(No Model.) 2 Sheets—Sheet 1.

E. THOMSON.

AIR BLAST ATTACHMENT FOR COMMUTATORS OF DYNAMO ELECTRIC MACHINES.

No. 273,406. Patented Mar. 6, 1883.

Fig. 1.

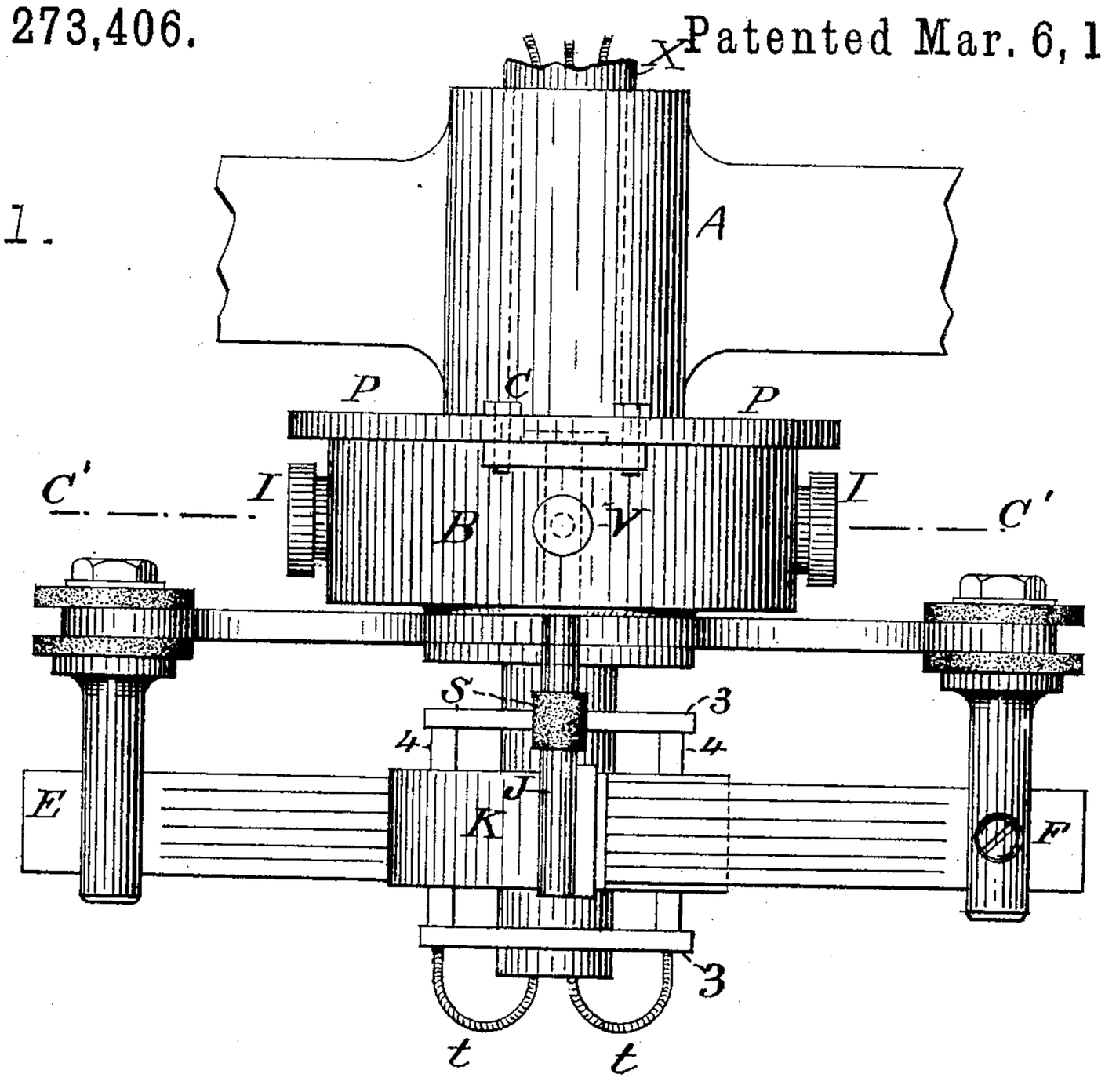
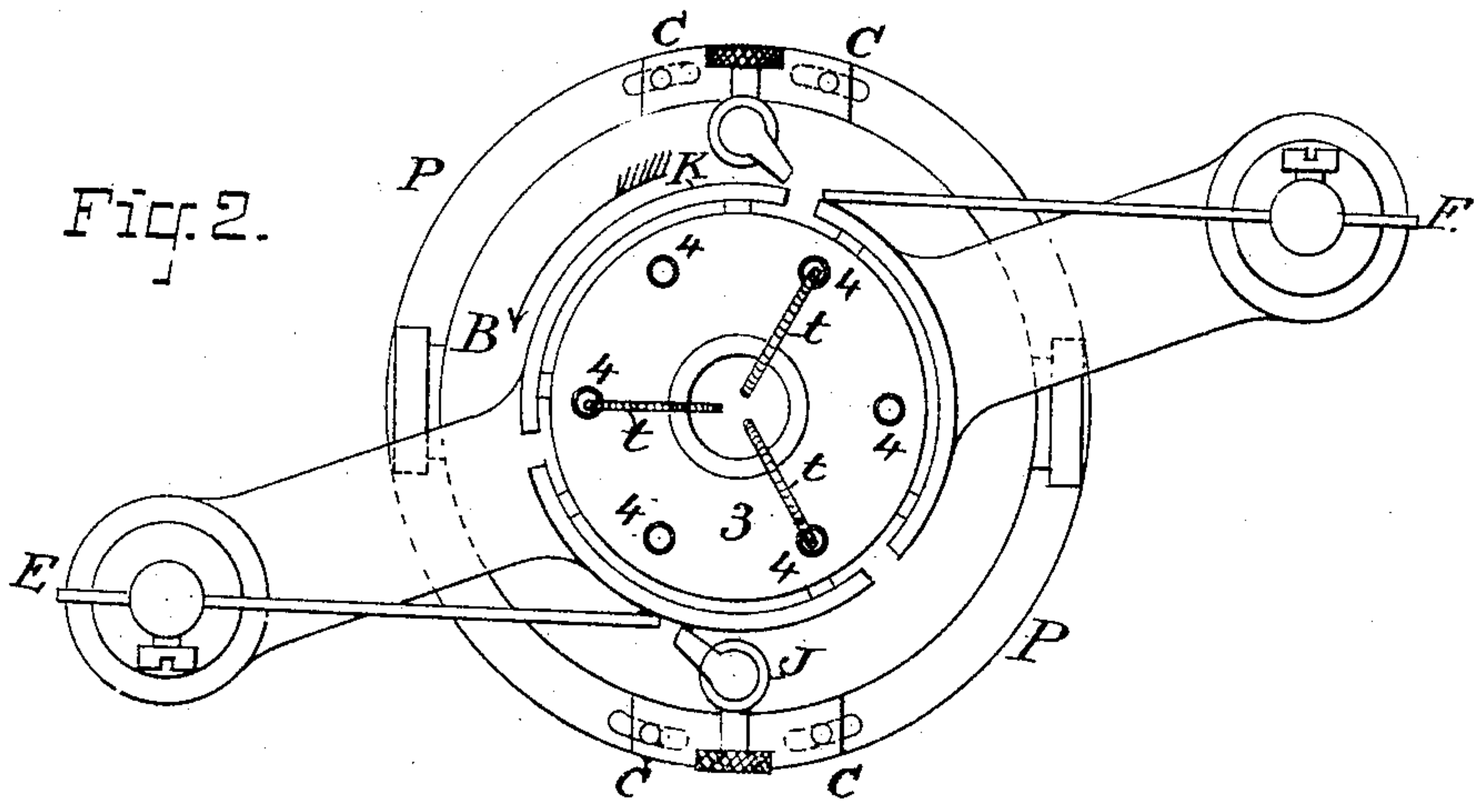


Fig. 2.



