June 12, 1928. 1,673,062

D. W. DAVIS

TRANSFORMER

Filed Oct. 20, 1924

Fig. 1

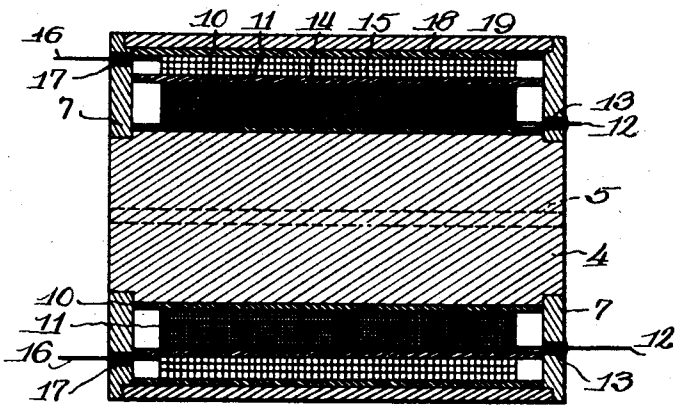


Fig. 2

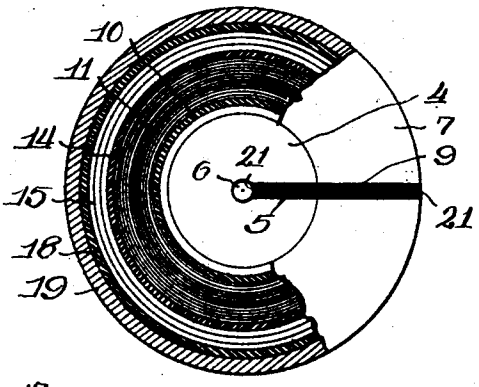
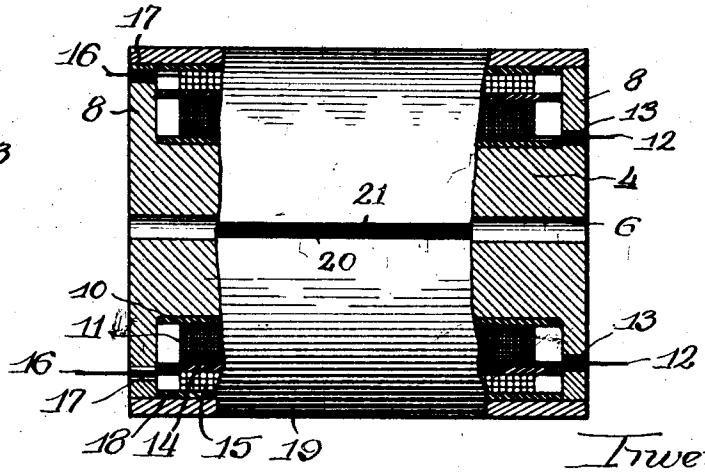


Fig. 3



Witness
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UNITED STATES PATENT OFFICE.

DEAN W. DAVIS, OF VILLA PARK, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO ROBERTSON-DAVIS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

TRANSFORMER.

Application filed October 20, 1924. Serial No. 744,576.

My present invention relates generally to transformers, and it has more particular reference to a structure of this character that is readily adapted for use in connection with electrical appliances such, for example as a dim light or night-lamp, annunciators, doorbells, toys and the like in which it is desirable, and sometimes necessary, to cut down the electric current to a minimum.

The primary object of my invention is the provision of a transformer having the above-mentioned characteristics, that is simple in construction but highly effective and dependable in the performance of the special functions for which it has been designed. Other objects reside in providing a transformer that is compact in its arrangement and inexpensive to manufacture so that it may be conveniently installed in the base of a small night-lamp structure or sold with electrically operated toys and must therefore be retailed for a moderate price. Further objects of my present invention reside in the novel construction and arrangement of the parts which will be readily understood as the description proceeds.

I prefer to attain the before-mentioned objects and to carry out my invention in substantially the manner hereinafter fully described and as more particularly pointed out in the claim; reference being now made to the accompanying drawings that form a part of this specification, in which,

Figure 1 is an axial longitudinal section of a transformer made in accordance with my invention.

Figure 2 is a view of one of the ends thereof, the adjacent end flange being partially broken away to disclose the interior construction.

Figure 3 is a longitudinal side elevation of a transformer the end portions being broken away and in section to illustrate a slightly modified construction.

In the accompanying drawings, I have disclosed a typical or preferred embodiment of my invention, and I have employed the same reference characters to designate like parts wherever they occur throughout the several views. All of the views are in a sense diagrammatic for the purpose of illustrating the principles of my invention.

