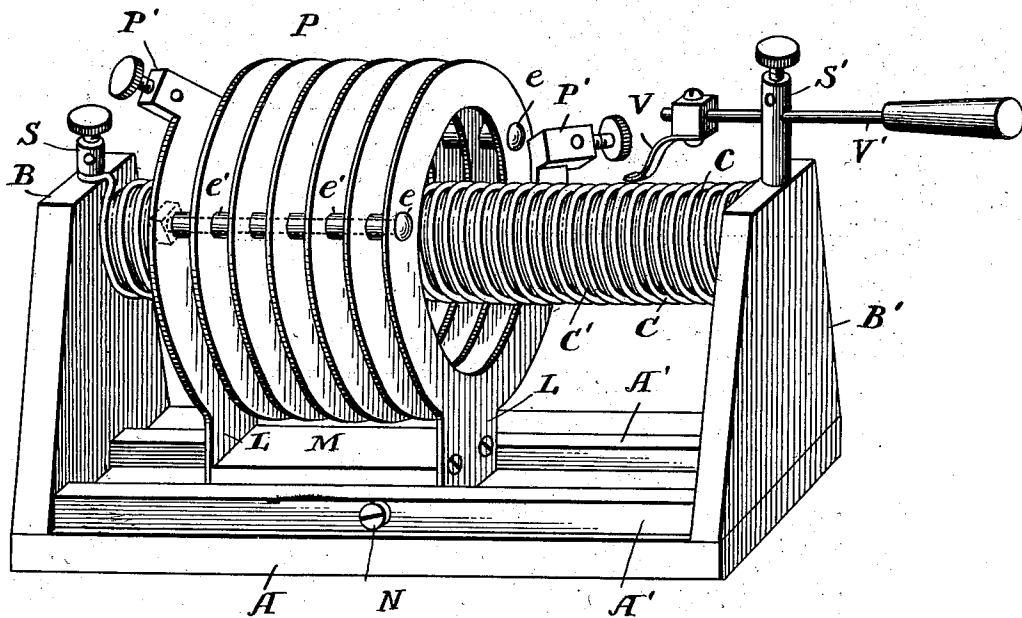


No. 848,676.

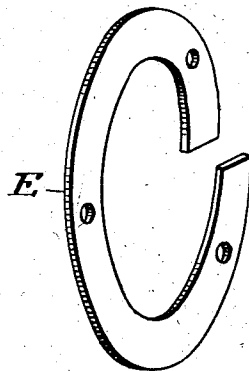
PATENTED APR. 2, 1907.

J. MURGAS.  
ELECTRIC TRANSFORMER.  
APPLICATION FILED MAR. 17, 1906.

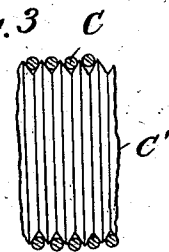
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses

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# UNITED STATES PATENT OFFICE.

JOSEPH MURGAS, OF WILKES-BARRE, PENNSYLVANIA.

## ELECTRIC TRANSFORMER.

No. 848,676.

Specification of Letters Patent.

Patented April 2, 1907.

Application filed March 17, 1906. Serial No. 306,608.

*To all whom it may concern:*

Be it known that I, JOSEPH MURGAS, a citizen of the United States, residing at Wilkes-Barre, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Electric Transformers, of which the following is a specification.

My invention relates to electric transformers, which, while adapted for use for many and various purposes, are more especially adapted for use in connection with wireless telegraphy.

The object of my invention is to provide a simple, cheap, and effective transformer; and my invention consists in the various features of construction and arrangement of parts and having the general mode of operation substantially as hereinafter more particularly set forth.

In the accompanying drawings, Figure 1 is a perspective view showing a preferred embodiment of my invention. Fig. 2 is a perspective view of one of the rings of which the primary is made. Fig. 3 is an enlarged detail view showing the spiral thread more clearly.

In the use of transformers of this general character or type it is desirable that some means should be provided whereby the secondary conductor of the transformer can be adjusted so as to include a greater or less portion of the secondary in the circuit connected thereto. Moreover, not only is it desirable to so adjust the effective length or portion of the secondary, but it is also desirable to adjust the primary in relation to the secondary so that it will be symmetrically adjusted or adjusted so as to be located practically in the middle of the effective portion of the secondary. Further, it is desirable to provide a primary having relatively low resistance and of such a construction that it may be made of any desired length, and that the coils thereof may be conveniently held in proper relation to each other.

With this general statement of some of the objects of my invention I will now proceed to describe the embodiment thereof illustrated in the drawings, it being understood that my invention is not limited to the precise details of construction shown therein; but that they may be varied by those skilled in the art to adapt the invention for various purposes for which it is capable of being used.