ATTEST:

J. A. Murdy
Thos. Toomey.

INVENTOR:

E. Thomson
by R. G. Townsend.
Atty.

(No Model.) 2 Sheets—Sheet 2.

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AIR BLAST ATTACHMENT FOR COMMUTATORS OF DYNAMO ELECTRIC MACHINES.

No. 273,406. Patented Mar. 6, 1883.

Fig. 3.

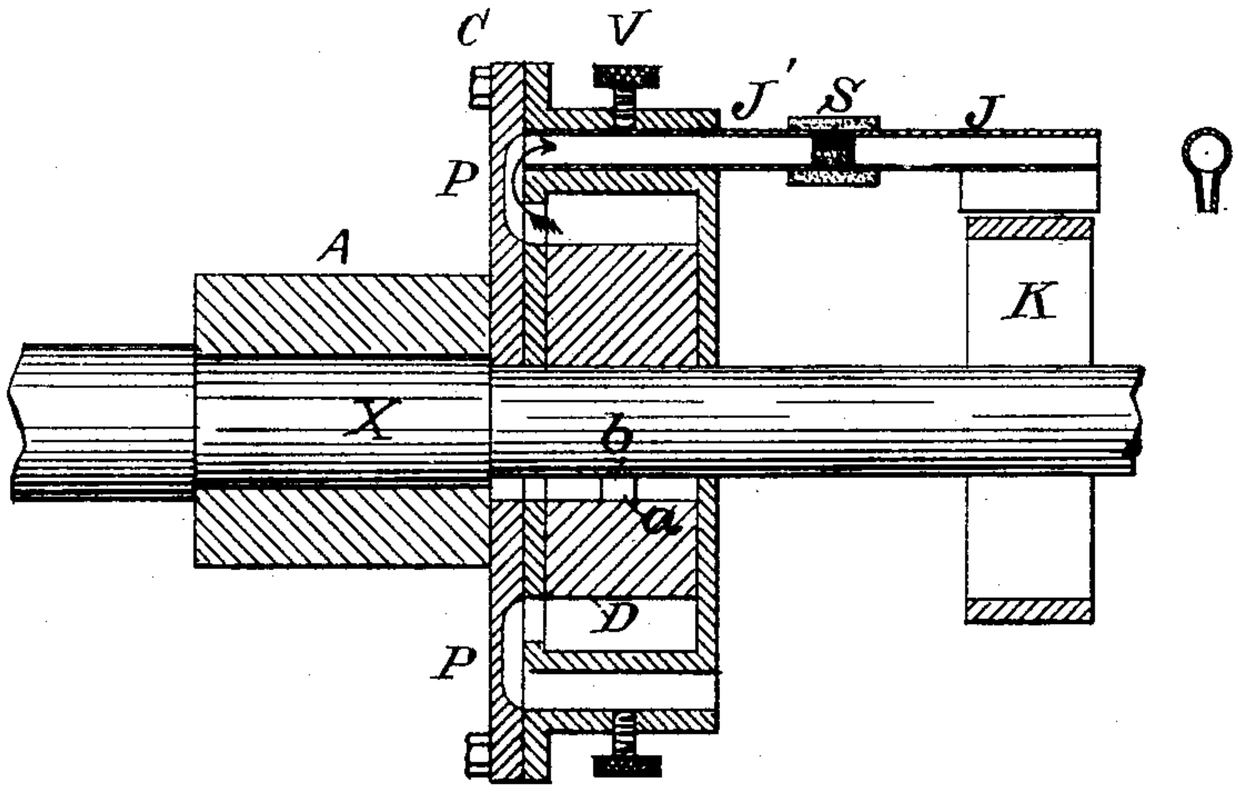
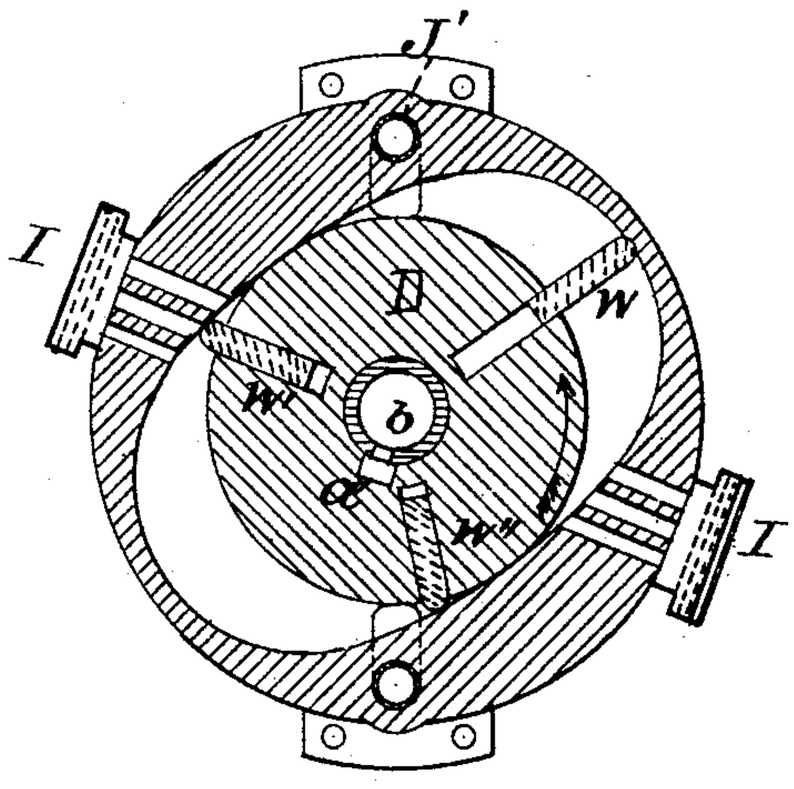