Referring to the drawings, and more particularly Figure 1 thereof, it will be seen the transformer comprises a suitable core 4 of cylindrical cross-section that is preferably formed of magnetic iron or like material and is provided with a longitudinally extending slot 5. As will be seen in the cross-section of the structure this slot 5 forms a radial channel in the core and extends from the axis thereof to the circumference and prevents "eddy-currents" through the structure and over-heating when in use, as will hereinafter more fully appear. At its inner end or at the axis of the core the slot is slightly increased in dimensions as at 6 (Figure 2) to receive a tie-rod or bolt that is of larger diameter than the width of the slot and which is usually employed for securing suitable caps (not shown) upon the ends of the transformer depending upon the service for which the device is intended.

Transversely disposed collars project laterally from the ends of the core and they may be either separate disks 7 that are centrally apertured and secured to the core in any suitable manner as illustrated in detail in Figure 1 of the drawings, or said collars may be in the form of disk-like flanges 8 cast integrally with the ends of the core as seen in Figure 3. In either event the collars have radial slots 9 that extend from the axis to the edge of each disk or flange and aline with and form continuations of the slot 5 in the core. Thus said core and collar combine to provide a spool that is adapted to receive the winding of the primary and secondary coils as well as the insulating layers that are interposed between the same, and the other elements.

Prior to assembling the coils upon the core the latter is wound with several thicknesses of a sheet of insulating material 10, after which the primary coil 11 of the transformer is wound thereon in the usual manner. The terminals 12 of this coil are passed through apertures in one of the collars, which apertures have rubber or like insulating bushings 13 inserted therein in which the wires are positioned to insulate the latter from the metal collar. I next wind several thicknesses of a sheet of insulating material 14 upon the outer convolutions or circumference of the primary coil, and upon this latter insulating material I

wind the secondary coil 15 in the usual manner. The terminals 16 of this secondary coil, like those of the primary coil, are passed through apertures in the collar at the opposite end of the core, which aperture has inserted therein insulating bushings 17 to insulate the wires from the metal collar. The coils and the respective insulating layers now surround the core between the end collars thereof and are maintained in assembly by said collars and an annular shell outside said coils. After the secondary coil has been wound, a sheet of insulating material 18 is wrapped upon the outer surface of said secondary winding to insulate the same from the enclosing outer metal sleeve or shell 19. As will be seen in Figure 1 of the drawings, this sleeve or shell is in the form of a metal cylinder of approximately the outer diameter of windings upon the spool formed by the core and collars, or as illustrated in Figure 3 the interior diameter of the cylinder is the same as the diameter of the collars so that the outer faces of the latter will be flush with the ends of the cylinder and their edges will be inside the shell. This shell is preferably a split sleeve or cylinder; that is, it has a slot 20 extending longitudinally thereof, and when the structure is assembled this slot will be so positioned that its ends are in registry with the outer ends of the slots 9 in the collars and also in radial alinement with the longitudinal slot 5 in the core. During assembly of the several parts, the slots 5, 9 and 20 are filled with suitable insulating material 21, the purpose of the slots being to prevent the overheating of the transformer when in use, while the insulating material in said slots avoids the creation of "eddy-currents" about the core.

From the foregoing it will be obvious that I have provided a transformer that is extremely compact and is small in size so that it is readily adaptable for services requiring a miniature structure and only a light charge of current. When in use, the terminals 12 of the primary coil are connected in any suitable or desirable manner with the conductors or supply wires of a building leading from the source of electric energy, and the terminals 16 of the secondary coil are connected into the article to which the secondary current is to be supplied. I have not illustrated this article as the same may be a door-bell, an electrically operated toy, a dim lamp, or other structures. On account of the simplicity and compactness of the transformer a lamp socket may be attached directly thereto at the end through which the terminals of the secondary coil lead, and the whole may then be inclosed in an ornamental housing so as to provide a lamp of relatively small proportions and with a dim light so that the same may be used as a night-lamp.

While I have herein illustrated and described a specific manner of carrying out my invention I desire it understood that changes or modifications thereof may be made without departing from the principles of my invention. I therefore desire it understood that all such changes or modifications are fully contemplated as coming within the scope of my invention as expressed in the appended claim.

What I claim is:—

A transformer comprising a spool consisting of an inner core that is axially bored and radially slotted from end to end, and lateral flanges at opposite ends of said core disposed transverse to the axis of said body, which flanges have axial bores and radial slots that form continuations respectively of the bore and slot of the core, said core and flanges formed of magnetic material, primary and secondary coils wound on the core of said spool between said flanges, and a cylindrical casing of magnetic material surrounding the coils and fitted at its ends to the edges of said flanges and having a longitudinal slot extended from end to end, said slot registering at its ends with the slots at the edge of the flanges of the spool and the longitudinal portion of the slot alining with the slot in the core.

Signed at Chicago, Cook County, Illinois, this 9th day of October, 1924.

DEAN W. DAVIS.