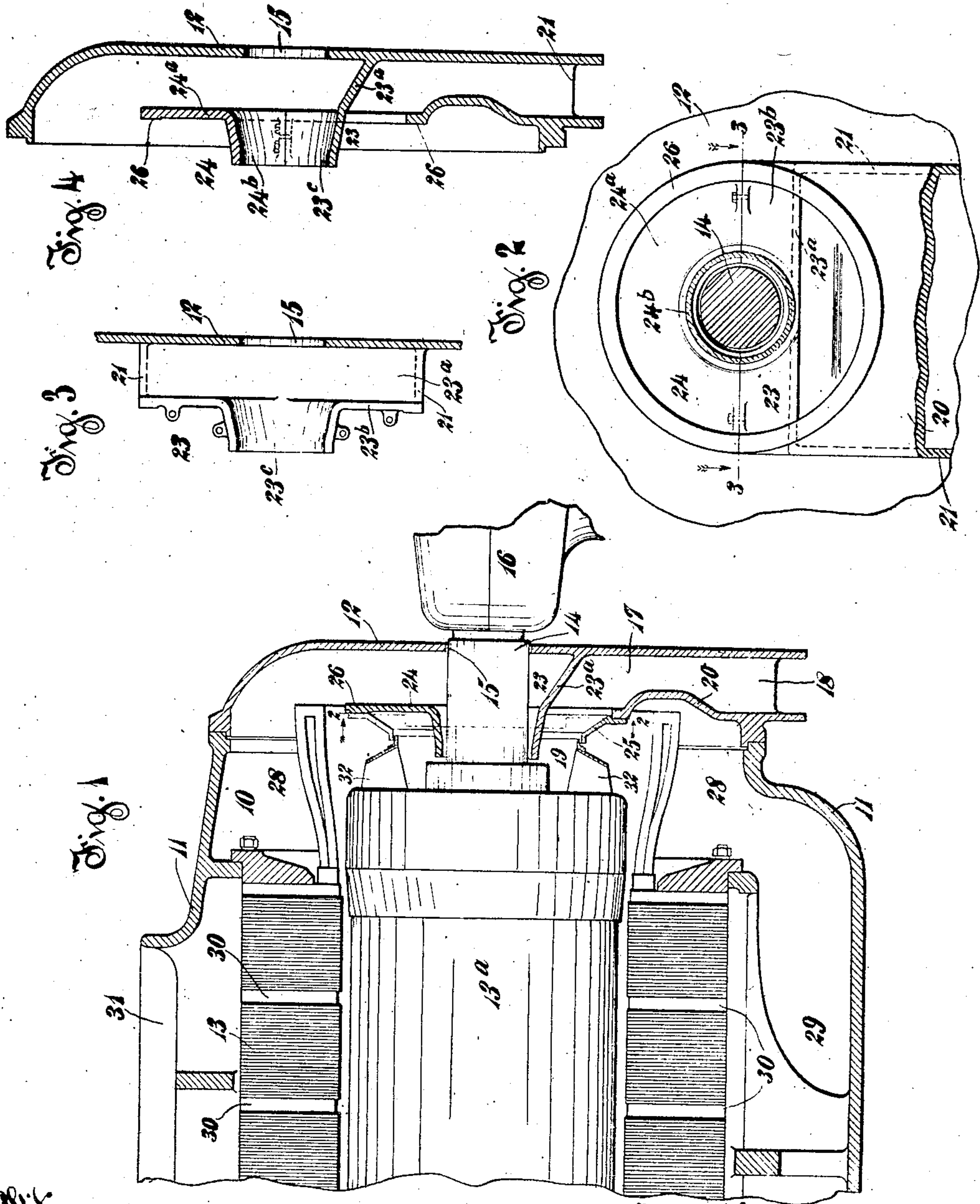


A. H. WOUTERS.  
 DYNAMO ELECTRIC MACHINE OF THE INCLOSED TYPE.  
 APPLICATION FILED MAR. 18, 1907.

899,370.

Patented Sept. 22, 1908.



Witnesses

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# UNITED STATES PATENT OFFICE.

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## DYNAMO-ELECTRIC MACHINE OF THE INCLOSED TYPE.

