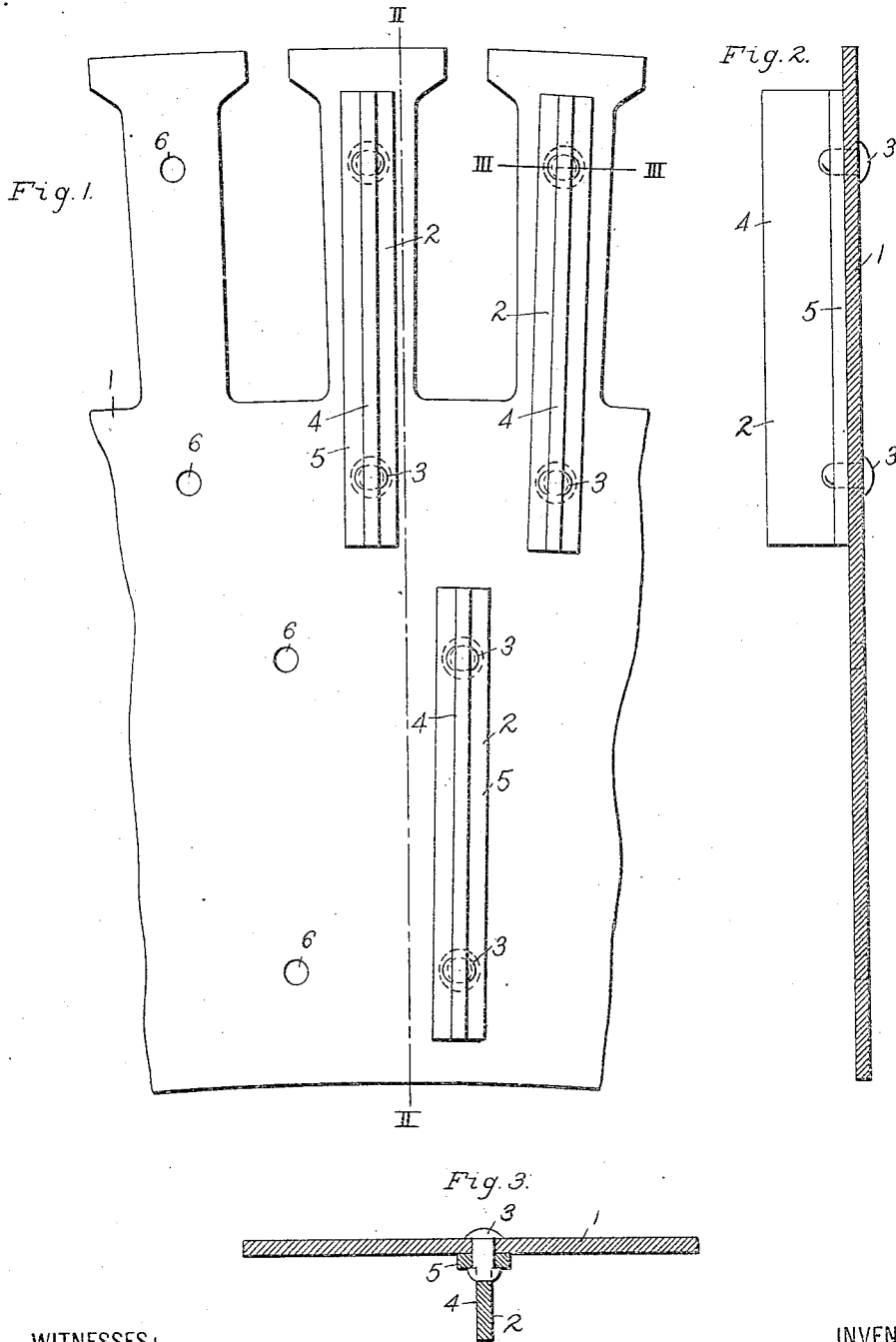


P. A. LANGE.
 VENTILATING PLATE FOR LAMINATED STRUCTURES.
 APPLICATION FILED FEB. 20, 1907.

933,766.

Patented Sept. 14, 1909.



WITNESSES:
 Fred H. Miller
 R. J. Carlson.

INVENTOR
 Philip A. Lange
 BY
 Wesley C. Carr
 ATTORNEYS

UNITED STATES PATENT OFFICE.

PHILIP A. LANGE, OF MANCHESTER, ENGLAND, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

VENTILATING-PLATE FOR LAMINATED STRUCTURES.

933,766.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed February 20, 1907. Serial No. 358,478.

