided with a pair of orifices 12 and 13 diametrically opposite and in alignment with the orifices 14 which extend through the sleeve extensions 10 of the bushings 11. The orifices 12 and 13 in the stator tube 2 and orifices 14 in the sleeve extensions 10 are of the same size and in alignment and are adapted to receive sleeves 15 and 16. A supporting rod 17 extends through the sleeves 15 and 16 to support the rotor tube 3 within the stator tube 2. The bushings 11 secured to the rotor tube 3 are provided with tapped orifices 18 which are adapted to receive screws 19, and orifices 20 in the sleeves 15 and 16 in alignment with the tapped orifices 18 in the studs 11 permit the ends of the screws 19 to engage the rod 17 extending through the sleeves 15 and 16 to rigidly secure the rotor tube 3 to the rod 17 so that the same may be rotated relative to the stator tube 2, and as the transformer T is of the

90 degree coupler type, the said rotor tube 3 may be rotated 90 degrees or until it is at right angles to the axis of the stator tube 2.

A bracket 25 is pivotally secured to a U shaped depending member 26 by means of the rivets 27. A plate 28 provided with ears 29 has pivotally secured to it by means of the rivets 30 the U shaped member 26, and this plate 28 is secured to a suitable base board or sub panel 4 by suitable screws and the U shaped member 26, bracket 25 and plate 28 are pivotally secured, as just described for adjusting purposes relative to each other. The bracket 25 which is pivotally secured to the U shaped member 26 extends rearwardly therefrom and is provided with a pair of integrally formed ears 31 extending upward and which are provided with aligned orifices through which the rod 17, which supports the rotor tube 3, extends. The bracket 25 also is provided with three integrally formed upwardly extending ears 32, 33 and 34 which are provided with aligned orifices 35. A shaft 36 is rotatably supported in these aligned orifices 35, in the ears 32, 33 and 34 and has secured to it a cylindrical cam member 37 provided with a pair of receding helical cam faces 38 and 39. A pair of reciprocating rods 40 and 41 are slidably supported in aligned orifices 42 and 43 in the ears 33 and 34 of the bracket 25 and are operatively associated with the cam member 37 secured to the shaft 36 for purposes as will presently be described.

A member 44 secured to the rod 17 by means of the set screw 45' rests between the ears 31 of the bracket 25 and is provided with a pair of integrally formed wings 45 and 46 diametrically opposite and which are engaged by the rounded ends 47 and 48 of the reciprocating rods 40 and 41. The cam member 37 secured to the shaft 36 is positioned thereon between the integrally formed ears 32 and 33 of the bracket 25 and a helical spring 49 on the shaft 36 resting between the ear 32 of the bracket 25 and the end face 50 of the cam member 37 forces the helical cam faces 38 and 39 in engagement with the angular formed ends 51 and 52 of the reciprocating rods 40 and 41 and the opposite rounded ends 47 and 48 of the reciprocating rods 40 and 41 are in turn forced into engagement with the respective wings 45 and 46 of the member 44. It is readily apparent that the spring 49 acting against the cam member 37 maintains the angular faced ends 51 and 52 of the reciprocating rods 40 and 41 respectively in engagement with the receding helical faces 38 and 39 of the cam member 37 and also maintains the rounded ends 47 and 48 of the reciprocating rods 40 and 41 respectively in engagement with the diametrically opposite wings 45 and 46 of the member 44 secured to the rod 17 and also prevents any lost motion between cam member 37, recip-

