

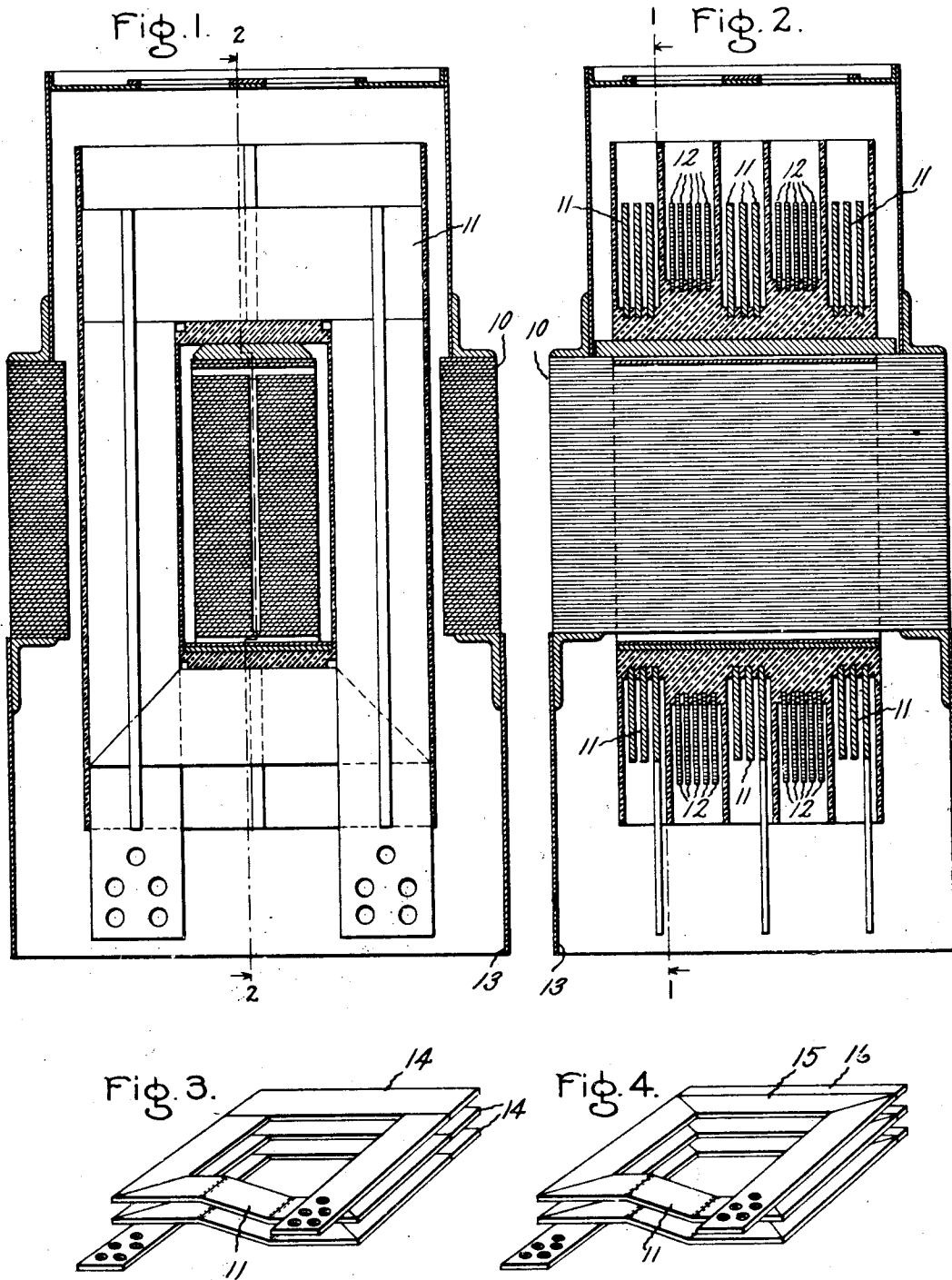
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TRANSFORMER

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Inventor:
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UNITED STATES PATENT OFFICE.

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TRANSFORMER.

