

June 2, 1925.

D. J. ANGUS

1,539,928

REACTANCE

Filed Sept. 2, 1922

Fig. 1.

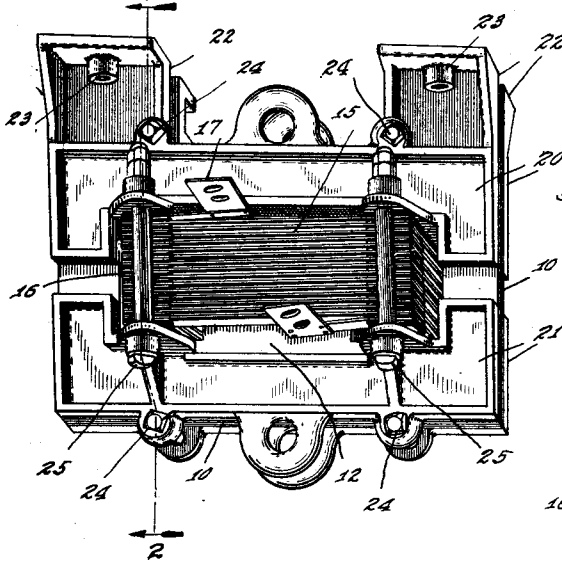


Fig. 4.

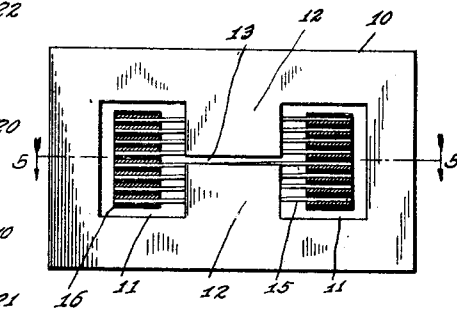


Fig. 3.

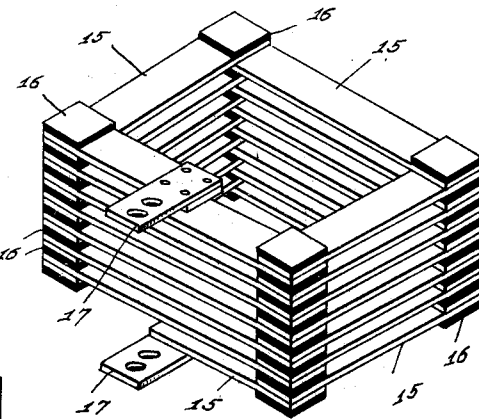


Fig. 2.

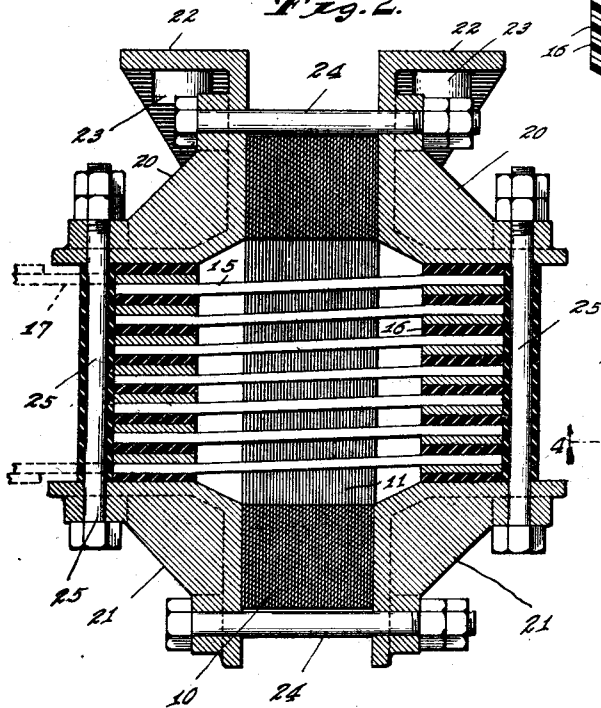
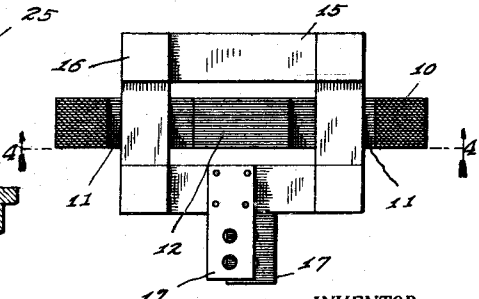


Fig. 5.



