

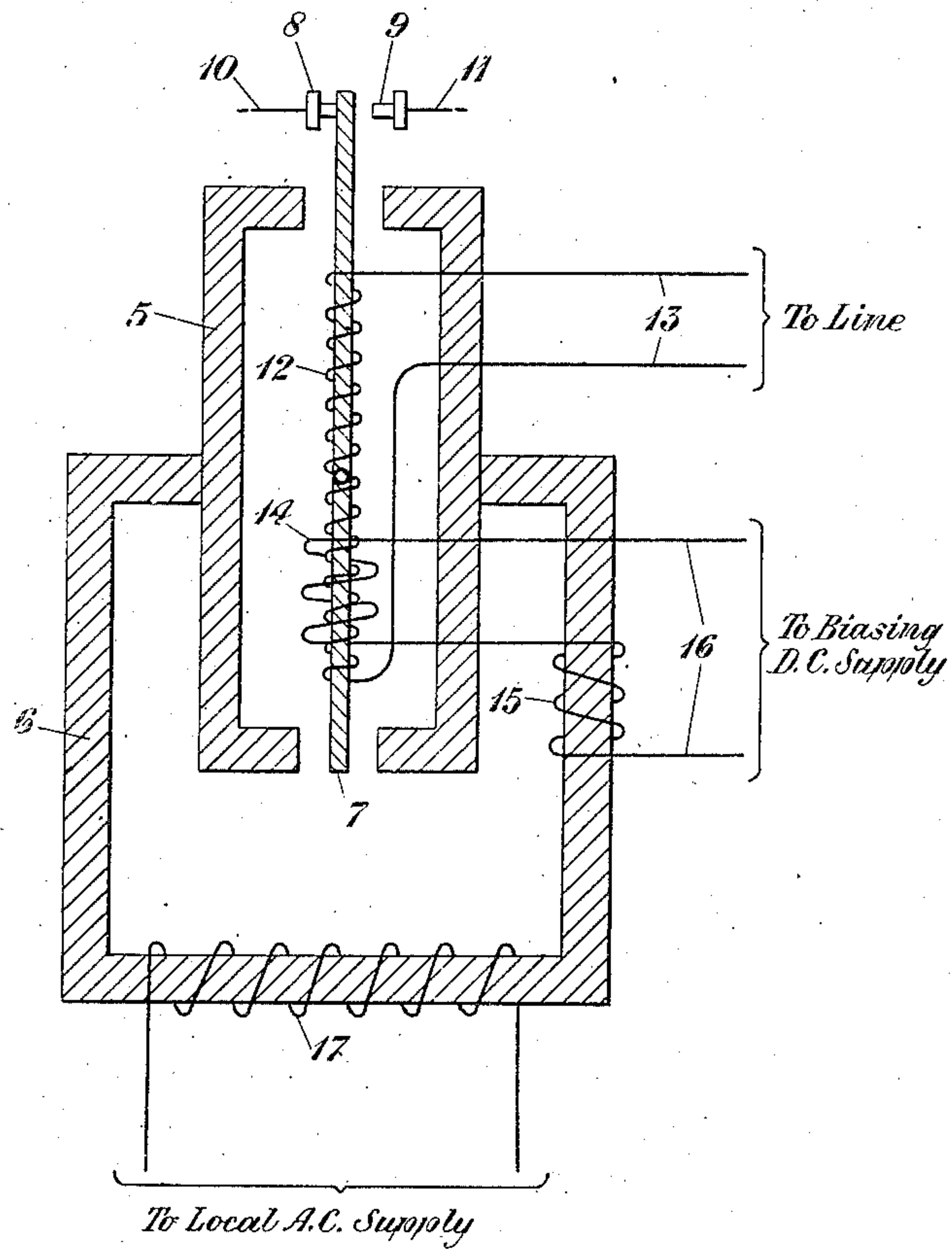
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ALTERNATING CURRENT RELAY

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ALTERNATING-CURRENT RELAY

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This invention relates to relays, and more particularly to devices of this character which are adapted to be used in connection with electrical currents of comparatively high frequency.

An object of the invention is to provide an alternating current relay that shall have great sensitivity and which shall respond with certainty to currents of desired frequencies. Another object is to provide a relay that shall require simplified circuits, for its operation and a consequent reduction in its cost and maintenance. These objects and further objects of the invention will be apparent from the following description, when read in connection with the attached drawing, in which one embodiment thereof is illustrated.