Fig. 4.



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J. A. Murdy
Thos. Toomey

INVENTOR:

E. Thomson
by H. B. Townsend
Atty.

UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF NEW BRITAIN, CONNECTICUT, ASSIGNOR TO THE AMERICAN ELECTRIC COMPANY, OF SAME PLACE.

AIR-BLAST ATTACHMENT FOR COMMUTATORS OF DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 273,406, dated March 6, 1883.

Application filed November 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, and a resident of New Britain, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Air-Blast Attachments for Commutators of Dynamo-Electric Machines, of which the following is a specification.

My invention is designed to furnish a simple and effective means of carrying out the invention patented to me by Letters Patent of the United States No. 265,936, dated October 10, 1882. In that patent I have set forth how a blast of air or of any insulating liquid or fluid may be used to maintain the insulation of two plates or surfaces having a difference of potential or polarity, and I have described in particular the method of preventing flashing between the segments of a commutator by means of a blast of air applied to the spaces between the commutator plates or segments immediately after the commutator-brush passes from one segment to another.

My present invention is an improvement upon the devices described in my prior patent, and provides a means that is practically a part of the machine, and is little liable to get out of order.

My invention consists in mounting the device for generating the air-blast directly upon the armature-shaft or attaching it directly to the same, said devices being connected to suitable air-ducts or blast directors or jets, whereby the blast is directed upon the commutator at the points where the slots pass the brushes.

My invention consists, further, in the combination, with suitable air ducts or jets arranged to direct a blast of air upon the commutator, of rotary air-blast apparatus mounted on the armature-shaft.

My invention consists, further, in the combination of rotating vanes or wings and a casing within which said vanes or wings move, the casing or the wings, as is found desirable, being connected to the armature-shaft, so as to revolve therewith while the other parts are stationary, and suitable air ducts and jets connected with the casing and suitably applied to the commutator.

My invention consists, further, in the combination, with the armature-shaft, of one or more valves, wings, or vanes mounted on the armature-shaft and arranged to slide freely in a radial direction, and a stationary casing of suitable form, in contact with the interior surfaces of which the vanes or wings are held by centrifugal action.

My invention further consists in the combination, with the air jets or pipes directed upon the commutator, of a joint of insulating material connecting them with the air-supply pipes or ducts.

My invention consists, also, of certain combinations and details of construction, that will be first fully described, and then pointed out in the claims.

