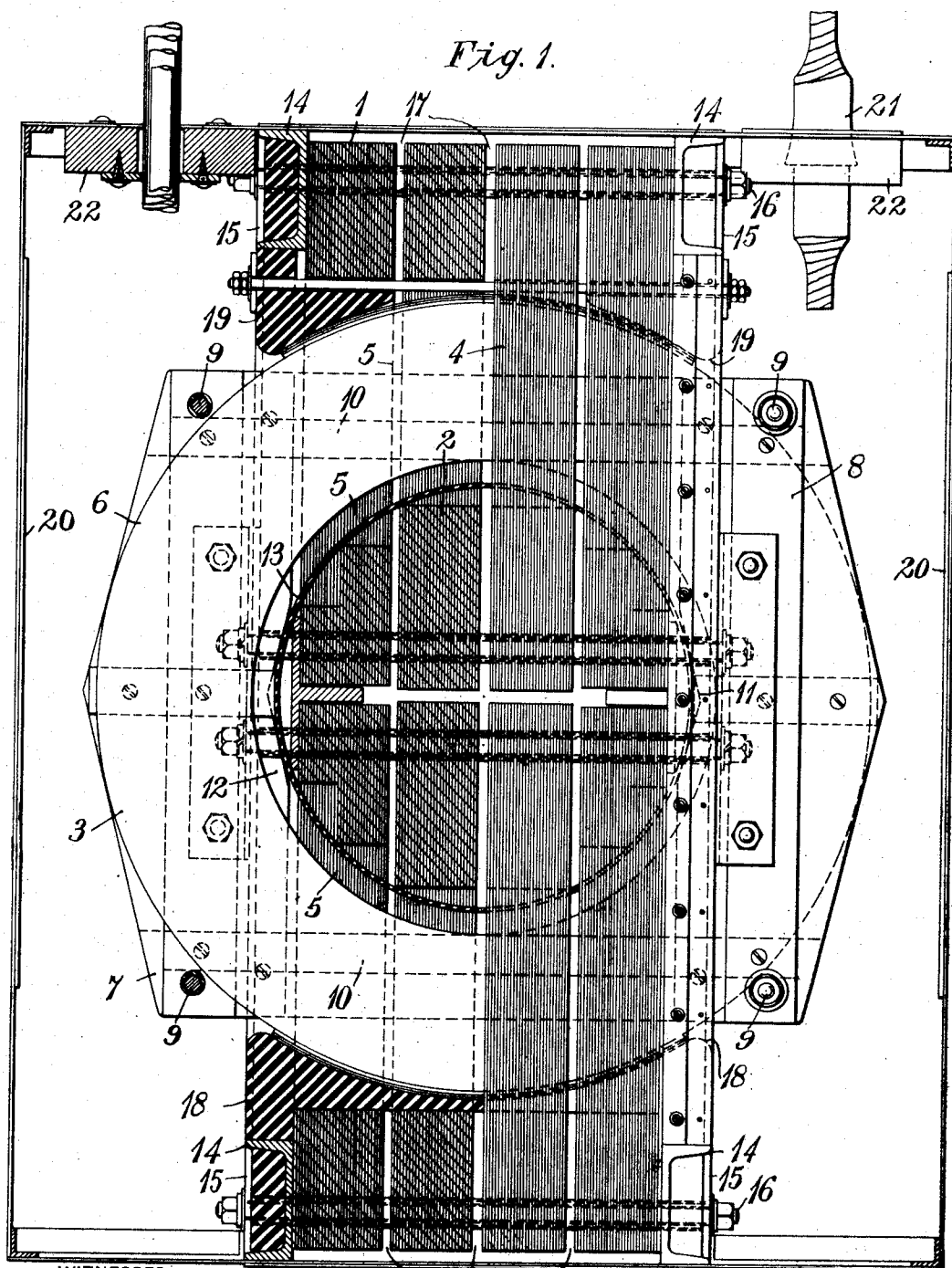


1,010,083.

H. C. SOULE.
TRANSFORMER.
APPLICATION FILED JAN. 10, 1908.

Patented Nov. 28, 1911.
3 SHEETS—SHEET 1.