rocating rods 40 and 41 and the wings 45 and 46. The spring 49 also provides frictional means to maintain the rotor element 3 in any of its adjusted positions. The end 55 of the shaft 36 which extends forward of the ear 32 of the bracket 25 has secured to it a suitable operating knob to facilitate the rotation of the shaft 36 and the cam member 37 secured thereto and has secured thereto a suitable indicator. Graduations on the panel 57 in association with the indicator will indicate the degree of rotation of the rotor element 3 of the transformer T. To rotate the rotor tube 3 relative to the stator tube 2 the shaft 36 is rotated in the direction of the arrow as indicated thereon in Fig. 3 through the medium of a knob. As the cam member 37 is secured thereto it is also rotated when the shaft 36 is rotated. As the cam member 37 rotates the angular faced ends 51 and 52 of the reciprocating rods 40 and 41 follow the contour of the respective cam faces 38 and 39 and as the helical cam face 39 of the cam member 37 advances due to rotation of the shaft 36 in this direction it forces the reciprocating rod 41 to the right with reference to Fig. 3 and as its opposite rounded end 48 engages the wing 46 of the member 44 secured to rod 17, the said wing 46 is also forced to the right causing the rod 17 to which the member 44 is secured to rotate, and the rotor element 3 which is secured to the rod 17 as before described, is rotated relative to the stator element 2 as clearly illustrated in Fig. 4. The wing 45 of the member 44 which is diametrically opposite the wing 46 is moved to the left with reference to Fig. 3 and as the rounded end 47 of the reciprocating rod 40 engages the wing 45, the said reciprocating rod 40 is moved to the left due to the movement of the wing 45. The opposite angular faced end 51 of the reciprocating rod 40, being in engagement with the helical cam face 38, follows the receding cam face 38 due to the rotation of the cam member 37 to permit the movement of the reciprocating rod 40 to the left.

To return the rotor element 3 from the position shown in Fig. 4 to the position shown in Fig. 2 the shaft 36 is rotated in the opposite direction to that indicated by the arrow, to cause the advancing helical cam face 38 to force the reciprocating rod 40 to the right with reference to Fig. 4, causing the wing 45 to be moved to the right thus rotating the rod 17 and rotor element 3 secured thereto. The wing 46 is of course moved to the left and as the angular end face 52 of the reciprocating rod 41 engages the cam face 39 it follows the receding cam face 39 to permit the movement of the reciprocating rod 41 to the left. A stop pin 60 secured to the cam member 37 and angular extensions 61 on the bracket 25 cooperate to prevent excessive rotation of the shaft 36 in either direction.

While I have illustrated and described the

control device of my invention associated with a single transformer T of the coupler type it is of course readily apparent that the device is applicable to a multiple control arrangement in which a plurality of transformers as T or tuning devices are to be controlled.

While I have described a particular form of my invention it is to be understood that changes and modifications will readily suggest themselves to those skilled in the art and I therefore aim to cover all such changes and modifications as come within the spirit and scope of the appended claims.

What I claim as new and desire to secure by United States Letters Patent, is as follows:

1. A device of the character described including a shaft adapted to be rotated, a rocking member secured to said shaft, a second shaft mounted at right angles to said first shaft, a supporting bracket for said second shaft, means for pivotally supporting said bracket, a cam member attached to said second shaft, and sliding means lying between said cam and said rocking member and spring pressed into engagement respectively with said cam and said rocking member for connecting said cam member to said rocking member on said first shaft for rotating the same when said second shaft is rotated.

2. A device of the character described including a shaft adapted to be rotated, a rocking member secured to said shaft, a second shaft mounted at an angle to said first shaft, a supporting bracket for said second shaft, means pivotally supporting said bracket, a cam member secured to said second shaft and a longitudinal movable member controlled thereby for transmitting movement from said second shaft to said first shaft through said rocking member and spring means for maintaining said cam in engagement with said movable member and said movable member in engagement with said rocking member.

3. A device of the character described including a shaft adapted to be rotated, a rocking member secured to said shaft, a pair of members adapted to be moved back and forth for causing rotation of said shaft, a bracket for supporting said pair of members, means for pivotally supporting said bracket, said rocking member and rotatable means at right angles to said shaft for controlling the back and forth movement of said pair of members and spring means for maintaining said rotatable means and said pair of members respectively in engagement with said pair of members and said rocking member.