To all whom it may concern:

Be it known that I, PHILIP A. LANGE, a citizen of the United States, and a resident of Manchester, in the county of Lancaster, England, have invented a new and useful Improvement in Ventilating-Plates for Laminated Structures, of which the following is a specification.

My invention relates to the ventilation of electrical apparatus, and has special reference to means for spacing and ventilating laminated magnetizable core structures.

The object of my invention is to provide a spacing or ventilating plate that shall be inexpensive and durable in construction and that shall embody improved means for attaching spacing members to the plate.

In electric apparatus, such as transformers, generators and motors, which are provided with magnetizable cores formed of plates or laminae, it is necessary to provide spaces between some of the plates in order to sufficiently ventilate the cores. In the prior art, spacing ribs have often been secured to certain of the laminae, which are commonly termed ventilating plates to distinguish them from the remaining laminae of which the core is largely composed. According to my present invention, the ribs are fastened to the ventilating plates in an improved manner, whereby the labor is materially reduced.

In the accompanying drawing, Figure 1 is a front elevation of a portion of a ventilating plate constructed in accordance with my invention. Fig. 2 is a sectional view along the line II—II of the plate shown in Fig. 1, and Fig. 3 is a sectional elevation on the line III—III of Fig. 1.

Referring to the drawing, the ventilating or spacing member comprises a plate 1, which is adapted for use with substantially cylindrical laminated core structures of dynamo-electric machines, and a plurality of spacing blocks or ribs 2 which are attached thereto. The spacing ribs 2, which are of substantially T section, although ribs of I section may be employed with equal facility, are attached to the plate 1 by means of rivets 3. Each of the ribs 2 comprises a web 4 which is disposed in a plane substantially perpendicular to the plate 1 and a base strip 5 which is held in engagement with the surface of the plate.

The method of attaching the ribs to the

plate is as follows: Holes 6 are provided in the plate 1 of a diameter slightly greater than the thickness of the web, and holes corresponding in size and disposition are drilled through each base strip 5 and a short distance into the web; in other words, so as to extend into the web 4 beyond its junction with the base strip. Since the holes are a little larger in diameter than the thickness of the web, it will be readily understood that a small hole is formed on each side of the web or the thickness of the metal at these points is very much reduced. The plate and rib are then assembled in proper relations and rivets are inserted into the holes in the plate and into the corresponding holes in the rib and are finally forced or driven in until their heads are approximately flush with the plate. As the inner end of the rivet meets the web it is upset and expands outward through the holes or through the thin parts at the sides of the web and against the outer face of the base strip, thereby holding the rib securely in position on the plate.

The rivets may be formed of copper or other suitable material, preferably softer than that of the rib, and their number and size may be varied to suit prevailing conditions. It will of course be understood that the spacing ribs may be applied to ventilating plates which are adapted for various purposes, and that the size and shape of the ribs may be materially altered without departing from the spirit of my invention.

I claim as my invention:

1. Ventilating or spacing means for laminated structures comprising a plate, and a plurality of spacing ribs each of which comprises a web and a base strip, said plate and base strip having registering holes which terminate in the web, and rivets the inner ends of which are upset between the web and the adjacent face of the base strip.

2. Ventilating or spacing means for laminated structures comprising a plate, and a plurality of spacing ribs each of which comprises a web and a base strip at right angles thereto, the plate and rib having registering holes the respective diameters of which are greater than the thickness of the web and terminate in the web adjacent to the strip, and rivets the inner ends of which are upset between the web and the base strip.

3. Ventilating or spacing means for laminated structures comprising a plate, and a

plurality of spacing ribs each of which consists of a base strip and a web having holes or cavities which terminate in the web adjacent to the base strip, and rivets which are
5 forced into the holes and are upset between the web and the base strip for attaching the rib to the plate.

4. Ventilating or spacing means for laminated structures comprising a plate, and a
10 plurality of spacing ribs each of which consists of a base strip and a web having holes or cavities extending through the base strip and into the web, and rivets which project through holes in the plate into the cavities
15 and are expanded laterally over the base strip.

5. Ventilating or spacing means for lami-

nated structures comprising a plate having holes suitably spaced, and a plurality of spacing ribs each of which consists of a base
20 strip and a web having holes or cavities that cut away portions of the base strip and enter the web in its central plane, and rivets which project through the holes in the plate into the cavities and extend laterally over the
25 base strip.

In testimony whereof, I have hereunto subscribed my name this 31st day of January 1907.

PHILIP A. LANGE.

Witnesses:

JAS. STEWART BROADFOOT,
PERCY W. HOLT.