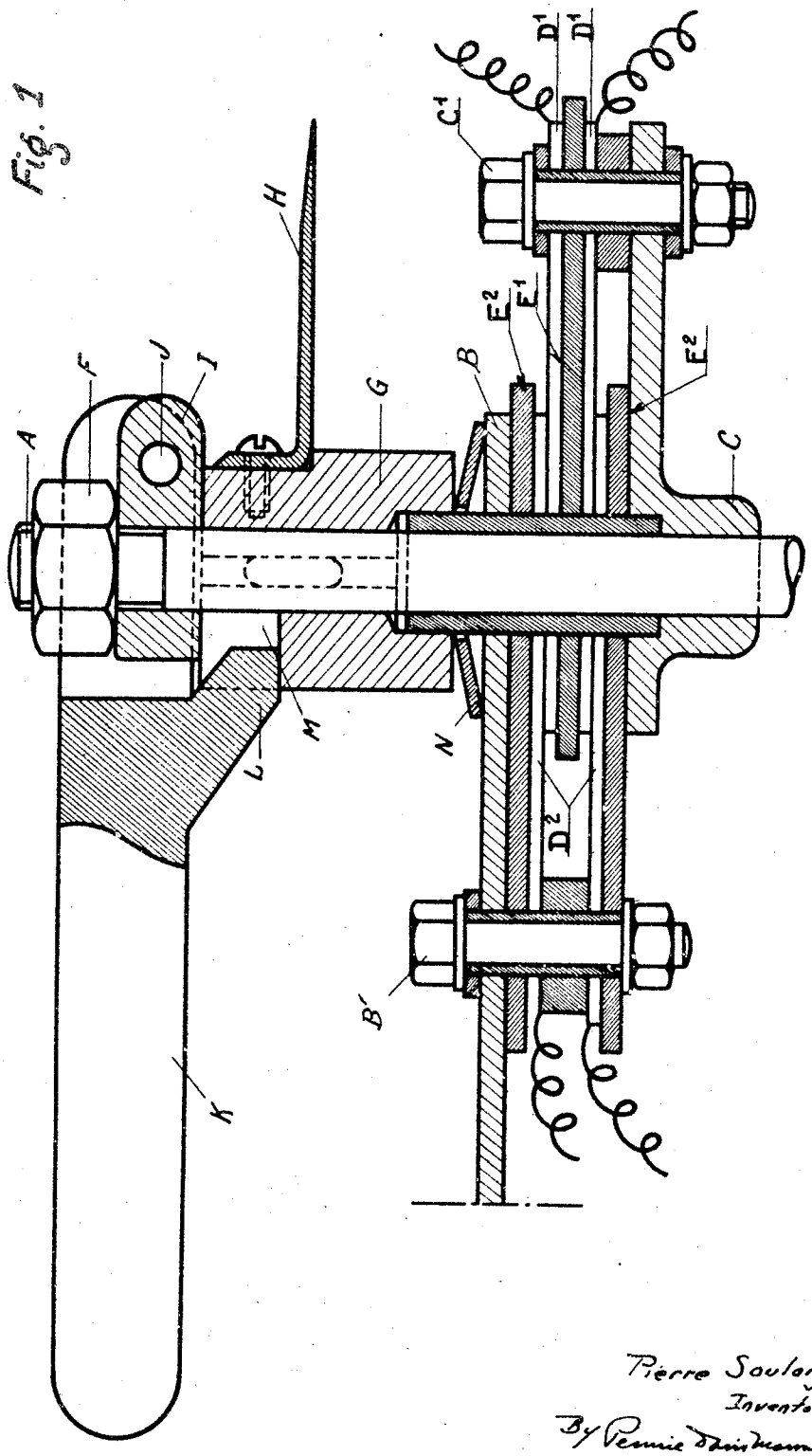
April 29, 1941. P. SOULARY 2,239,941

OPERATING DEVICE FOR ADJUSTABLE TRANSFORMERS AND THE LIKE

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Fig. 1



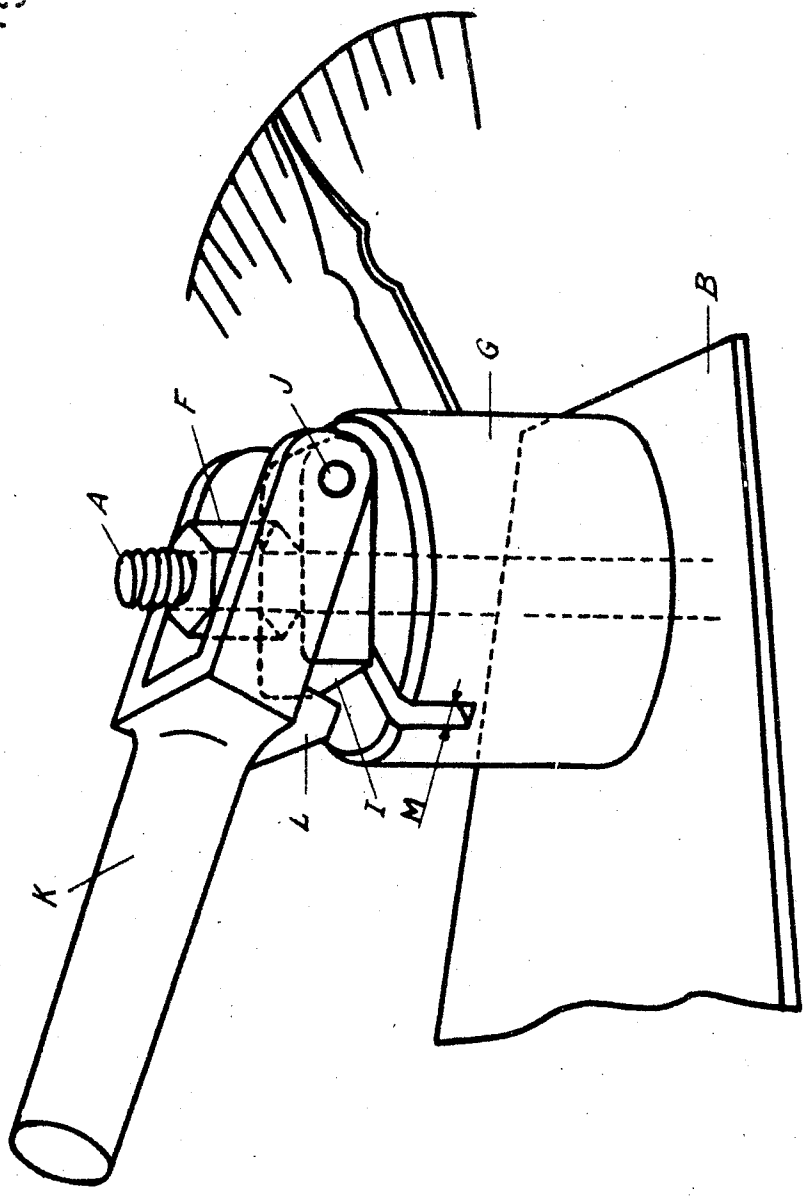
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Fig. 2



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OPERATING DEVICE FOR ADJUSTABLE TRANSFORMERS AND THE LIKE

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10 Claims. (Cl. 171—119)

The present invention relates to a device for adjusting and locking a part which is movable around an axis and is submitted to electromagnetic forces tending to cause it to rotate around said axis.

The said device finds a particularly advantageous application in cases where the rotatably mounted part comprises a portion of an electric circuit, the ends of which are connected to the stationary part of the circuit, the movable part being the movable coil found for example in induction regulators, mutual inductance coils and variable leakage reactance transformers for electric welding. The present device allows the position of the movable coil to be quickly regulated and ensures not only efficient locking but also perfect electric connection between the movable and the stationary portions of the electric circuit.

It comprises substantially a system of sliding contacts consisting for the one part of stationary elements joined to the stationary portion of the electric circuit, and for the other part of movable elements joined to the movable portion of the said electric circuit and mounted upon a rotating axis carrying the said movable portion which is submitted to electromagnetic forces, the said system being controlled by a single handle mounted on the said axis in such a manner that it allows on the one hand, the movable part to be brought to the desired position and on the other hand, the movable portions of the contacts to be locked firmly against the stationary portions, so that the displacement of the movable part submitted to the electromagnetic forces is made impossible and a very good electric contact is ensured.

The invention will now be more particularly described with reference to the accompanying drawings, which illustrate one construction according to the invention.

Figure 1 illustrates a vertical section of a device according to the invention for adjusting the position of and locking a movable coil.

Figure 2 illustrates in perspective the hand mechanism for effecting the adjustment and locking.

The spindle A by its rotary movement displaces the movable coil which is not shown in the drawings. As shown in Figure 1 the spindle A rotates in a stationary part B and drives a part C to which it is keyed. The movable part C has bolted to it by means of the bolt C_1 the conductor vanes D_1 connected to the ends of the movable coil; the stationary part B has bolted to it by means of the bolt B_1 the conductor vanes D_2 of similar construction to the preceding vanes and connected to the terminals of the stationary portion of the circuit, being furthermore disposed on either side of the vanes D_1 for contact therewith; insulating vanes E_1 and E_2 are also attached to the parts B and C by means of the bolts B_1 and C_1.

