A. C. HOVEY.

VARIABLE SELF INDUCTION COIL.

APPLICATION FILED OCT. 20, 1909.

985,009.

Patented Feb. 21, 1911.

2 SHEETS—SHEET 1.

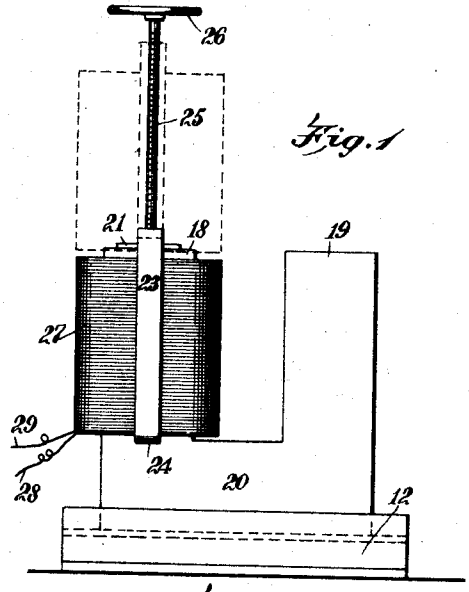

Fig. 1

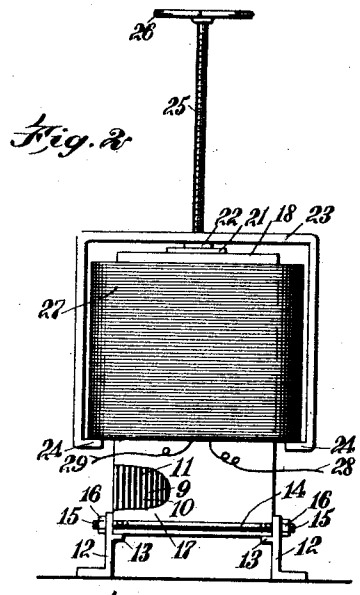

Fig. 2

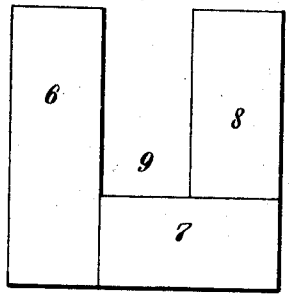

Fig. 3

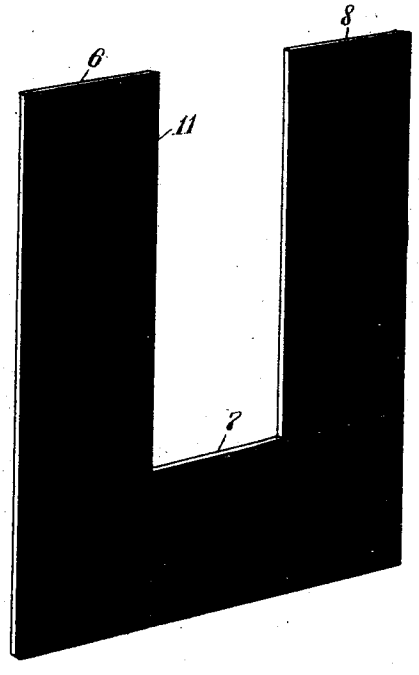

Fig. 5

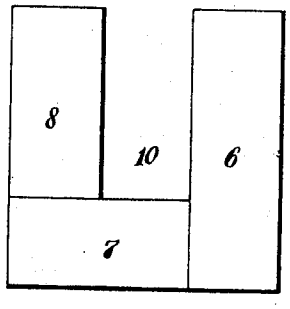

Fig. 4

WITNESSES

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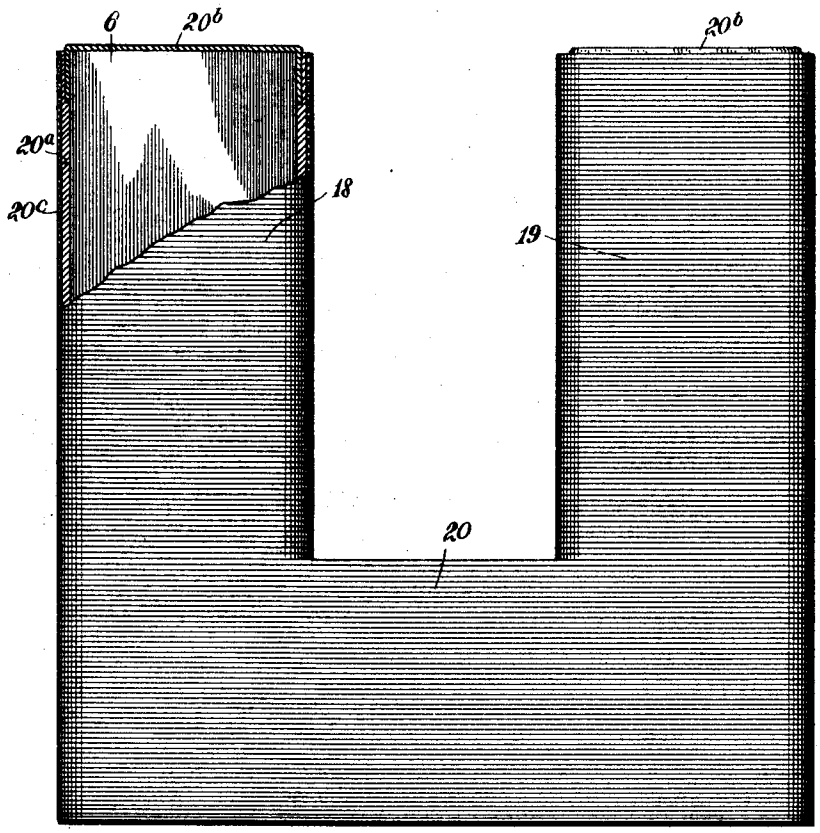
2 SHEETS—SHEET 2.