In the accompanying drawings, Figure 1 is a top view of the air-blast attachment and the commutator to which it is applied, the commutator being a three-segment commutator, such as is described in prior patents granted to me, and constructed and mounted in the manner described in another of my applications. Fig. 2 is an end view of the commutator and the air-blast attachments. Fig. 3 is a longitudinal section on the line of the armature-shaft. Fig. 4 is a transverse section through the rotary air-blast apparatus on the line C′ C′ of Fig. 1.

Upon the shaft X of the machine, Fig. 1, I place the commutator K, as usual, and attach thereto the armature terminals *t* in any well-known way. The commutator K is preferably one in which the segments are mounted in free air upon a light frame-work, and consists essentially, as described by me in one of my applications, of two disks or plates, 3 3, secured to the armature-shaft, and connected by a series of rods or bars, 4 4 4, to which the segments are suitably secured, and through which connection is made between the armature terminals *t t t* and the commutator-segments. The shaft X bears the revolving portion of the blast mechanism. B is the stationary box or casing inclosing the revolving portions of the same, which box B is supported in any suitable manner from any portion of the machine. From the box B jets J are led and directed upon the commutator, so that the

air will pass into the slots between the segments just as said slots pass from beneath the commutator-brushes. There are of course two such jets in ordinary cases, placed diametrically opposite. The jets are connected with the air ducts or pipes leading from the air-blast generator by interposed couplings or sleeves S, of rubber or other suitable insulating material, to prevent leakage of current, and possible shocks in touching simultaneously the jets and commutator-brushes. The jets are made, if preferred, adjustable in position across the face of the commutator, and are set in place by a clamp-screw, V, which bears against a pipe, J′, sliding in a duct in the case B, as shown. To facilitate the adjustment of the jets J upon the commutator circumferentially, the box B is also made adjustable around the shaft by screws or bolts C, which pass through or into elongated slots in the support P, and since the box B carries the jets J by clamping said box B to its support in any position, a permanent setting of the jets may be secured. Fig. 2 shows the same parts viewed from end of the shaft, where also the jets J J are seen to be directed toward the tips of the commutator-brushes E F, respectively.

The construction and method of mounting the air-blast-generating devices or blower are more fully shown in section, Figs. 3 and 4. Upon the shaft X is carried, but not rigidly, a slotted barrel or cylinder, D, the hub of which has a key-way, *a*, in which a short lug or spline, *b*, on the shaft engages. The opening in D is slightly larger than the shaft, thus allowing play of the latter endwise and of D sidewise without cramping. In the case of a three-segment commutator three slots are cut radially in the disk or barrel D, and in these slots are three movable wings, valves, or pistons, preferably of hard rubber, W W′ W″, Fig. 4. During rotation these wings are held outward from the axis by centrifugal force. The shape of the wings and disk D is such as to secure a moderate fit of parts with the outer case, except where the configuration is different. The metal case B is formed interiorly, as in Fig. 4, of elliptical or oval outline, where two jets only are used with two commutator-brushes, but may be readily modified to suit the case of four or more jets. The direction of revolution is as shown by arrows. Air-inlets I I, covered with one or more wire-gauze diaphragms to intercept dust, are provided, as shown. The outlets are of course connected with the jet-pipes J′ J′.

In Fig. 3 the arrangement of jets and conduits thereto is exhibited. When the shaft X is revolved rapidly, rotary movement is imparted to the disk D and wings W W′ W″, Fig. 4, and the latter, being carried outward into the crescent-shaped spaces, act as pistons to propel puffs of air from the inlets I I to the jet-pipes J′ J′. There are three puffs from each jet in one revolution, and the position of the lug *b* on the shaft is made such that the puffs are timed or simultaneous with the passage of the slots of the commutator past brushes E F, as aforesaid. The preferred support of the outer casing or box, B, is from a plate, P P, upon the bearing A of the machine, said plate having slots curved circumferentially for the setting of the box B in proper position, as before described, and having also recesses in its face forming the communication between the air-space in which the wings or valves move and the openings in which the pipes J′ J′ are set, as shown in section in Fig. 3.

