

No. 647,584.

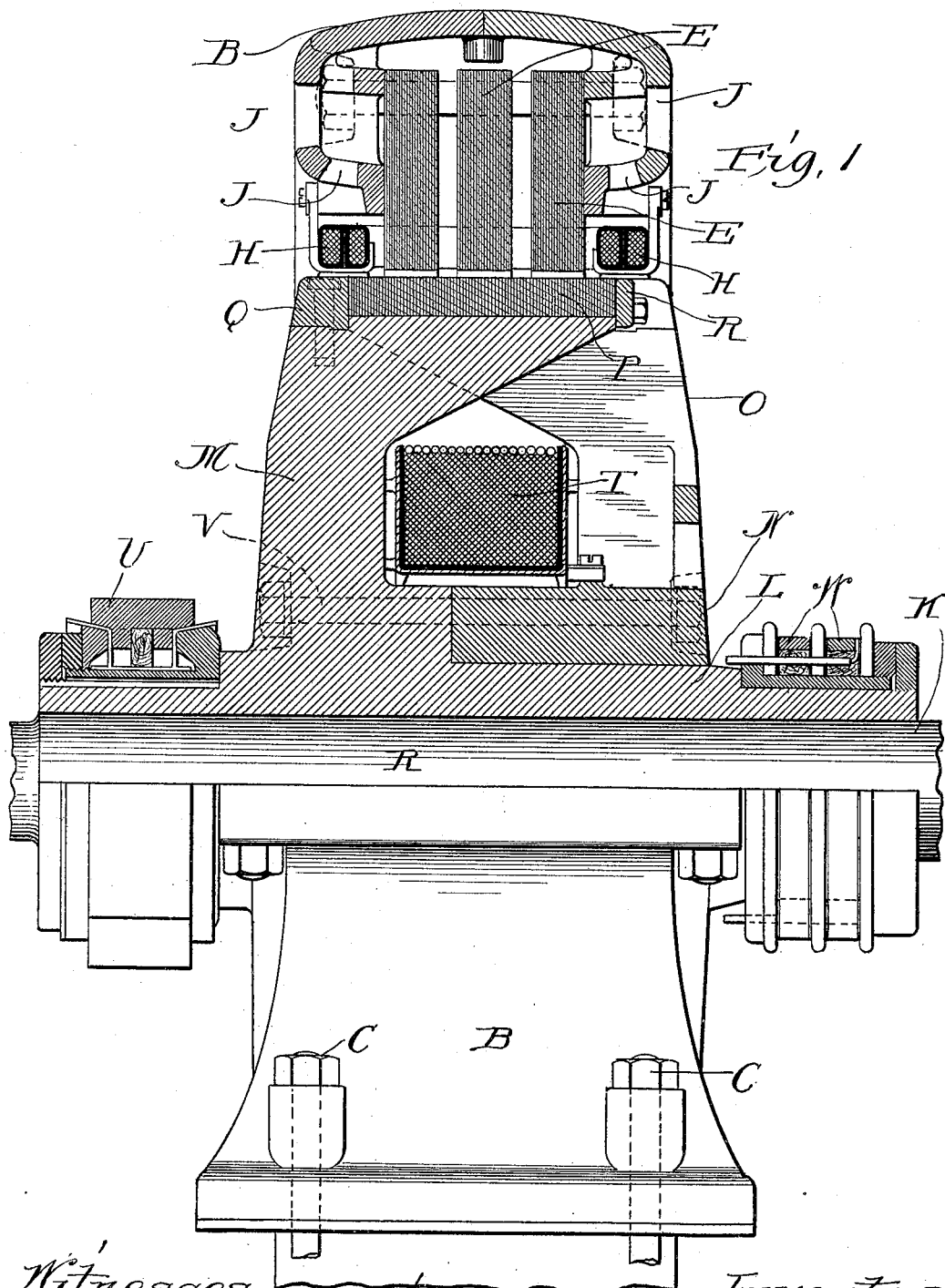
Patented Apr. 17, 1900.

S. H. SHORT.  
INDUCTOR ALTERNATOR.

(No Model.)

(Application filed Sept. 1, 1898.)