Fig. 6



WITNESSES

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UNITED STATES PATENT OFFICE.

ALLYNE CLARK HOVEY, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF THIRTY ONE-HUNDREDTHS TO WALTER ROSENBAUM AND THIRTY ONE-HUNDREDTHS TO HERMAN S. HEYMANN, BOTH OF PITTSBURG, PENNSYLVANIA.

VARIABLE SELF-INDUCTION COIL.

985,009. Specification of Letters Patent. Patented Feb. 21, 1911.

Application filed October 20, 1909. Serial No. 523,602.

To all whom it may concern:

Be it known that I, ALLYNE CLARK HOVEY, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Variable Self-Induction Coil, of which the following is a full, clear, and exact description.

My invention relates to variable self-induction coils, my more particular purpose being to provide a coil which may be so used as to dispense with a rheostat, or to avoid the necessity for a choking coil, and in which the voltage may be readily controlled at will.

More particularly stated, my invention seeks to accomplish the following purposes, to wit: I. To enable the operator, by shifting the position of a winding relatively to a core, to raise or lower the voltage of the currents passing through the winding. II. To provide a transformer with a core made up of laminæ of magnetic material, so disposed as to avoid heating and to prevent the production of undesirable noises while the device is in action. III. To provide simple mechanical means to enable the the operator to shift the position of the winding relatively to the core. IV. To provide generally an efficient mechanical construction for the core and for the winding. V. To provide efficient means for holding together and supporting various parts of the core.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation showing the transformer complete; Fig. 2 is an end elevation of the transformer, a portion of the covering being broken away; Fig. 3 is a plan view of one group of plates used in building the U-shaped core; Fig. 4 is a plan view of another group of said plates used in the construction of the core; Fig. 5 is an enlarged perspective showing a group of the plates, each plate being coated upon one side with insulating material; and Fig. 6 is an enlarged side elevation of the core, portions of which are broken away in order to show the covering therefor.

In order to build a core, I provide a number of plates 6, 7, 8 of magnetic material, preferably soft iron. The sizes and thickness of these plates may be varied within proper limits according to the precise purpose for which the transformer is to be used. The plates may be made of scrap materials, which will be found economical owing to the fact that smaller pieces may be employed than would otherwise be the case. As indicated in Figs. 3 and 4, the plates 6, 7, 8 are of different lengths, and because of this fact, still greater economy may be employed in working up scrap material.

As indicated in Fig. 3, I place a plate 6 on the left, and abutting against the bottom of it I place a plate 7, while extending laterally from this plate and abutting against it is a plate 8. This group of plates thus assembled I designate, for convenience, as a composite plate 9. I take three other plates 6, 7, 8 and assemble them as indicated in Fig. 4, designating them, for convenience, as a composite plate 10. The composite plate 9 differs from the composite plate 10 merely in the fact that the plate 6 is at the left in the composite plate 9 and the plate 6 is at the right in the composite plate 10.

The various plates 6, 7, 8 are each provided upon one side with a coating 11 of insulating material, as will be understood from Fig. 5. Two angle irons 12 are provided with shelves 13 and extending through the upper portions of these angle irons, so as to couple the same together, are rods 14 provided with threaded ends 15. Nuts 16 are revolubly mounted upon these threaded ends and when turned force the angle irons 12 toward each other. The angle irons 12 and rods 14 connecting the same together constitute a pedestal or framework for supporting the other parts, as will be understood from Figs. 1, 2. After forming a number of composite plates 9, 10, as shown in Figs. 3, 4, I lay one of these composite plates over another, thereby building up a U-shaped core 20 having generally the form indicated in Figs. 1 and 6. This core is made principally of iron, but owing to the laminated form in which the iron is assembled, the structure of the core is in effect very much broken up, this effect being increased by the fact that a

large number of plates are used, and increased still further by the fact that each successive composite plate is separated from the next succeeding composite plate by insulation.