By the construction as above described jets or puffs of air are obtained simultaneous with the passage of the commutator-slots from beneath the tips of the commutator-brushes, and at the same time the wear of the moving parts is reduced to almost nothing. Very little lubrication of the blast mechanism suffices. In fact, I find that sufficient oil will ordinarily work its way form the bearing A to keep the parts in good order. No restriction is put upon the rotation or end-play of the shaft X when such play exists. The disk D is free to accommodate itself so as to move truly with the box B. I find advantage in the use of hard-rubber wings W W′ W″ on account of immunity from wear, lightness, ease of construction, and comparative freedom from expansion, should the parts become heated from the box A. My invention suffices to obtain a forcible blast, if need be, and is run with entire safety at high speeds.

I do not limit myself to placing the revolving parts of the air-blast devices directly upon the armature-shaft, although such arrangement is preferable. An air-blast device constructed and connected to the air-jets in the manner described would still be of value if not directly connected to or revolved from the armature-shaft.

What I claim as my invention is—

1. The combination, with the commutator, of air-jets or directors applied thereto, as and for the purpose described, and air-blast devices mounted on the armature-shaft and connected with said jets.

2. The combination, with suitable air ducts or jets arranged to direct a blast of air upon the commutator, of rotary air-blast apparatus mounted on the shaft carrying said commutator.

3. The combination, with air-jets directed upon the commutator for a dynamo-electric machine, of a box or casing and wings or vanes fitted therein, said box or said wings being stationary, as may be desired, while the movable portion is mounted on the armature-shaft, and air ducts or conduits connecting the casing with the air-jets.

4. The combination, with the armature-shaft, of one or more vanes or wings mounted in any suitable manner so as to be capable of radial motion, a casing within which said wings revolve, and with whose interior surface they are held in engagement by centrifugal action,

and air-jets directed upon the commutator and connected with said casing.

5. The combination, with the air-jets directed upon the commutator, of air-blast apparatus giving impulses or puffs simultaneously with the passage of the commutator-divisions past the brushes.

6. The combination, with the commutator, of air-jets directed upon the same, and blast mechanism operating in time with the commutator, and having blast-spaces equal in number to the jets and wings or vanes equal in number to the division-lines of the commutator.

7. The combination, with the jets directed upon the commutator, of rotary blast mechanism loose on the armature-shaft.

8. The combination, with the commutator, of laterally-adjustable air-jets.

9. The combination, with the commutator, of circumferentially-adjustable air-jets.

10. The combination, with the casing for the blast mechanism, of air-jets supported therefrom and directed upon the commutator, and means for adjusting said casing circumferentially.

11. The combination, with the air-jets directed upon the commutator, of a section of pipes of insulating material between said jets and the air-blast mechanism.

12. The combination, with the air-jets directed upon the commutator, of a coupling-joint of insulating material connecting said jet with the air-supply pipe or duct.

13. The combination, with the commutator, of insulated air jets or pipes.

14. The combination, in a dynamo-electric machine, of casing B, supported from the bearing for the armature-shaft, vanes W W′ W″, mounted in slots in a carrier connected to the shaft, and air-jets J, connected with the casing.

15. The combination, in a dynamo-electric machine, of casing B, wings or vanes of hard rubber, and air-jets connected with the casing and directed upon the commutator.

16. The combination, in a dynamo-electric machine, of casing B, pipes J′, carrying the air-jets, and set-screws V.

17. The combination, with a dynamo-electric machine, of the barrel D, connected with the armature-shaft by slot and spline, wings W, &c., a casing for the same, and air-jets directed upon the commutator.

18. The combination, with the commutator, of casing B, pipes J′, and support P, having a recess communicating with the air-blast chamber and the ducts carrying pipes J′.

19. The combination, in a dynamo-electric machine, of the air-jets directed upon the commutator, the casing B, the outlet and inlet pipes arranged at opposite extremities of the enlarged air-space, and the screen or gauze over the inlet-pipe.

Signed at New York, in the county of New York and State of New York, this 28th day of October, A. D. 1882.

ELIHU THOMSON.

Witnesses:
THOMAS TOOMEY,
GEO. C. COFFIN.