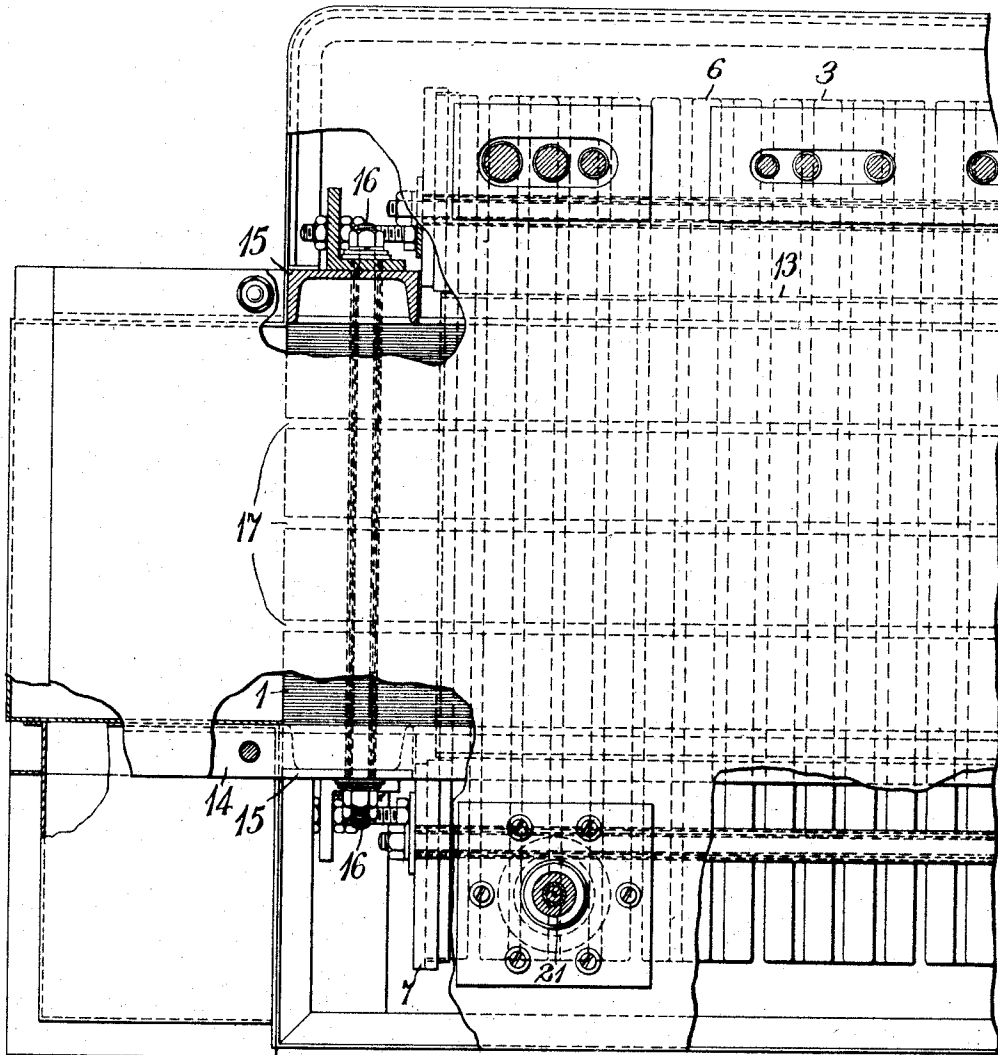


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Fig. 2.