The various composite plates having been assembled, they together have substantially the form of a U. This is next wrapped with tape 20^a and the ends of the core are covered by canvas or other suitable material 20^b, as indicated in Fig. 6. The entire core is now wound upon the outside of the tape with strong twine 20^c, the tape and twine thus constituting a covering, as shown more particularly in Fig. 6.

The core having thus been formed and having received its covering, is rested upon the shelves 13 and the nuts 16 are turned in order to tighten the angle irons against the core. This secures the core rigidly in relation to the angle irons. The U-shaped core 20, when thus mounted, presents two poles extending upwardly and for convenience I designate these poles as 18, 19. A plate 21, which may be of hard rubber or wood, is laid upon either one of the poles 18, 19 (say, for convenience, the pole 18), and this plate 21 is provided with a reduced portion 22 which serves as a bearing, as hereinafter described. A yoke 23, of non-conducting material, such as hard rubber, is provided with hooks 24 extending toward each other. A screw 25 is extended through the center of this yoke 23 and is turned in order to raise or lower the yoke. The screw 25 at its upper end is provided with a hand wheel 26 in order to enable it to be readily turned by hand.

A winding 27 made of magnet wire properly insulated, preferably with shellac, is strongly and compactly built and adapted to be moved as a unit. This winding rests on the hooks 24 and is provided with connecting wires 28, 29.

The operation of my device is as follows: One of the connecting wires 28, 29 is placed directly in communication with a line wire or a lead therefrom, the other connecting wire being led to the instrument or mechanism in which the current is to be used, and such instrument or mechanism is connected to another line wire, or a lead therefrom. The winding 27 is thus placed in series with the instrument or mechanism in which the current is to be used. The current being turned on, the winding 27 is rapidly energized and deënergized, and in doing this it acts inductively upon the pole 18 which it encircles. This pole is strongly magnetized, and because of this fact it reacts upon the winding so as to vary the currents flowing through the latter. In this way the voltage from the coil can be readily varied, to adjust itself to variations in line voltage, by the simple movement of turning the hand wheel 26. The self-induction coil above described appears to merely change the character of the line currents passing through the winding 27, and in thus changing the character of said currents conserves their energy to a maximum extent. Owing to the choking effect of the winding 27 upon the currents passing through it (this choking effect being greatly augmented by the action of the magnetic core upon the winding), the transformer acts to some extent like a rheostat, and I find in practice that for many purposes no rheostat need be employed where the transformer is used. My invention, therefore, promotes economy in discarding an instrument otherwise necessary. The operator, by turning the hand wheel 26, causes the yoke 23 to be raised or lowered, and consequently varies the position of the winding 27 relatively to the pole 18. The screw 25 being of proper length, the winding 27 may be raised, but not beyond such a point as would break the magnetic circuit. In this way any degree of voltage from approximately zero up to the maximum voltage of the line, may readily be attained by the simple movement of turning the hand wheel 26. Moreover, the changes in voltage are not made abruptly or by jumps, but are quantitative, being proportioned exactly to the degree of rotation which the operator chooses to confer upon the hand wheel.

I find in practice that when this transformer is in action, the core and all other parts of the device are very cool. This is because eddy currents are not set up in the core to any appreciable extent, and the reason for such currents not being set up is due to the manner in which the various laminæ of the core are shaped, assembled and insulated.

The device above described is of especial value in connection with moving picture shows. It may also be used to advantage in handling arc lights, electric stereopticons, and spot lights. It is also of special service in the use of high frequency currents for purposes of wireless telegraphy and the operation of vacuum tubes. It may be used on shipboard to great advantage.

Generally speaking, the device above described has practical advantages in enabling the rates of insurance to be decreased, where alternating currents are employed for practically any purpose associated with the household or with service of an ordinary kind.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a variable self-induction coil, the combination of a magnetic member, a winding loosely encircling the same, a yoke provided with hooks for supporting said wind-

ing, and a screw extending through said yoke and resting upon said magnetic member for the purpose of raising and lowering said yoke and said winding.

2. The combination of a magnetic member, a winding loosely encircling the same, a yoke provided with hooks for supporting said winding, a plate resting upon said core, and a screw extending through said yoke for supporting said yoke and said winding, said screw resting upon said plate.

3. The combination of a magnetic member, a winding loosely encircling the same, a yoke provided with hooks for supporting said winding, a screw extending through said yoke for supporting said yoke and said winding, a plate mounted upon said magnetic member, said screw resting upon said plate, a plurality of angle irons disposed adjacent to said core, each angle iron being provided with a shelf extending slightly under said core, and means for clamping said angle irons against said core so as to support the same.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ALLYNE CLARK HOVEY.

Witnesses:
HERMAN S. HEYMANN,
WALTER ROSENBAUM.