May 24, 1949. L. LORANT 2,471,222

REGULATED TRANSFORMER

Filed Nov. 7, 1947

Fig. 1.

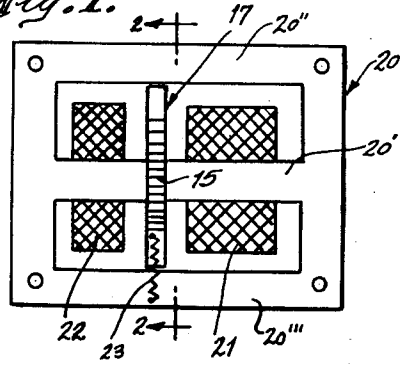


Fig. 2.

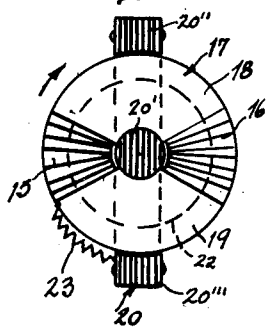


Fig. 3.

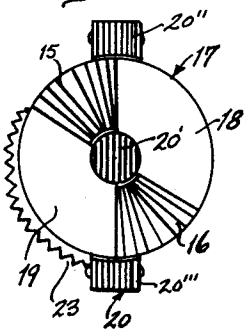


Fig. 4.

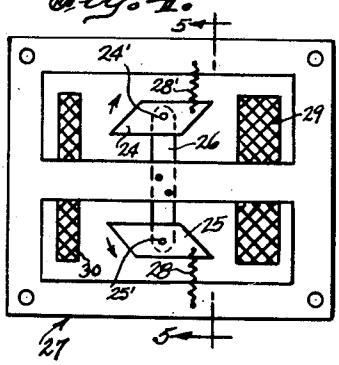


Fig. 5.

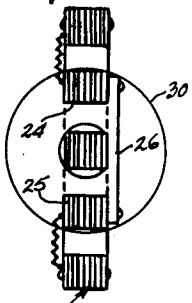


Fig. 6.

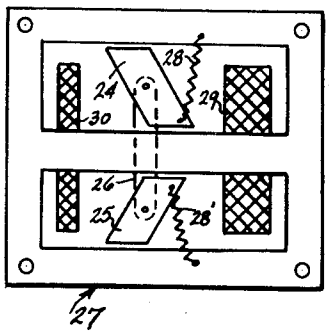


Fig. 7.

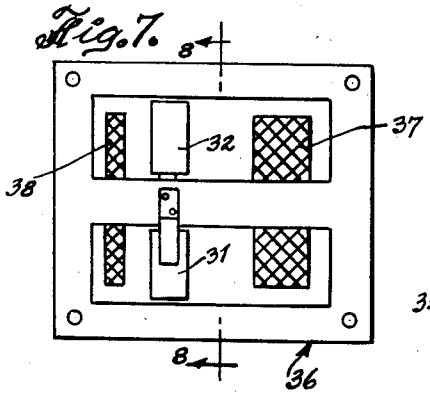


Fig. 8.

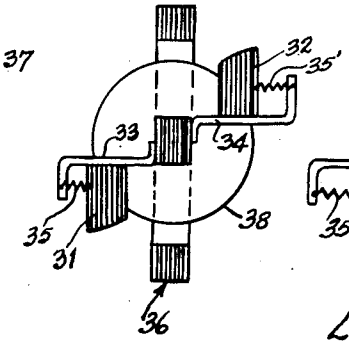
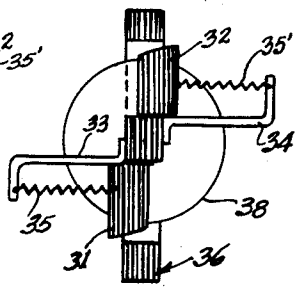


Fig. 9.



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Patented May 24, 1949

2,471,222

UNITED STATES PATENT OFFICE

2,471,222

REGULATED TRANSFORMER

Lionel Lorant, Long Island City, N. Y.

Application November 7, 1947, Serial No. 784,557

1 Claim. (Cl. 171—119)

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The present invention relates to electrical transformers and more particularly to the constant-current type.

An object of this invention is to provide a novel and improved transformer which automatically maintains the current in the circuit at practically a constant value, regardless of load within limits of operation for which it is designed.

Another object hereof is to provide a transformer of the character mentioned, of novel and improved construction, utilizing leakage paths in the magnetic circuit thereof, which are automatically controlled to maintain constant current at the output of the transformer though load or line voltage is changed.

A further object hereof is to provide a novel and improved plan of transformer construction, which is reasonably cheap to manufacture, fully automatic in operation, and efficient in carrying out the purposes for which such apparatus is designed.

Other objects and advantages will become apparent as this disclosure proceeds.

In the accompanying drawings forming part of this specification, similar characters of reference indicate corresponding parts in all the views.

Fig. 1 is a top plan view of a transformer embodying the teachings of this invention.

Fig. 2 is a section taken at line 2—2 in Fig. 1, showing the transformer in inactive condition.

Fig. 3 is a similar section showing the transformer in active condition.

Fig. 4 is a top plan view of a transformer of modified construction in accordance with the principles of this invention. This view shows inactive condition.

Fig. 5 is a section taken at line 5—5 in Fig. 4.

Fig. 6 is a view similar to Fig. 4, showing the latter in active condition.