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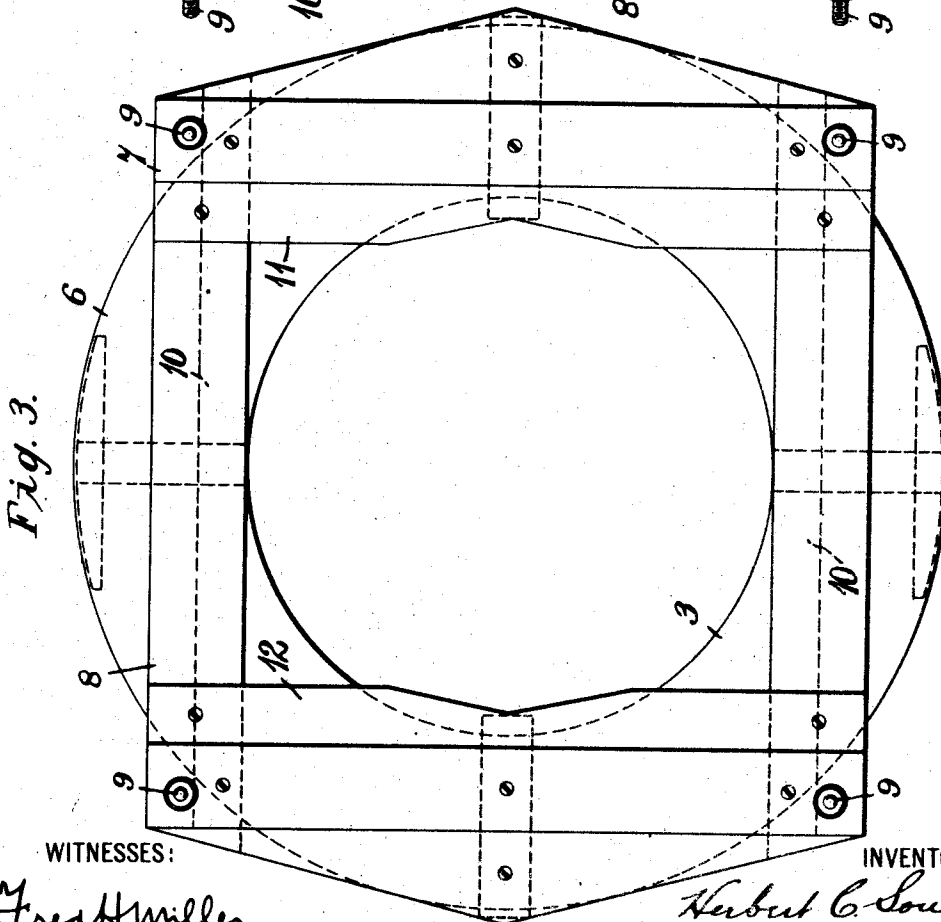
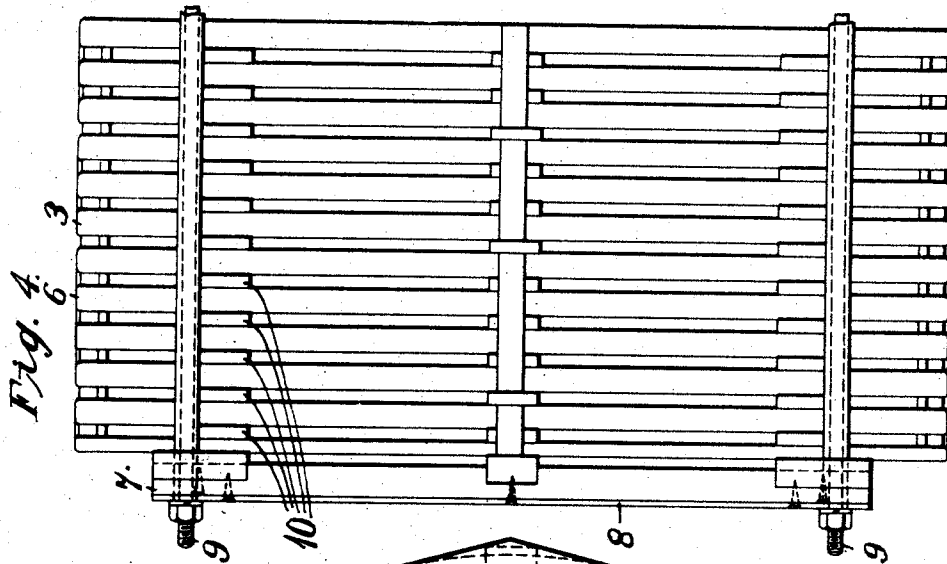
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UNITED STATES PATENT OFFICE.

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TRANSFORMER.

1,010,083.

Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed January 10, 1908. Serial No. 410,214.

To all whom it may concern:

Be it known that I, HERBERT C. SOULE, a citizen of the United States, and a resident of Wilkesburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Transformers, of which the following is a specification.

My invention relates to electrical apparatus and particularly to alternating current transformers which are adapted for use with railway vehicles, and it has for its object to provide a device, of the class above indicated, that shall be simple and durable in construction and readily ventilated by the application of an air blast.

According to my present invention, I provide a circular-coil transformer of the core type having simple and effective means for so clamping the spaced coils together that they may be handled independently of the core and means for adjustably securing the assembled winding to said core.

Figure 1 of the accompanying drawings is a sectional elevation of a transformer constructed in accordance with my invention. Fig. 2 is a plan view of a portion of the device shown in Fig. 1, and Figs. 3 and 4 are views of the assembled winding with the core removed.