4. A device of the character described including a supporting bracket and a shaft rotatably supported thereby, pivoted means for supporting said bracket, a cam member secured to said shaft, a transverse rod rotatably supported by said bracket, reciprocating

means affected by the rotation of said cam member to engage means secured to said transverse rod to cause rotation of said transverse rod, and spring means for maintaining said cam in engagement with said reciprocating means and said reciprocating means with said means secured to said rod.

5. A device of the character described including a supporting bracket and a shaft rotatably supported thereby, pivoted means for supporting said bracket, a cam member secured to said shaft, a transverse rod rotatably supported by said bracket, a pair of reciprocating rods slidably supported by said bracket and moving in a rectilinear direction when said cam is rotated to affect means secured to said transverse rod to cause rotation of the same, and spring means for maintaining said cam in engagement with said reciprocating rods and said reciprocating rods in engagement with said means secured to said transverse rods.

6. A device of the character described including a supporting bracket and a shaft rotatably supported thereby, pivoted means for supporting said bracket, a cam member secured to said shaft, a transverse rod rotatably supported by said bracket, a pair of reciprocating rods slidably supported by said bracket and moving in opposite rectilinear directions when said cam is rotated, means secured on said rod engaged by one of said reciprocating rods to cause rotation of said transverse rod, and spring means for maintaining said cam in engagement with said reciprocating rods and said reciprocating rods in engagement with said means secured to said transverse rod.

7. A device of the character described including a supporting bracket and a shaft rotatably supported thereby, pivoted means for supporting said bracket, a cam member secured to said shaft, a transverse rod rotatably supported by said bracket, a pair of reciprocating rods slidably supported by said bracket, one of said rods being moved in a rectilinear direction by the rotation of said cam to engage means secured to said transverse rod to rotate the same, said means also effecting the movement of said other reciprocating rod in an opposite direction, and spring means for maintaining said cam in engagement with said reciprocating rods and said reciprocating rods in engagement with said means secured to said transverse rod.

8. A device of the character described including a supporting bracket and a shaft rotatably supported thereby, pivoted means for supporting said bracket, a cam member secured to said shaft, a transverse rod rotatably supported by said bracket, a member provided with diametrically opposite wings secured to said transverse rod, a pair of reciprocating rods slidably supported by said bracket, the opposite ends of which respec-

tively engage the said cam member and wings of the member secured to said rod, said cam member upon rotation effecting rectilinear movement of one of said reciprocating rods to move said member secured to said rod to rotate the same, said member also effecting the movement of said other reciprocating rod in an opposite rectilinear direction, and spring means for maintaining said cam in engagement with said pair of reciprocating rods and said reciprocating rods in engagement with said member secured to said transverse rod.

9. A device of the character described including a supporting bracket and a shaft rotatably supported thereby, means for pivotally supporting said bracket, a cam member secured to said shaft, provided with a pair of receding helical cam faces, a transverse rod rotatably supported by said bracket, a member provided with diametrically opposite wings secured thereto, a pair of reciprocating rods slidably supported by said bracket, the opposite ends of which respectively engage the said cam faces and the said wings of said member, said reciprocating rods being moved in opposite rectilinear directions upon the rotation of said cam member through the agency of said shaft, one of said rods effecting rotation of said transverse rod, through movement of said member, said member upon rotation effecting the movement of said other reciprocating rod in an opposite rectilinear direction, and means for maintaining said cam in engagement with said pair of reciprocating rods and said reciprocating rods in engagement with said member secured to said transverse rod.

10. An arrangement for causing oscillatory movement of a shaft by the oscillatory movement of a second shaft at right angles to said first shaft, including a cam secured to said second shaft, a supporting bracket for said second shaft, means for pivotally supporting said bracket, a rotatable member secured to said first shaft, a pair of slidable members connected between said cam and said rotatable member, and spring means for maintaining said cam in engagement with said pair of slidable members and said slidable members in engagement with said rotatable member.

Signed by me at Chicago, in the county of Cook and State of Illinois, March, 1927,

MARTIN B. GROUT.