2 Sheets—Sheet 1.



Witnesses  
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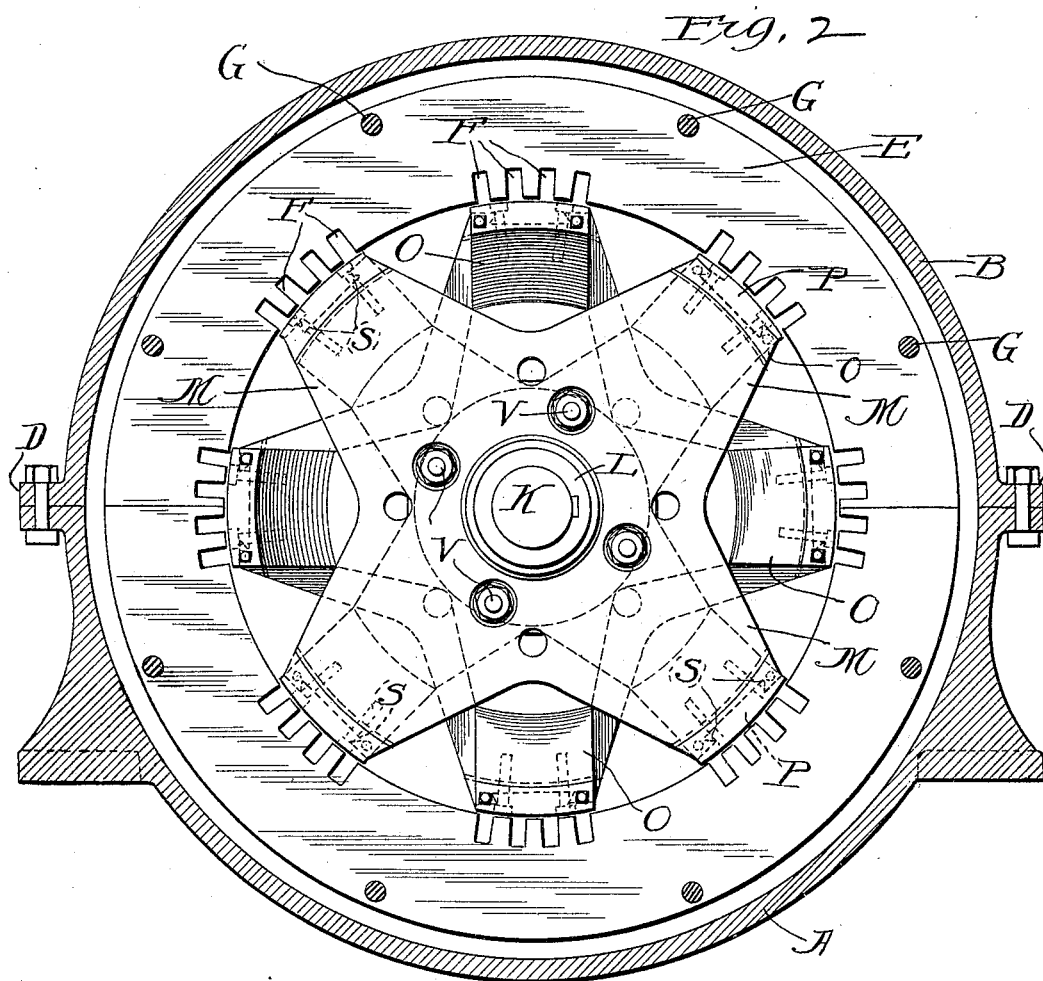
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2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

SIDNEY H. SHORT, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, OF PITTSBURG, PENNSYLVANIA.

## INDUCTOR-ALTERNATOR.

SPECIFICATION forming part of Letters Patent No. 647,584, dated April 17, 1900.

Application filed September 1, 1898. Serial No. 690,053. (No model.)

*To all whom it may concern:*

Be it known that I, SIDNEY H. SHORT, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Alternator, of which the following is a specification.

This invention relates to alternators.

The object of the invention is to produce an alternator of simple and improved construction and arrangement and efficient in operation.

The invention consists, substantially, in the construction, combination, location, and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally specifically pointed out in the appended claims.

Referring to the accompanying drawings and to the various views and reference-signs appearing thereon, Figure 1 is a view, partly in side elevation and partly in vertical section, of a form of alternating-machine embodying the principles of my invention. Fig. 2 is a view in vertical transverse section of the same.

In carrying the principles of my invention into practical operation I employ the inductor type of machine with a stationary armature and revolving field.