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DONALD J. ANGUS, OF INDIANAPOLIS, INDIANA.

REACTANCE.

Application filed September 2, 1922. Serial No. 586,033.

To all whom it may concern:

Be it known that I, DONALD J. ANGUS, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Reactance, of which the following is a specification.

It is the object of my invention to provide a simple construction for a reactance: wherein the conducting element is made of straight conducting bars laid together, to get the effect of an edgewise winding but without any edgewise bending; wherein closed-loop laminae may be associated with a conducting element without requiring the threading through the loop of a long conductor; wherein the magnetic element is made of closed-loop laminae through which the conducting bars pass, which laminae have central parts which come nearly into contact with each other but are held apart in operation by the strength of the laminae themselves against edgewise bending; and wherein the same clamping parts are used for clamping the magnetic laminae and the conducting bars.

The accompanying drawing illustrates my invention: Fig. 1 is a perspective view of a reactance embodying my invention; Fig. 2 is a vertical section on the line 2—2 of Fig. 1; Fig. 3 is a perspective view of the conducting element; Fig. 4 is an elevation of one of the laminae, with the conducting bars in their proper relative position thereto but in section on the line 4—4 of Fig. 5; and Fig. 5 is a plan of the conducting bars, with the magnetic element in proper relation thereto but in section on the line 5—5 of Fig. 4.

The reactance comprises a magnetic element, a conducting element, and two pairs of clamping elements. The magnetic element is built up of laminae 10, preferably of the shape shown in Fig. 4, having two spaced openings 11 through them, and having between such openings two fingers 12 projecting inward toward each other but having their adjacent ends spaced apart to provide an air gap 13, making a total opening in the shape of the letter H. The magnetic element is built up of a suitable number of these laminae.

The conducting element is built up of a series of flat straight bars 15. These bars are laid together to form a rectangular coil, as shown in Fig. 3, with interspersed blocks

of insulation 16 at the corners between successive turns of the winding so that the bars 15 are all in series to form the winding. By suitable arrangement of the blocks 16 and bars 15, desired arrangements of connecting the bars are possible, but the simple series arrangement is shown. The bars 15 at the beginning and end of the winding are provided with connecting pieces 17, which project laterally and may be provided with holes for receiving suitable connecting bolts. In building up the conducting element, the bars 15 are assembled one by one in the magnetic element, two sets of the bars 15 passing through the openings 11 in the laminae, and the other two sets of the bars 15 suitably connecting the ends of those bars which pass through the openings 11.

There are two pairs of clamping elements, comprising two upper clamping elements 20 and two lower clamping elements 21. The upper clamping elements (assuming that the reactance is to be hung from the ceiling in the manner customary) have attaching feet 22, with suitable perforated bosses 23 for the attaching bolts. The laminae 10 are clamped along their upper parts between the two clamping members 20, and along their lower parts between the two clamping members 21, by suitable clamping bolts 24 transverse to the laminae and preferably in the plane of those bars 15 which pass through the openings 11. The bars 15 composing the conducting element are clamped tightly together between the upper clamping members 20 and the lower clamping members 21, by clamping bolts 25 transverse to the bars 15 and preferably in the same planes transverse to the laminae 10 as are the clamping bolts 24. By this arrangement of clamping bolts 24 and 25, the strain on the clamping members 20 and 21 is localized in the planes of such bolts, and there is no tendency to bend the parts of the structure such as there would be if the bolts 24 were in different planes transverse to the laminae 10 from the bolts 25 and from the bars 15 which pass through the openings 11.

In assembling the structure, the laminae 10 are put together to build up the desired magnetic element, and are clamped between the clamping members 20 and between the clamping members 21 by the clamping bolts 24. Then the conducting element is built in place, by laying the bars 15 upon each

other with the insulation blocks 16 properly interspersed, and the bolts 25 are put in place and drawn tight to clamp the bars 15 firmly together. The thickness of the conducting bars 15 is shown exaggeratedly in the drawing, for the sake of clearness, although in actual practice the thickness of the bars 15 and the blocks 16 would be less than that shown, and especially less than is shown in Figs. 2 and 3. By this method of construction, the conducting element may be made of flat strip without the necessity for any edgewise bending of the strip, and with its attendant difficulties and expense; and without the threading of a long length of conductor through the openings 11. In addition, the laminæ 10 may be made as complete laminæ enclosing the conducting bars, and the magnetic pull which exists tending to close the air gap 13 is resisted by the strength of the laminæ 10 themselves against edgewise bending, without the necessity for any special clamping devices for resisting this pull such as are necessary in constructions in which the two fingers 12 are on separate laminæ.