Referring to the drawings, the transformer here illustrated comprises a substantially rectangular core 1 having an inner portion 2 on which a winding 3 is mounted and outer portions 4 and 5 each of which comprises a side and two ends to serve as a return circuit for the magnetic flux produced in the inner portion 2 by the winding. The winding 3 comprises a plurality of circular coils 6 which are spaced apart and clamped together by a frame 7 having rectangular end members 8, longitudinal tie bolts 9 and cross strips 10 that are interposed between the adjacent coils 6. In this way, the winding is assembled and may be handled independently of the core without danger of injury or relative displacement of its coils. The end members of the frame are provided with additional cross-strips 11 and 12 which are notched to engage an insulating sleeve or cylinder 13 which surrounds the inner portion 2 of the magnetizable core, thereby preventing lateral movement of the winding, relatively to the core, in a horizontal plane.

The core 1 is preferably built up of soft iron or steel plates in a well known manner, and the assembled structure is held together by channel beams 14 and 15 and tie bolts 16. The laminated structure, formed as above indicated, is provided with ventilating spaces 17 through which cooling fluid, such as air, may be forced during the operation of the transformer. The inner portion of the core has substantially twice as great an area of cross-section as each of the outer portions 4 and 5, since the inner portion serves as a common path for the magnetic flux which is divided as it passes through the outer portions. The section of the inner portion of the core is double cruciform in order to reduce the necessary diameter for the coils, of which the winding is composed.

The winding 3 is supported by a cradle-block 18 of insulating material which is clamped to the core, at one side and is centered by insulating blocks 19 which are adjustably secured to the core, at the opposite side, and may be drawn toward each other to force the coils against the block 18. The spacing strips 10 serve to separate the adjacent coils of the winding so that a circulation of air or other cooling fluid may be established, the arrangement of parts preferably being such that separate bodies or currents of cooling fluid all flow through the spaces 17 in the core structure and through the spaces between the coils which are provided by the strips 10.

The assembled transformer is inclosed in a suitable casing 20 and the transformer connections are established by short lengths of cable which are secured to the desired coils and extend out through the casing, being supported by bushings 21 of insulating material or by collars 22, according as the leads form high or low-voltage connections to the transformer.

It will be understood that various modifications in the size and arrangement of details may be effected within the scope of my invention, and I desire that only such limitations shall be imposed as are indicated in the appended claims.

I claim as my invention:

1. A transformer comprising a magnetizable core, a plurality of circular coils disposed thereon in substantially vertical planes, a cradle-block which engages the

lower outer edges of the coils, and adjustable means for engaging the upper edges of the coils to force their lower edges against the cradle-block.

5 2. A transformer comprising a magnetizable core having an inner body portion and outer portions of substantially rectangular form, a plurality of circular coils mounted on the inner body portion, and relatively
10 adjustable means adapted to engage the opposite outer edges of the coils to support them in vertical planes.

3. A transformer comprising a substantially rectangular magnetizable core having
15 an inner body portion which connects the ends of the outer portions together, a plurality of circular coils mounted on the inner body portion, a cradle-block of insulating material mounted upon one outer side portion to engage the edges of the coils, and
20 insulating blocks adjustably secured to the opposite outer side portion to engage the edges of the coils.

4. A transformer comprising a core, a
25 plurality of circular coils therefor, a spacing and clamping frame for the coils, and an adjustable supporting cradle to engage the upper and lower outer edges of the coils and support them in vertical planes.

5. A transformer comprising a core, a 30 plurality of circular coils therefor, a clamping frame for the coils comprising end members, spacing strips and tie bolts, and a supporting cradle for the assembled winding comprising blocks of insulating material ad- 35 justably secured to the core and adapted to embrace the edges of the coils at opposite sides.

6. A transformer comprising a substantially rectangular magnetizable core having 40 an inner portion that connects the ends of the outer portion together, a plurality of circular coils mounted on the inner core portion, a clamping frame for the coils that is independent of the core and comprises end 45 members, spacing strips and tie bolts, and a supporting cradle for the assembled winding comprising blocks of insulating material adjustably secured to the core and adapted 50 to embrace the opposite outer edges of the assembled coils.

In testimony whereof, I have hereunto subscribed my name this 20th day of December, 1907.

HERBERT C. SOULE.

Witnesses:

VERYL BROUGHTON,
BIRNEY HINES.