No. 899,370.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed March 18, 1907. Serial No. 362,900.

*To all whom it may concern:*

Be it known that I, ALFRED H. WOUTERS, belonging to the Kingdom of the Netherlands, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Dynamo-Electric Machines of the Inclosed Type, of which the following is a full, clear, and exact specification.

My invention relates to machines or apparatus in which an air pressure or a forced circulation of air is maintained, and particularly to inclosed dynamo-electric machines which are cooled by a forced circulation of air.

It is customary to inclose certain types of dynamo-electric machines in housings or casings and to maintain a forced circulation of air through and around the parts of the machines to dissipate the heat generated therein, so as to prevent an excessive and dangerous rise of temperature. The circulation of air is usually maintained by fans or blowers on the rotating element, the air being led into the housing through admission chambers located at the ends and extending upward from the bottom thereof to the shaft. The bottom of each admission chamber is connected to an outside source of air supply, and the upper end communicates with the interior of the housing in which the dynamo-electric machine is located by a large circular opening or passageway through which the shaft extends. The shaft extends through the admission chambers and the end walls of the housing, the diameter of the shaft openings in the end walls of the housing being just enough larger than the diameter of the shaft to prevent contact between the shaft and the walls of the housing when the machine is in operation. Although the clearance between the shaft and walls of the housing is very small there is a liability that warm, or moisture and oil laden air from the vicinity of the machine will be drawn into the interior of the housing through the shaft openings.

The object of my invention is to prevent a leakage of air into the housing through the annular openings between the shaft and the surrounding walls of the housing.

My invention involves certain novel improvements in the construction of the inclosing housing and novel combinations and arrangements of parts which will be described

in the specification and set forth in the appended claims.

In the drawings which show one form of my invention, Figure 1 is a vertical longitudinal sectional view of one end of a dynamo-electric machine and housing equipped with my invention; Fig. 2 is a partial vertical sectional view on the line 2—2 of Fig. 1, looking in the direction indicated by the arrows; Fig. 3 is a sectional plan view of part of the housing on the line 3—3 of Fig. 2 looking in the direction indicated by the arrows, the shaft being removed; and, Fig. 4 is a view similar to part of Fig. 1 showing a section of the end housing with the shaft removed.

Referring now to the figures of the drawing, I have shown at 10 my improved housing or casing consisting in this instance of a main or middle portion 11 and end portions 12. I have here shown only one end of the machine and housing, it being understood that the construction at both ends is the same. The main or middle portion of the housing supports the core 13 of the stationary armature of the dynamo-electric machine, in this case, a turbo-alternator. The rotating field magnet 13<sup>a</sup> of the machine is mounted on the shaft 14 which extends through shaft openings 15 in the walls of the end portions 12 of the housing and is supported in bearings 16.

The housing is provided at each end with an air admission chamber 17, the construction and arrangement of which constitute principal features of my invention. Each chamber 17 extends from the bottom of the housing upward around the shaft, having at the lower end an air inlet opening 18 and at the upper end a large annular opening or passageway 19 around the shaft, through which opening or passageway the air passes to receiving chambers within the housing. The lower portion of each admission chamber is formed in this case by the end wall of the housing, an inner wall or partition 20, and inner vertical side walls 21. The upper portion projects inward a short distance away from the wall of the housing and is in the shape of an annulus which entirely encircles the shaft, and is formed or inclosed by walls which are independent of the shaft and end wall of the housing. The upper portion of each admission chamber or the portion which surrounds the shaft, as here shown, is formed by a flange-like projection 23 extending in-