The assembly of vanes above described is mounted between the part B and the part C. The vanes D_1 and E_1 are movable and rotate with the part C, the vanes D_2 and E_2 are stationary. In the drawings only two sets, each of which is formed by a stationary and a movable vane, are illustrated. The said movable and stationary conductor vanes constitute two sliding contacts insulated from the mechanical parts and allow the two ends of the movable coil to be electrically connected to the two stationary conductor vanes and thus also to the other stationary portions of the electric circuit.

The exterior extremity of the spindle A is threaded and a nut F is screwed on to said extremity. Between this nut and the stationary part B there are disposed two further parts. One part G is splined to the spindle A in such a manner as to allow it to slide axially upon but not to rotate around the said spindle, and may carry an adjustment indicator H. The other part I which may freely slide axially upon and rotate around the spindle A carries an articulation J upon which the operating handle K pivots. The latter is forked at its end, the nut F being held between the prongs thereof. The said handle may be connected to the part G by means of a lug L engaging in a slot M in the part G when the handle K is depressed as shown in Figure 1.

When the nut F is slackened, all that is necessary for effecting an adjustment of the position of the movable coil is to engage the lug L in the recess M by means of the handle K and then to turn the part G, which takes with it the spindle A, until the pointer is opposite the desired division on the scale.

Having obtained the desired position, the device is locked in this position by disengaging the lug L from the recess M, raising the handle K as shown in Figure 2, and tightening the nut F by rotating the handle and thus also the prongs thereof; the spindle A does not rotate but in moving upwardly it brings the movable part C and the stationary part B closer together, in this manner firmly pressing together the movable vanes and the stationary vanes. Owing to

this locking a perfect electric contact is ensured.

The apparatus may be so provided that one turn or whole number of turns of the handle will suffice to lock or to unlock the spindle completely, which allows both of gauging the position of the movable coil from the position of the handle after locking, and of engaging the lug in the recess immediately after the locking of the nut, as the same effort of locking is required after each adjustment. For this purpose there may be interposed between the part C and the part B a spring washer N which on flattening out gives a progressive locking action. The effort necessary at the end of the stroke of the handle for engaging the lug in the recess may be modified by changing the faces of the nut which are in contact with the fork of the handle. For this purpose the handle is raised until the nut is disengaged from the fork, when the nut may be rotated clockwise or anti-clockwise through one or more sixths of a turn, after which the handle is depressed. In this manner the flattening of the washer is modified by an amount corresponding to the displacement of the nut, thus also modifying the final effort to ensure locking.

It is understood that the aforesaid example is non-limitative, especially as regards the number of sliding contacts, and the disposition of the mechanical parts which effect the orientation of the movable coil and the pressing together of the vanes.

In certain apparatus the movable part to be adjusted and which is fixed on the spindle, does not consist of a coil mounted in the electric circuit but of a magnetic core or of a short-circuit winding to be displaced within a magnetic field.

The hereinbefore described device is applicable to this kind of apparatus, the meshing vanes then no longer forming sliding contacts as there is no need for ensuring electric continuity, and comprise no kind of electric connection and act merely as a friction brake; the assembly of the mechanical system remains the same.

I claim:

1. A device for adjusting and locking a part which is rotatably mounted upon a spindle and is submitted to electro-magnetic forces tending to cause it to rotate around the said spindle, comprising substantially a system of sliding members interleaved with one another and consisting partly of fixed elements connected to the stationary part within which the spindle rotates, and partly of movable elements mounted upon the rotatable spindle carrying the movable part which is submitted to the electro-magnetic forces, the said system being controlled by a single handle, a movable part mounted upon the spindle in such a manner as to be only axially displaceable thereon, and a part which is freely mounted upon the said spindle and to which the handle is articulated, the said handle being provided with a lug which may be brought to engage in a recess provided in the said axially movable part, locking being effected by the rotation of a nut screwed on to the screw-threaded extremity of the spindle by means of the fork-shaped extremity of the handle which encases the nut.

2. In a variable transformer or like apparatus adapted to be controlled by rotating a member thereof subjected to a magnetic torque and carried by a spindle which passes through a stationary part of the apparatus, a clamping member fixedly mounted on the spindle at the same side of the stationary part as said rotatable member, and control means carried by said spindle at the opposite side of said stationary part, rotatable with said spindle and movable axially relative thereto, said control means including a handle and means to interlock said handle with said spindle against rotation relative thereto, said handle being movable into a driving position in which it is interlocked with said spindle and is operative, upon rotation, to rotate said spindle to control said transformer or like apparatus, and movable into a non-driving position in which said interlocking means are disengaged, and a movable clamping member operable by said handle when said interlocking means are disengaged, said last named clamping member when operated by said handle cooperating with said first named clamping member to clamp said stationary part between said clamping members.