In the drawing, the numeral 5 represents a yoke divided in halves and having a rectangular portion 6 extending therefrom. The portion 6 may be integral with the portion 5 or may be joined thereto in magnetic connection in such manner as to eliminate air-gaps so that magnetic losses are prevented. The members 5 and 6, which are shown in vertical section, are preferably composed of silicon steel or other material having low hysteresis loss and low residual magnetism. Said members may be mounted in any suitable manner upon a base with fibre or other non-conductor interposed to provide proper insulation. The armature 7, which may also be composed of silicon steel, is shown as being pivoted at its center and positioned centrally of the halves of yoke 5 and having one end extending upwardly from said yoke. Although the armature 7 is indicated as centrally pivoted, it may be equally well mounted at its lower end, and in either position it is adapted to vibrate under the attraction of the poles of the yoke so as to make contact with the points 8 and 9, to which are connected the conductors 10 and 11, respectively, which may be associated with local circuits.

A coil 12 is shown as encircling the armature 7 and in practice this may be in the form of a spool, in the center of which said armature is positioned. The ends of the coil 12 are connected to conductors 13, which extend to an outgoing line. For the purpose of bias-

ing diaphragm 7, a coil 14 surrounding said armature and a coil 15 surrounding one side of the portion 6 of yoke 5 are connected in series with conductors 16, which extend to a source of direct current. On the lower arm of the member 6, a coil 17 is provided and connected to conductors which lead to a local source of alternating current for the purpose to be presently described.

In the operation of the improved arrangement, a high frequency or alternating current incoming over the line conductors 13 flows in the coil 12, surrounding the pivoted armature 7, and sets up a magnetic field therein. The operating flux produced will divide equally at the ends of the armature 7 and flow around the two halves of the enclosing soft steel yoke 5 in opposite directions. Alternating current from a local source flows over the conductors connected with the coil 17, which surrounds the yoke 6, and produces therein a polarizing flux. This current is in phase with the current from the incoming line over conductors 13.

The polarizing flux created by the flow of alternating current from the local source and the operating flux created by the flow of alternating current over the line conductors, produces such reaction in the armature as to cause it to move toward the same contact during both the positive and negative half-cycles of the alternating current wave. The inertia of the armature is such as to prevent its leaving the contact when the alternating current wave is passing through the zero point. Consequently, when a succession of current waves arrives over the line in phase with the current waves flowing in winding 17 and magnetizing the yoke members 5 and 6, the armature will be shifted against one of its contacts and will there remain until the succession of waves over the line ceases.

When the current over the line conductors ceases the armature may be moved to its spacing contact by the biasing current from the local direct current source which flows through the coils 14 and 15 in series, as illustrated. A spring may also be used, if desired, to give the desired biasing effect.

What is claimed is:

1. A relay comprising a divided yoke, an extension for magnetically connecting the divided portions of the yoke, an armature movably mounted between the divided portions of the yoke, a coil associated with said armature, a second coil associated with said extension, means independently associated with each coil for independently impressing thereon polarizing and operating currents in phase with each other, and means serially associated with said extension and armature for biasing the armature.

2. A relay comprising a divided yoke, an extension for magnetically connecting the divided portions of the yoke, an armature movably mounted between the divided portions of the yoke, a coil associated with said armature, a second coil associated with said extension, and an independent source of alternating current connected with each coil, the currents from each source being of like phase for producing such reaction in the armature as to cause it to move in the same direction during both the positive and negative half cycles of alternating current wave.

3. A relay comprising a divided yoke, an extension for magnetically connecting the divided portions of the yoke, an armature movably mounted between the divided portions of the yoke, a coil associated with said armature, a second coil associated with said extension, an independent source of alternating current connected independently with each coil, the currents from each source being of like phase for producing such reaction in the armature as to cause it to move in the same direction during both the positive and negative half cycles of alternating current wave, and means serially associated in circuit with said extension and armature for biasing said armature.

4. A relay comprising a divided yoke, an extension for magnetically connecting the divided portions of the yoke, an armature movably mounted between the portions of the yoke, a coil associated with the said extension, a second coil associated with said extension, means independently associated with each coil for independently impressing thereon alternating currents in phase with each other for creating an operating flux and a polarizing flux in said yoke and armature, said fluxes coacting to cause said armature to move in the same direction during both the positive and negative half cycles of alternating current wave, and means serially connected in circuit with said extension and armature for biasing said armature to its spacing contact.

In testimony whereof, I have signed my name to this specification this 15th day of February, 1924.

VAUGHN P. THORP.