ward from the end wall and around the lower half of the shaft, a separate cap or casting 24 which extends around the upper half of the shaft and rests on and is secured to the flange-like projection 23, and an annular member 25 which engages a circular rim or flange 26 (see Fig. 2) on the faces of the upper cap or casting 24 and inner wall 20. The flange-like projection 23 consists in this case of a flat portion 23<sup>a</sup> inclined inwardly and upwardly from the end wall of the housing between the vertical walls 21 which form the sides of the lower part of the admission chamber, and a vertical portion 23<sup>b</sup> which extends upward to the center line of the shaft on each side thereof and has an inwardly extending tapering nose or projection 23<sup>c</sup> which extends around the lower half of the shaft to the center line. The upper cap or casting 24 consists of a semi-circular member 24<sup>a</sup> having a tapering nose or projection 24<sup>b</sup> which is the complement of the nose or projection 23<sup>c</sup>. When the cap 24 is placed in position the member 24<sup>a</sup> rests on and forms a continuation of the vertical portion 23<sup>b</sup> of the flange-like projection 23 and the nose or projection 24<sup>b</sup> extends around the upper half of the shaft and rests on the nose or projection 23<sup>c</sup> forming therewith a tube or sleeve-like portion through which the shaft extends. Each of the annular openings or passageways 19 previously referred to, is formed by the inner end of this tube or sleeve-like portion and the annular member 25. These openings or passageways as is seen are adjacent the ends of the rotating element 13<sup>a</sup>.

The housing is provided at each end between the core and the end wall with an air receiving chamber 28, and at the bottom with a receiving chamber 29 which communicates with the chambers 28 and with the air passageways 30 in the core. At the top of the housing is an exhaust opening or chimney 31 through which the air escapes after passing through the machine. The circulation of air through the housing and dynamo-electric machine is maintained in this case by fans or blowers 32 mounted on the ends of the rotating element. It is seen that the air receiving chambers 28 into which air is forced by the fans and in which the air is under pressure, include also the spaces between the end walls and the upper portions of the admission chambers.

When the machine is in operation air is drawn by the fans or blowers through the admission chambers into the receiving chambers 28 from which it passes to the receiving chamber 29, through the passageways 30 in the core, and out through the chimney 31. It will be seen that the air in the spaces around the shaft adjacent the shaft openings in the ends of the housing will be under a slight pressure so that there will be no tendency for the air to leak into the housing

through the annular clearance spaces between the shaft and the walls of the housing, but as the pressure on the inner sides of the end walls is greater than the pressure on the outer sides there will be an escape of air outward through said clearance spaces.

I do not desire to be confined to the exact details shown but aim in my claims to cover all modifications which do not involve a departure from the spirit and scope of my invention.

What I claim as new is:—

1. In combination, a housing having an air receiving chamber and an air admission chamber, and a shaft passing through the end walls of the housing, said air receiving and air admission chambers having an annular communicating opening around the shaft, the portion of the admission chamber adjacent the shaft extending inward away from the end wall of the housing into the receiving chamber.

2. In combination, a housing having an air receiving chamber, and an air admission chamber at the end of the housing, and a shaft passing through the walls of said receiving chamber, said admission chamber extending upward from the bottom of the housing around the shaft, and projecting into the receiving chamber away from the end wall of the housing and from the shaft.

3. In combination, a housing having an air-receiving chamber, a shaft passing through the end wall thereof, a fan or blower within said housing adapted to be rotated by said shaft, an air admission chamber in the end of the housing and extending from the bottom thereof upwardly around the shaft, the inclosing walls of said admission chamber being independent of the shaft and forming an annular opening adjacent the fan or blower, and means for spacing inwardly from the shaft opening in the end wall of the housing that portion of the admission chamber which is provided with the annular opening.

4. In combination, a housing having an air-receiving chamber and an air-admission chamber, a shaft passing through the end walls of the housing, and walls for extending said admission chamber around the shaft and for spacing the extended portion from the end of the housing and from the shaft.

5. In combination, a housing having an air receiving chamber and an air admission chamber, and a shaft passing through the end walls of the housing, said admission chamber having an annular portion surrounding the shaft, and formed by walls which are independent of the shaft and end wall of the housing and are spaced inwardly from the end walls of the housing.

6. A dynamo-electric machine provided with an inclosing housing in which are located a stator and a rotor, the rotor being provided with shaft extensions which project out-



wardly through openings in the end walls of  
said housing, fan-blades carried by said  
rotor, and walls spaced inwardly from the  
end walls of the housing forming an air admis-  
5 sion chamber within the housing for con-  
ducting air to said fan-blades, said spaced  
walls terminating in an annular extension  
surrounding the shaft and provided with an

annular opening adjacent to said fan-blades.

In testimony whereof I affix my signature, 19  
in the presence of two witnesses.

ALFRED H. WOUTERS.

Witnesses:

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