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My invention relates to transformers. The maximum load which a transformer can carry is generally limited by the temperature of the hottest part of the windings.

5 The load capacity is therefore usually increased by permitting or causing currents of some cooling medium such as oil or air to flow through ventilating ducts and passages in the windings. It is obvious that
10 if some part of the windings is heated more than the rest of the transformer, then the load capacity of the whole transformer will be limited by the temperature of this hottest part. The general object of the invention
15 is to provide an improved winding arrangement wherein the temperatures may be more nearly uniform throughout.

The invention will be better understood from the following description taken in connection with the accompanying drawing in which Fig. 1 is a sectional view of an air
20 blast transformer with a low voltage winding constructed in accordance with the invention, the view being on line 1—1 of Fig. 2; Fig. 2 is a sectional view on the
25 line 2—2 of Fig. 1; Fig. 3 is a perspective view on a reduced scale of a section of the low voltage winding shown in Figs. 1 and 2, and Fig. 4 shows a modified construction
30 of a low voltage winding section.

Like reference characters indicate similar parts in the different figures of the drawing.

The transformer shown in the drawing is a horizontal core air blast type transformer. The magnetic core 10 has three
35 legs, the center leg being surrounded by three sections 11 of a low voltage winding and two sections 12 of a high voltage winding. The core 10 with its windings is supported on a closed hollow base 13 into which
40 air may be forced to provide a source of air under pressure from which the air will flow upwardly and transversely to the winding leg of the core through ventilating spaces
45 between the winding coils and in the core to cool both.

The small portions of the windings immediately above the center leg of the core are of course considerably shielded from the
50 cooling air currents by this core leg and the insulation between it and the windings. These shielded parts of the windings are therefore less effectively cooled than the other parts which are not shielded and are
55 readily reached by the air. This may not be

serious in the case of the winding sections 12 because these form the high voltage winding and carry only a small current. The winding sections 11, however, operate at low voltage and carry very heavy current so that the heating effect is much greater. 60

The heavy current winding sections 11 are formed from straight flat conductive strips, preferably copper, as shown in Fig. 3, the strips being welded together at the joints near the corners of the winding. In the form shown in Fig. 3, the strips 14 which are shielded from the air currents by the core are substantially wider and therefore have greater cross section and less resistance than the other strips which form the rest of the winding. The heating effect of the current is thus less in the strips 14 than in the other parts of the winding so that the temperature may be about the same throughout the winding even though the cooling effect of the air is not. 70 75

A low voltage winding 11 built up in a different way is shown in Fig. 4. The wider part of each turn includes a strip 15 similar to the other parts of the winding and a narrow strip 16, the strips 15 and 16 being welded together to form a single wide strip similar to the strip 14 of Figs. 1 to 3. 80

The invention has been explained by describing and illustrating particular forms thereof but it will be apparent that various changes may be made without departing from the scope of the invention as defined in the appended claims. 85 90

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. A transformer including a magnetic core having a winding leg, and a winding surrounding said winding leg and having ventilating passages for conducting a cooling medium transversely of said winding leg, whereby a portion of said winding is shielded from said cooling medium by the winding leg, said shielded portion of the winding being of greater cross section than other unshielded portions. 95 100

2. An air blast transformer including a magnetic core having a winding leg, and a winding surrounding said winding leg and having ventilating passages for conducting cooling currents of air transversely of said winding leg, whereby a portion of said winding is shielded from said air currents by the winding leg, said shielded portion of the 105 110

winding being of greater cross section than other unshielded portions.

3. An air blast transformer including a magnetic core having a winding leg, a winding surrounding said winding leg and having ventilating passages for conducting cooling currents of air transversely of said winding leg, and means at one side of said winding leg and in communication with said passages to provide a source of cooling air

under pressure, whereby a portion of said winding at the opposite side of said winding leg from said source of air is shielded from the cooling currents of air, said shielded portion of the winding being of greater cross section than other unshielded portions thereof. 15

In witness whereof, I have hereunto set my hand this 12th day of December, 1928.

LOCKE H. BURNHAM.