Dec. 15, 1925. 1,565,031

A. W. THOMPSON

LOCOMOTIVE TRANSFORMER

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Fig. 1.

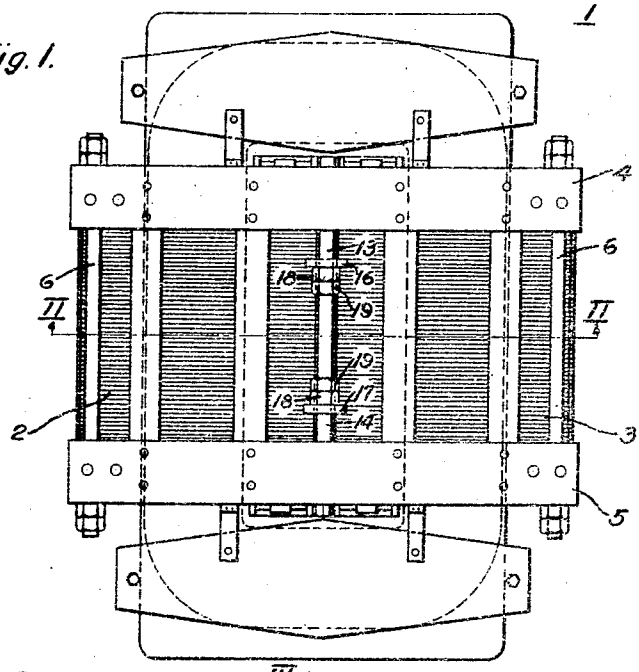
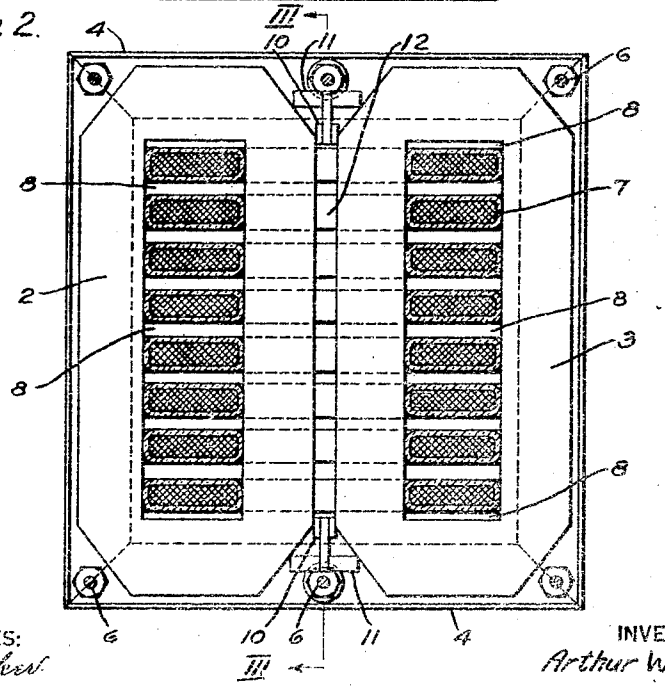


Fig. 2.



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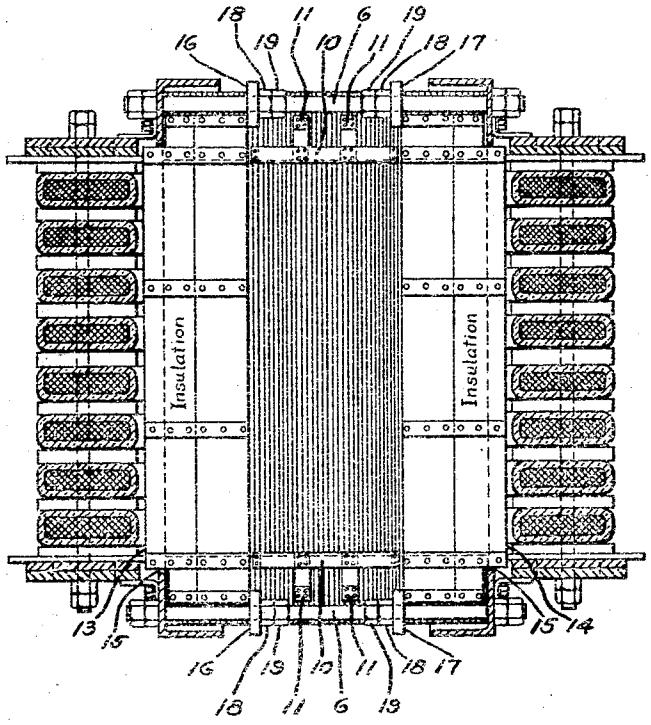
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Fig. 3.



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UNITED STATES PATENT OFFICE.

ARTHUR W. THOMPSON, OF EAST McKEESPORT, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

LOCOMOTIVE TRANSFORMER.