I claim as my invention:

1. A reactance, comprising a magnetic element and a conducting element, said magnetic element comprising a plurality of laminæ with registering holes through them, and said conducting element comprising a plurality of metal bars built up with their ends overlapping to form a coiled conducting path, some of said bars passing through holes in the laminæ, and means for clamping said overlapping ends together.

2. A reactance, comprising a laminated magnetic element, a conducting element composed of a plurality of metal bars built up into the desired coil in inductive relation with said magnetic element, and two pairs of clamping members arranged so that each clamping member assists in clamping both the laminæ and the bars.

3. A reactance, comprising a laminated magnetic element, a conducting element composed of a plurality of metal bars built up into the desired coil in inductive relation with said magnetic element, and two pairs of clamping members, each pair of clamping members being arranged to clamp the laminæ between them, and opposite members of the two pairs being arranged to clamp between them the built-up metallic bars.

4. In combination, a conducting element comprising a plurality of metal bars laid together with their ends overlapping to form a coil, a laminated magnetic element in inductive relation to such coil, insulating blocks interspersed with the overlapping ends of said bars to insulate adjacent turns apart, and clamping members for clamping together both said laminæ and

said bars, said clamping members being provided with clamping bolts arranged in planes in which the ends of the bars overlap.

5. In combination, a laminated magnetic element, a conducting element in general transverse to the plane of the laminæ, said conducting element being built up into the desired coil from a plurality of metal bars having their ends overlapping, four clamping members each having a face co-operating with the laminæ and a face co-operating with the conducting element, clamping bars interconnecting the elements on one side of the laminæ with those on the other side, and clamping bars interconnecting the clamping members on one side of the conducting element with those on the other side.

6. In combination, a laminated magnetic element, a conducting element in general transverse to the plane of the laminæ, four clamping members each having a face co-operating with the laminæ and a face co-operating with the conducting element, clamping bars interconnecting the elements on one side of the laminæ with those on the other side, and clamping bars interconnecting the clamping members on one side of the conducting element with those on the other side.

7. A reactance, comprising a magnetic element and a conducting element, said magnetic element consisting of laminæ provided with two sets of registering holes through them, and said conducting element consisting of a plurality of straight flat metal bars built into a substantially rectangular coil by having both ends of each flat bar overlapping ends of two other bars, alternate flat bars extending through the holes in the laminæ, and means for clamping said overlapping ends together.

8. A reactance, comprising a magnetic element and a conducting element, said magnetic element consisting of laminæ provided with two sets of registering holes through them, and said conducting element consisting of a plurality of straight flat metal bars built into a substantially rectangular coil by having both ends of each flat bar overlapping ends of two other bars, alternate flat bars extending through the holes in the laminæ, insulating blocks interspersed at the corners of said coils to separate adjacent turns thereof, and means for clamping said overlapping ends and blocks together.

9. A reactance, comprising a magnetic element and a conducting element, said magnetic element comprising a plurality of laminæ with registering holes through them, and said conducting element comprising a plurality of metal bars built up with their ends overlapping to form a coiled conducting path, some of said bars passing through holes in the laminæ, insulating blocks inter-

persed with said overlapping ends to insulate adjacent turns apart, and means for clamping said overlapping ends and insulating blocks together.

- 5 10. In combination, a conducting element comprising a plurality of metal bars laid together with their ends overlapping to form a coil, a laminated magnetic element in inductive relation to said coil, insulating
10 blocks interspersed with overlapping ends of said bars to insulate adjacent turns apart, and means for clamping together said overlapping ends and the blocks interspersed therewith.

- 15 11. A reactance, comprising a magnetic element composed of a plurality of laminæ, a conducting element in inductive relation to said magnetic element and built up of a

plurality of separate metal bars laid together with their ends overlapping and
20 common means for clamping together both said laminæ and said bars.

12. A reactance, comprising a magnetic element composed of a plurality of laminæ, a conducting element in inductive relation
25 to said magnetic element and built up of a plurality of separate metal bars laid together with their ends overlapping, and means for clamping together both said laminæ and said bars.

30 In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 29th day of August, A. D. one thousand nine hundred and twenty-two.

DONALD J. ANGUS.