Fig. 7 is a top plan view of another transformer employing the features of this invention, shown in inactive condition.

Fig. 8 is a section taken at line 8—8 in Fig. 7.

Fig. 9 is a similar section showing the transformer of Fig. 7 in active condition.

In the drawings, I have chosen to illustrate the embodiment of the teachings of this invention, in transformers having the "shell type" of core structure; meaning those whose cores provide two metallic magnetic paths. The practice of this invention is equally adaptable, as will be evident to those versed in the art, to transformers commonly designated as of the "core type"; meaning those whose cores provides but a single metallic magnetic path. It is understood that

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slight gaps in such magnetic paths would not alter the type designations mentioned.

In transformers of the types cited, it is known practice to shunt such magnetic paths between primary and secondary coils, by the use of auxiliary core components which are either fixed or whose position are manually adjustable. Such shunts when fixed, are either suitably mounted on the main core structure or else made an integral part thereof to provide a magnetic leakage path. When manually moveable, the extent of such magnetic leakage may be controlled. With such shunts, fixed or otherwise, such transformers are known of the constant-current class, whose principle of operation to so function, is well known and therefore requires no further explanation.

The principal purpose of the present invention, is to accomplish automatic control of such magnetic leakage or shunt paths, by automatic positioning of such auxiliary core components, the shunts.

In the embodiment shown in Figs. 1, 2 and 3, the shunts are designated by the numerals 15 and 16 respectively, each of which is of laminated iron or other suitable core material, formed as diametrically opposite sectors of a wheel structure indicated generally by the numeral 17, and separated by the wheel sectors 18 and 19 which are of non-metallic material. Said wheel 17 is rotatably mounted on the middle leg 20' of the core 20, between the primary coil 21 and the secondary coil 22, carried on said middle leg. The wheel 17 is free for rotary movement, and is of a diameter to extend in approximate abutment with the inner edges of the outer legs 20'' and 20''', which edges preferably conform to wheel contour. Spring means 23, secured at one end to core 20 and at its other end to the wheel 17, serves to maintain the shunts 15 and 16 as in Fig. 2, where they have least influence as magnetic leakage means. During operation of the transformer, the magnetic field then existing between the core legs 20' and 20'', and the core legs 20' and 20''', will cause the wheel 17 to turn to a position where shunt 15 will bridge leg 20' with all or part of leg 20'', and shunt 16 will bridge leg 20' with an identical amount of leg 20''', depending upon the intensity of such magnetic fields. Movement of the wheel 17 away from rest position, will of course stress the spring 23.

The shunts may be separate and otherwise moveably associated with the main core structure. For instance, in the embodiment shown in Figs. 4, 5 and 6, the shunts are designated by

the numerals 24 and 25, each of which is pivotally mounted on a bracket 26 which preferably is of non-metallic material mounted on the middle leg of the transformer 27. When said transformer is in inactive condition, the shunts lie parallel with the transformer legs and so maintained by the springs 28 and 28' respectively. When the transformer is in operation, said shunts 24 and 25 will be swung to some position along a line transverse the legs to provide magnetic leakage paths between the coils 29 and 30, depending upon magnetic field intensity between the transformer legs. Maximum magnetic leakage position is shown in Fig. 6. Then again, if desired, the shunts as in the embodiment of Figs. 7, 8 and 9, may be suitably mounted to slide into the respective spaces between the transformer legs. Here the shunts are designated by the numerals 31 and 32; the respective track means on which they slide being indicated by the numerals 33 and 34, and the springs by 35 and 35'. Here the transformer is designated as 36 and its coils by the numerals 37 and 38.

All springs should be chosen of such strength to permit only prescribed movement of the shunts for various magnetic field intensities, so that for any particular operational condition of the transformer circuit, substantially proper magnetic leakage shall be effected.

It is to be noted that the transformer constructions shown in Figs. 1 and 4, may be placed in any position without any effect by gravity to alter movement of the shunts. The same applies to the embodiment shown in Fig. 7, only when the line of movement of the shunts is along the horizontal. Also to be noted that the total overall dimensions of the device is not at all affected by inclusion of the automatically controlled shunts in the embodiments shown in Figs. 1 and 4, and very little in the embodiment illustrated in Fig. 7, which could be remedied by use of a blade spring (not shown) in place of the coil spring for each of the shunts.

This invention is capable of various forms and numerous applications without departing from the essential features herein disclosed. It is therefore intended and desired that the embodiments shown herein be deemed illustrative and not restrictive and that the patent shall cover all patentable novelty herein set forth; reference being had to the following claim rather than to the specific description herein to indicate the scope of this invention.

I claim:

In an electrical transformer of the character described, a core having an outer ring and a leg across said outer ring forming a pair of openings in said core, a primary coil and a secondary coil carried on said leg in spaced relation and an auxiliary core member rotatably mounted intermediate its ends about said leg between the coils, adapted upon operation of the transformer to be influenced to movement from a normal rest position to a position whereby said auxiliary core member shall provide magnetic leakage paths shunting said leg and ring across each of said openings in the core; the extent of movement of the auxiliary core member being determined by the intensity of the magnetic field between the coils when the transformer is operated and the amount of the leakage being determined by the extent of movement of the auxiliary core member, and means urging the said core member to normal rest position.

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REFERENCES CITED

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

FOREIGN PATENTS

Number	Country	Date
566,708	France	Feb. 19, 1924