Application filed October 15, 1923. Serial No. 668,520.

To all whom it may concern:

Be it known that I, ARTHUR W. THOMPSON, a citizen of the United States, and a resident of East McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Locomotive Transformers, of which the following is a specification.

My invention relates to transformers, and it has particular relation to such transformers as are suitable for use in connection with electric locomotives.

My invention has, for one of its objects, to provide a transformer in which the various parts are securely retained in position during abnormal conditions such as heavy overloads, short circuits, and the like.

A second object of my invention is to provide a transformer in which the coils may be placed under stress to maintain them substantially rigid under all operating conditions.

In the operation of transformers, particularly of the railway type, it is necessary that the various structural parts be maintained in their relative positions under severe conditions of service. When coils are subjected to heavy overloads or to short-circuit conditions, the mechanical stresses are such that the coils tend to become distorted and the structure either deranged or partially destroyed. The vibration that is encountered during the operation of electric railways may effect the displacement of the coils and parts of the core structure to close ventilating ducts therebetween unless the several parts are securely retained in position.

In accordance with my invention, I provide a laminated core structure that consists of two spaced core members or loop portions. The laminæ are securely clamped together by means of end frames and clamping bolts. The coils, which are spaced from each other and from the core structure, are securely held in their respective positions by means of longitudinally movable plates that are adjustably connected to the clamping bolts.

In the accompanying drawings, Figure 1 is a plan view of a transformer constructed in accordance with my invention;

Fig. 2 is a view in transverse section, taken on the line II—II of Fig. 1; and

Fig. 3 is a view, in horizontal section, taken on the line III—III of Fig. 2.

Referring to the drawings, a transformer 1 comprises a laminated core structure consisting of two spaced core members or loop portions 2 and 3, that are placed in side-by-side relation. The two core members are held in position by means of flanged end frames 4 and 5 that are connected at opposite sides of the core structure by means of clamping bolts 6. The adjacent sides of the core members 2 and 3 are surrounded by coils 7 that are spaced laterally from the core members and from each other to provide ventilating ducts 8 therebetween.

As best shown in Figs. 2 and 3, the core members 2 and 3 are spaced apart by means of spacing members 10 of insulating material that extend transversely of the laminæ and that are prevented from displacement by enlarged portions 11 that are without the ventilating duct 12 and are adjacent to the corresponding central clamping bolts 6.

Referring particularly to Fig. 3, the transformer is provided with slidable locking plates 13 and 14 that are located at the respective ends of the transformer. The plates 13 and 14 are of steel or other suitable metal at their inner portions to provide mechanical strength and their outer portions are of micarta or other suitable insulating material. The insulating portions of the plates project through slots 15 in the respective end frames to engage the end portions of the several coils 7. Each of the plates 13 and 14 is connected to the central clamping bolts 6 by means of apertured lugs 16 and 17, respectively, through which the bolts extend.

When the transformer structure has been assembled and it is desired to fix the several coils in position, the locking plates 13 and 14 are actuated outwardly by means of adjustable nuts 18 that are located on the central clamping bolts until the several coils are placed under such stress as will retain them permanently in their adjusted positions. The nuts 18 are then secured in their adjusted positions by means of lock nuts 19.

When the coils are securely locked or braced in position by means of the structure described above, the tendency to distort the shape of the coils or to displace them from their proper positions is offset by the stress under which the coils have been placed by

the movable plates 13 and 14. The core members are securely held in their relative positions by the end frames and the clamping bolts. Accordingly, the several parts of the transformer remain in such positions that they may be properly ventilated and that proper operating conditions are maintained under substantially all service conditions.

The advantages above enumerated as well as many others will be apparent to those skilled in the art to which my invention appertains.

I claim as my invention:—

1. The combination with a laminated core structure comprising a plurality of loop portions and a coil surrounding one side of each of said loop portions, of end frames for said core structure and means for spacing said loop portions to provide a ventilating duct therebetween.

2. The combination with a laminated core structure comprising a plurality of closed loop portions and a plurality of spaced coils surrounding adjacent sides of said loop portions, of means for spacing said loop portions, means for clamping said core structure, and adjustable means for placing said coils under stress to maintain them in position.

3. The combination with a laminated core structure comprising a plurality of loop portions and a coil surrounding one side of each of said loop portions, of end frames for said core structure, and means for spacing said loop portions for preventing relative displacement of the laminæ of the loop portions.

4. The combination with a laminated core structure comprising a plurality of loop portions and a coil surrounding one side of each of said loop portions, of end frames for said core structure, and means for spacing said loop portions for preventing relative displacement of the laminæ of the loop portions and to prevent the individual laminæ of the loop portions from moving into the ventilating duct.

In testimony whereof, I have hereunto subscribed my name this 9th day of October 1923.

ARTHUR W. THOMPSON.