March 1, 1949.

L. D. GRIGNON ET AL

2,463,170

VARIABLE INDUCTANCE DEVICE

Filed Dec. 9, 1946

Fig. 1.

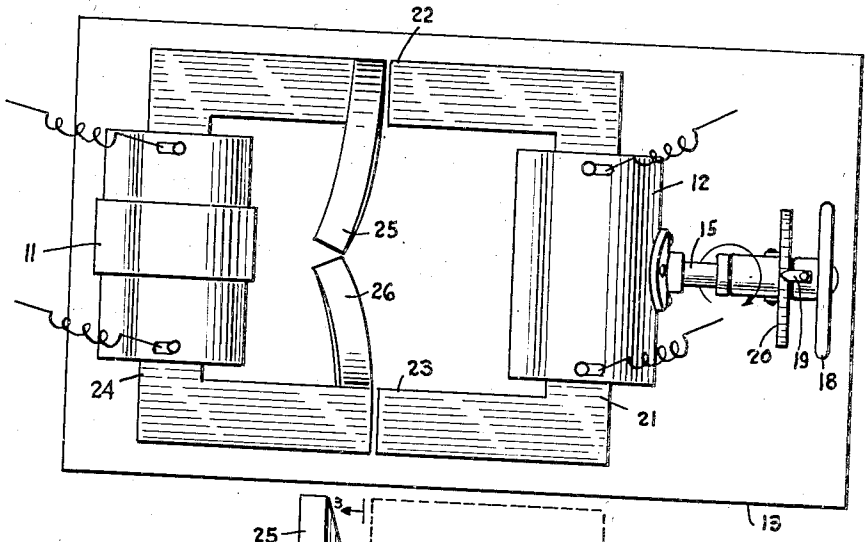
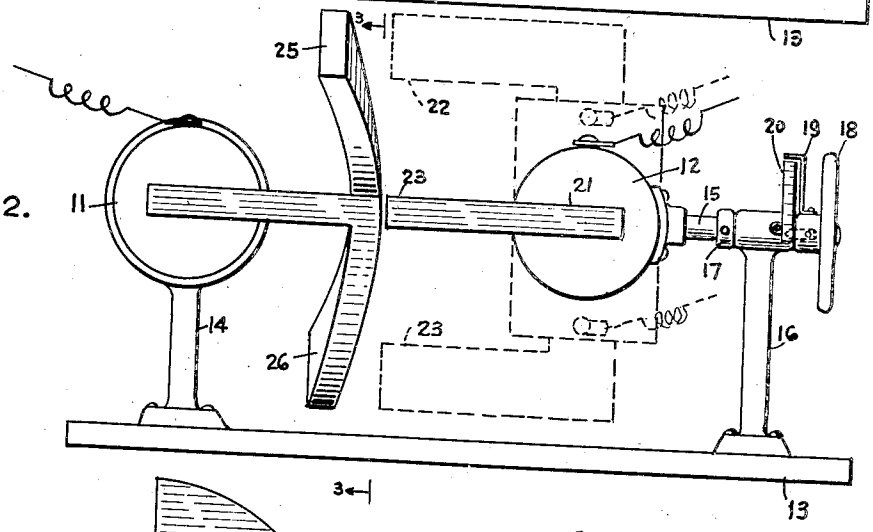


Fig. 2.



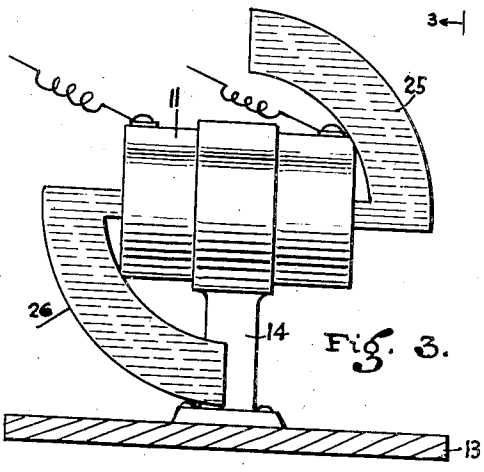


Fig. 3.

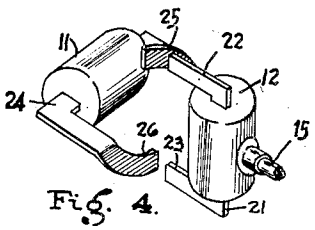


Fig. 4.

INVENTOR
Lorin D. Grignon
Hilbert G. Wilkes

BY Robt. L. Lamm
ATTORNEY

Patented Mar. 1, 1949

2,463,170

UNITED STATES PATENT OFFICE

2,463,170

VARIABLE INDUCTANCE DEVICE

Lorin David Grignon, Los Angeles, and Hilbert Garrison Wilkes, North Hollywood, Calif., assignors to Twentieth Century-Fox Film Corporation, Los Angeles, Calif., a corporation of New York

Application December 9, 1946, Serial No. 715,036

6 Claims. (Cl. 171—119)

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This invention relates to electrical equipment and deals particularly with a variable inductance device.

The invention to be described hereinafter has been developed to meet several conditions existing in the motion picture industry, but in its preferred form it may find usefulness in other fields wherever variable inductance is needed.