I provide a suitable support for the opera-

tive parts of the transformer and have shown it in the present instance as comprising a base A, having end flanges or uprights B B', and these latter serve conveniently to support the secondary C of the transformer. This secondary may be variously constructed, and I have shown it as comprising a tube C', which should be of insulating material, such as hard rubber, and in the surface of which is preferably cut a spiral thread c. Around this tube or support C' is wound the wire forming the secondary coil C, and this wire is bare and is laid in the threads c of the tube C' so as to provide for an invariable distance between the various turns of the secondary. It is evident that other ways of securing this result could be used; but I have found the spiral threads in the tube receiving the various coils of the secondary exceedingly cheap and effective. In order that the secondary may be included in any desired circuit, one of the terminals of the secondary coil C is connected to a binding-post S, conveniently mounted on the upright B, while upon the other upright B', I have shown another binding-post S'. In order that any desired number of turns of the secondary can be included in the circuit and made effective, I provide a sliding contact, shown in the present instance as comprising a contact V, mounted on a rod V', which is arranged to slide or be adjusted in the binding-post S'. This contact V can thus be moved and adjusted so as to include any desired number of turns of the secondary coils, the contact sliding and bearing upon the face of the wire of the secondary.

The primary P of the transformer is made up of a suitable number of turns, preferably in the form of flat metal, and in order that this may be cheaply and effectively made I provide a number of split or cut flat metal rings (shown at E, Fig. 2) which can readily be stamped or formed out of the desired material, and in order to provide a primary of any desired length it is only necessary to connect the adjacent ends of each two rings in some suitable way, as by solder or welding or screwing or otherwise, and it will be seen that by the use of the desired number of cut or split rings a primary of any desired length and capacity can be readily made by joining a number of split rings together so as to form a continuous spiral. The ends of the outside rings of the spirals may be formed into bind-

ing-posts, as P' P', by means of which the primary can be conveniently connected in circuit. In order that the various coils or rings may be maintained at fixed distances from each other, some suitable spacing and holding means must be provided, and I have shown rods *e*, preferably of insulating or non-conducting material, as hard rubber, extending through openings in the rings and provided with spacing pieces or tubes *e'*, surrounding the rods *e* and arranged between each adjacent pair of coils or rings. The outside or end washer may be in the form of a nut screwed upon the end of the rod in such a way as to firmly clamp the rings together.

Some means for supporting the primary with relation to the secondary must be provided, and while these may vary I have found it convenient to form the outer rings of the primary coil with legs L L, and these may be secured to a plate M, preferably of insulating material, which will not only serve to maintain them in proper relation but form a carriage for the primary. In the present instance this is arranged to slide on the base-board A, which is shown as provided with guides A' A' on its upper surface to receive the carriage M. The carriage can readily be adjusted and secured in any desired position by ordinary adjusting devices, as the screw N.

As before intimated, it is not only desirable to be able to adjust the secondary so as to include more or less of the turns of the coil in the effective portion of the secondary circuit, but it is also desirable to adjust the primary symmetrically with relation to this effective portion so that it may be relatively adjusted with relation to the middle of the effective portion of the secondary, and with this apparatus it will be seen that the contact V can be adjusted so as to include any desired number of the turns of the coil of the secondary in the circuit thereof, and the primary surrounding the secondary can be adjusted by moving its carriage upon the base, so that the primary will occupy a symmetrical position with relation to the effective portions of the secondary actually included in the circuit.

What I claim is—

1. In an electric transformer, the combination with the secondary coil thereof, of means for including any desired number of turns in the effective circuit, and a primary symmetrically adjustable with relation to the

middle of the effective portions of the coil of the secondary.

2. In an electric transformer, the combination with a secondary comprising a coil of bare wire, of means for including in the secondary circuit any desired number of turns of said coil, a primary coil surrounding the secondary coil, and means for symmetrically adjusting the primary with relation to the middle of the effective portions of the coil of the secondary.

3. In an electric transformer, the combination with a base, of a secondary comprising a support of insulating material having threads in its surface and a coil of bare wire laid in said threads, a binding-post secured to one of the terminals of the coil, an adjustable contact adapted to slide over the turns of the coil, a primary consisting of a continuous coil surrounding the secondary, and a carriage supporting the primary and adapted to be adjusted upon the base.

4. In an electric transformer, a base-board having a grooved way, a carriage sliding in the way, a primary mounted on the carriage, uprights connected to the base, a secondary secured to said uprights, a fixed binding-post for one terminal of the secondary, and an adjustable contact for making sliding connection upon the various turns of the secondary.

5. In a device of the character described, a secondary coil comprising a tube of insulating material having a spiral thread in its outside and a bare conducting-wire laid in the thread.

6. In a device of the character described, a primary comprising a plurality of cut rings, the adjacent ends of each of two rings being united to form a continuous spiral, and the outer rings being provided with legs to form a support for the primary.

7. In a device of the character described, a primary comprising a continuous spiral and having spacing and holding devices for maintaining the spirals in proper relation.

8. In a device of the character described, a primary comprising a continuous spiral and having rods extending through the spirals, and spacing tubes or washers mounted on the rods between the spirals.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH MURGAS.

Witnesses:

W. L. RAEDER.

K. E. FERRY.