In the drawings reference-sign A designates a suitable subbase, upon which is suitably bolted, as at C, the stationary armature-ring frame B. Preferably this frame B is divided into halves, as at D, so as to facilitate access to the armature-bobbins or the inductors for inspection, repair, or replacement. The armature-core is of the type employing built-up thin sector-shaped sheets or laminæ E, having teeth or slots, as indicated at F, on the inner edges thereof to receive the armature-coils, and, if desired, having ventilating ducts or passages interspersed at suitable or desirable points throughout the body thereof in the usual manner of built-up or laminated armature-cores. The plates or laminæ are suitably and firmly held in the stationary armature-ring frame in any desired manner—as, for instance, by means of bolts G. The

armature-coils (indicated at H, Fig. 1) are arranged on the inner surface of the core and are thoroughly embedded in the slots F, formed in the inner periphery or edge of the core-plates or laminæ. The armature-ring frame B is preferably formed hollow, as shown, and is provided in the side flanges thereof with openings J, through which air is drawn and freely circulated through the armature air ducts or passages and around the core-iron and armature-coils. It will thus be seen that the revolving-field-frame arms, presently to be described, create a fanning action, and hence I secure a most perfect ventilation of the armature. If desired, and in order to uncover the field or the inductors or armature-coils for inspection or repair, the entire armature, with its frame, may be moved parallel with the axis of the field-shaft upon the removal of bolts C, by which said frame is secured to the subbase.

Reference-sign K designates the shaft by which the inductor or field is revolved. This shaft is suitably journaled with the axis thereof concentric with the armature-ring frame B. Mounted upon shaft K and suitably splined or keyed to rotate therewith is a hub L, having a series of radiating arms or spokes M. A coöperative hub N is suitably mounted or sleeved upon and secured to rotate with hub L and is provided with similar radiating arms or spokes O. Bolts V serve to rigidly secure the hubs L and N together. The spokes O are arranged to alternate in spacing with spokes M. The outer ends of the series or set of spokes M are bent or projected toward the series O or set of spokes O, and similarly the outer ends of the series or set of spokes O are bent or projected toward the series or set M, as clearly shown in the drawings, thus leaving an annular inclosed space between the two sets of radiating arms or spokes and around the hub. In order to prevent the undue heating of the ends of the inductor spokes or arms by the formation of eddy-currents, said spoke ends are suitably tipped with blocks of thin steel sheets or laminations, as indicated at P. These sheets or laminations may be held in place in any

suitable or desirable manner, as by means of the clamping-blocks Q R and the dovetail projections S.

In the space above referred to inclosed between the two sets of radiating arms or spokes, their oppositely-projecting outer ends, and the hub is located the field-coil T. This coil or spool is wound with the shaft K as an axis and forms the field-coil or exciter for the inductor. In generators for lighting purposes the field-coil T is preferably compound wound in order that the pressure may rise in direct proportion to the increase in load.

Preferably the machine is separately excited from any suitable source—as, for instance, from a small direct-current dynamo. I have found in practice that only a very small current is required for this purpose. In order to carry the current from the separate exciter to the field-magnet-coil, which, as above explained, is mounted to rotate with the inductor, I provide hub L with an extension at each end thereof outside of the radiating inductor arms or spokes. Upon one extension is mounted a pair of collector-rings W, through which the field-magnet-exciting current is conducted to the magnet-coil.

When the alternator is to be over-compounded for incandescent lighting, a commutator U, having as many bars as there are inductor spokes or arms, is placed on the other end or extension of hub L. The alternate bars are suitably connected together and then to the ends of the series winding of the field-magnet. By this arrangement a portion of the armature-current is rectified, and hence as the quantity of such portion increases the magnetization of the inductor also increases, thus producing the requisite over-compounding. Carbon brushes are employed in the usual manner for the collector-rings, as well as for the commutator.

Machines constructed in accordance with my invention may be wound for single, two, or three phase current, as the exigency of the particular work required may demand. In the particular form of construction shown a

single-phase machine is illustrated. For a two-phase winding additional slots or teeth are formed on the inner periphery of the armature plates or laminations.

It will be seen that the armature may be wound and insulated for any pressure required, as there is practically no limit to the insulation which can be applied.

Many changes and variations in the details of construction and arrangement may readily suggest themselves to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described; but,

Having now set forth the object and nature of my invention and a form of apparatus embodying the principles thereof and having explained the construction, function, and mode of operation thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent of the United States, is—

1. In an alternator, a stationary armature-ring frame having ventilating-openings formed through the sides thereof, an armature supported thereby, in combination with a revolving inductor, whereby ventilating air-currents are drawn through said openings, as and for the purpose set forth.

2. In an alternator, a stationary armature-ring frame having ventilating-openings through the sides thereof, a laminated armature arranged within said ring and supported thereby, in combination with a revolving inductor arranged concentric with said ring, whereby ventilating air-currents are drawn into said openings to cool said laminated armature, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 22d day of August, 1898, in the presence of the subscribing witnesses.

SIDNEY H. SHORT.

Witnesses:

M. A. KENSINGER,  
JOHN J. BEVER.