One of the principal objects of the invention is to provide a device of the character described wherein the mutual inductance created between coacting coils may be varied to meet predetermined conditions. More specifically, it is an object of the invention to provide an inductance device having the pole pieces of the inductance coils shaped in a novel way so that the gap between the poles may be varied in any manner desired, such as logarithmically or linearly, from a full aiding position to a full opposing position. And, finally, another object of the invention is to provide inductance coils wherein at least one of the coils has pole pieces shaped circumferentially so that upon rotation of either of the mutually coacting coils the gap between the pole pieces may be varied in a predetermined manner.

Other objects and advantages will become apparent as the description proceeds in conjunction with the drawing in which:

Figure 1 is a plan view showing one form my invention may take;

Figure 2 is a side elevation of Figure 1;

Figure 3 is a view taken on line 3—3 of Figure 2; and

Figure 4 is a perspective view showing how the two coils may be rotated to regulate the mutual inductance therebetween.

Referring to the drawing, it will be seen that we have shown two coils 11 and 12 in inductive relation mounted on a base 13. In this instance coil 11 is rigidly mounted on a support 14, while coil 12 is fixed on a shaft 15, which in turn is rotatably mounted in a support 16 carried on the base 13. The shaft 15 may be held against longitudinal movement in its support by a collar 17 and a wheel 18, which may also be used for rotating the shaft. As a means of indicating the amount of rotation, we may use a pointer 19 that works over a calibrated arcuate segment 20. The conventional arrangement of coils of this nature is such that the gap between the pole pieces may be opened or closed either by moving the coils away from each other or by rotating one with respect to the other. Our invention makes use of the rotating coil principle and for this purpose the coil 12 is provided with an armature 21 that

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terminates in pole pieces 22 and 23 and is rotatably mounted as mentioned above. The opposite coil 11 likewise has an armature designated 24. This armature, unlike the armature of coil 12, terminates in pole pieces which are arcuate in form, as shown by numerals 25 and 26 (see Figure 3). It will be noted that the arcuate members 25 and 26 have substantially the same radius as the pole pieces 22 and 23 of coil 12 and at the same time curve away from the coil 12. This is for the purpose of providing an incremental variation in the gap between the pole pieces as the coil 12 is rotated relative to coil 11. As shown in the drawing, the horns 25 and 26 originate at ends of the armature 24, and curve in the same direction. They could, however, extend in both directions from the ends of the armature, or in the opposite direction from that shown, the only requirement being that they follow a circumference and do not of themselves form a complete circle.

In operation, the two coils are connected in circuit in any manner desired to achieve the purpose of the operator. For full aiding position, the coils would be set as shown in Figures 1 and 2 in solid lines, that is, with pole pieces 22 and 23 opposite the beginnings of the arcuate members 25 and 26 respectively. In this position the gap is of minimum width. As the coil 12 is rotated to the position shown by dotted lines in Figure 2, the gap between the poles is increased in a predetermined manner according to the curve away from the coil 12 in the arcuate members 25 and 26. This curvature may be previously calculated to yield a logarithmic variation in the inductance coupling between the pole pieces, or it may be calculated to derive a linear variation, or any other predetermined variation desired. If the coil 11 is rotated farther than the end of the arcuate members, the gap increases rapidly and if the coil 11 is rotated 180° it is then in a pole opposing position. It can thus be seen that as the coil 11 is rotated relative to coil 12 the inductive coupling between the two coils may be so controlled by predetermined calculations that the device could be made to have characteristics especially designed for eliminating a very narrow band of frequencies which, for instance, has been found to be particularly useful in overcoming certain faults in speech made by some persons. Other uses will appear to those versed in the art.

We claim:

1. A variable inductance device comprising a pair of induction coils having their pole pieces in mutual inductive relation, one of said coils

having arcuate horns on its pole pieces, and means for rotating one of said coils so that the arcuate horns pass the pole pieces of the other coil to vary the inductive relation between said coils.

2. A variable inductance device comprising a pair of induction coils having their pole pieces in mutual inductive relation, one of said coils having arcuate horns on its pole pieces, and means for rotating one of said coils so that the arcuate horns pass the pole pieces of the other coil and form a gap of varying width therebetween.

3. A variable inductance device comprising a pair of induction coils having their pole pieces in mutual inductive relation, one of said coils having horns on its pole pieces, said horns being arcuate in form and inclined away from the plane of circumference of said horns, and means for rotating one of said coils so that the arcuate horns pass the pole pieces of the other coil and form a varying gap therebetween.

4. A variable inductance device comprising a pair of induction coils having their pole pieces in mutual inductive relation, one of said coils having horns on its pole pieces that are segments of a circumference, and means for rotating one of said coils so that said horns pass the pole pieces of the other coil and form a gap therebetween.

5. A variable inductance device comprising a pair of induction coils having their pole pieces in mutual inductive relation, one of said coils having horns on its pole pieces that are segments of a circumference, and means for rotating one of said coils so that said horns pass the pole pieces of the other coil and form a gap therebetween, said horns extending in the same direction clockwise from said pole pieces.

6. A variable inductance device comprising a pair of induction coils having their pole pieces in mutual inductive relation, one of said coils having horns on its pole pieces that are segments of a circumference, and means for rotating one of said coils so that said horns pass the pole pieces of the other coil and form a gap therebetween, said horns extending in the same direction clockwise from said pole pieces and inclining away from the plane of said circumference in the same direction.

LORIN DAVID GRIGNON.
HILBERT GARRISON WILKES.

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The following references are of record in the file of this patent:

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