3. In a variable transformer or like apparatus adapted to be controlled by rotating a member thereof subjected to a magnetic torque and carried by a spindle which passes through a stationary part of the apparatus, a clamping member fixedly mounted on the spindle at the same side of the stationary part as said rotatable member, and control means carried by said spindle at the opposite side of said stationary part rotatable with said spindle and movable axially relative thereto, said control means including a handle and means to interlock said handle with said spindle against rotation relative thereto, said handle being movable into a driving position in which it is interlocked with said spindle and is operative, upon rotation, to rotate said spindle to control said transformer or like apparatus, and movable into a non-driving position in which said interlocking means are disengaged, and a movable clamping and bearing member operable by said handle when said interlocking means are disengaged, said last named clamping and bearing member supporting the spindle in position relative to said stationary part, and when operated by said handle cooperating with said first named clamping member to clamp said stationary part between said clamping members.

4. A variable transformer or like apparatus as set forth in claim 3 in which a resilient spacer is inserted between said stationary part and said clamping and bearing member.

5. In a variable transformer or like apparatus adapted to be controlled by rotating a member thereof subjected to a magnetic torque and carried by a spindle which passes through a stationary part of the apparatus, a clamping member fixedly mounted on the spindle at the same side of the stationary part as said rotatable member, and control means carried by said spindle at the opposite side of said stationary part rotatable with said spindle and movable axially relative thereto, said control means including a clutch member, a handle having a clutch element movable into a driving position in which it engages said clutch member and in which it is operative, upon rotation, to rotate said spindle to control said transformer or like apparatus, and to move to a position in which it is disengaged with said clutch member and in which it is inoperative to rotate said spindle, and a movable clamping member operable by said handle when the handle is out of its spindle-rotating position, said last named clamping member when operated by said handle cooperating with said first named clamping member to clamp said stationary part between said clamping members.

6. A variable transformer or like apparatus

as set forth in claim 5 in which said clutch member is arranged in a thrust-transmitting relation between said movable clamping member and the stationary part.

7. A variable transformer or like apparatus as set forth in claim 5 in which the handle is adapted to engage the movable clamping member in a plurality of relative angular positions for rotating as a unit therewith, and in which said handle is so pivoted as to be swung out of engagement with said movable clamping member, thereby to allow of angular adjustment of the movable clamping member relative to the handle.

8. A variable transformer or like apparatus as set forth in claim 5 in which the movable clamping member is a nut threaded to the outer end of the spindle, and in which the handle has prongs for engaging the nut after the manner of a wrench.

9. In a variable transformer or like apparatus adapted to be controlled by rotating a member thereof subjected to a magnetic torque and carried by a spindle which passes through a stationary part of the apparatus, a clamping member fixedly mounted on the spindle at the same side of the stationary part as said rotatable member, contact plates secured to said stationary part, contact plates mounted on said spindle and rotatable bodily therewith, all of said contact plates being mutually superimposed between said fixed clamping member and said stationary part, and control means carried by said spindle at the opposite side of said stationary part rotatable with said spindle and movable axially relative thereto, said control means including a handle and means to interlock said handle with said spindle against rotation relative thereto, said handle being movable into a driving position in which it is interlocked with said spindle and is operative, upon rotation, to rotate said spindle to control said transformer or like apparatus, and movable into a non-driving position in which said interlocking means are disengaged, and a movable clamping member operable by said handle when said interlocking means are disengaged, said last named clamping member when operated by said handle cooperating with said first named clamping member to clamp said stationary part and said superimposed contact plates between said clamping members on the spindle.

10. In a variable transformer or like apparatus adapted to be controlled by rotating a member thereof subjected to a magnetic torque and carried by a spindle which passes through a stationary part of the apparatus, a clamping member fixedly mounted on the spindle at the same side of the stationary part as said rotatable member, and control means carried by said spindle at the opposite side of said stationary part, rotatable with said spindle and movable axially relative thereto, said control means including a member rotatably located on the shaft, a handle pivotally mounted on said member and means to interlock said handle with said spindle against rotation relative thereto, said handle being movable into a driving position in which it is interlocked with said spindle and is operative, upon rotation, to rotate said spindle to control said transformer or like apparatus, and movable into a non-driving position in which said interlocking means are disengaged, and a movable clamping member operable by said handle when said interlocking means are disengaged, said last named clamping member when operated by said handle cooperating with said first named clamping member to clamp said stationary part between said clamping members.

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