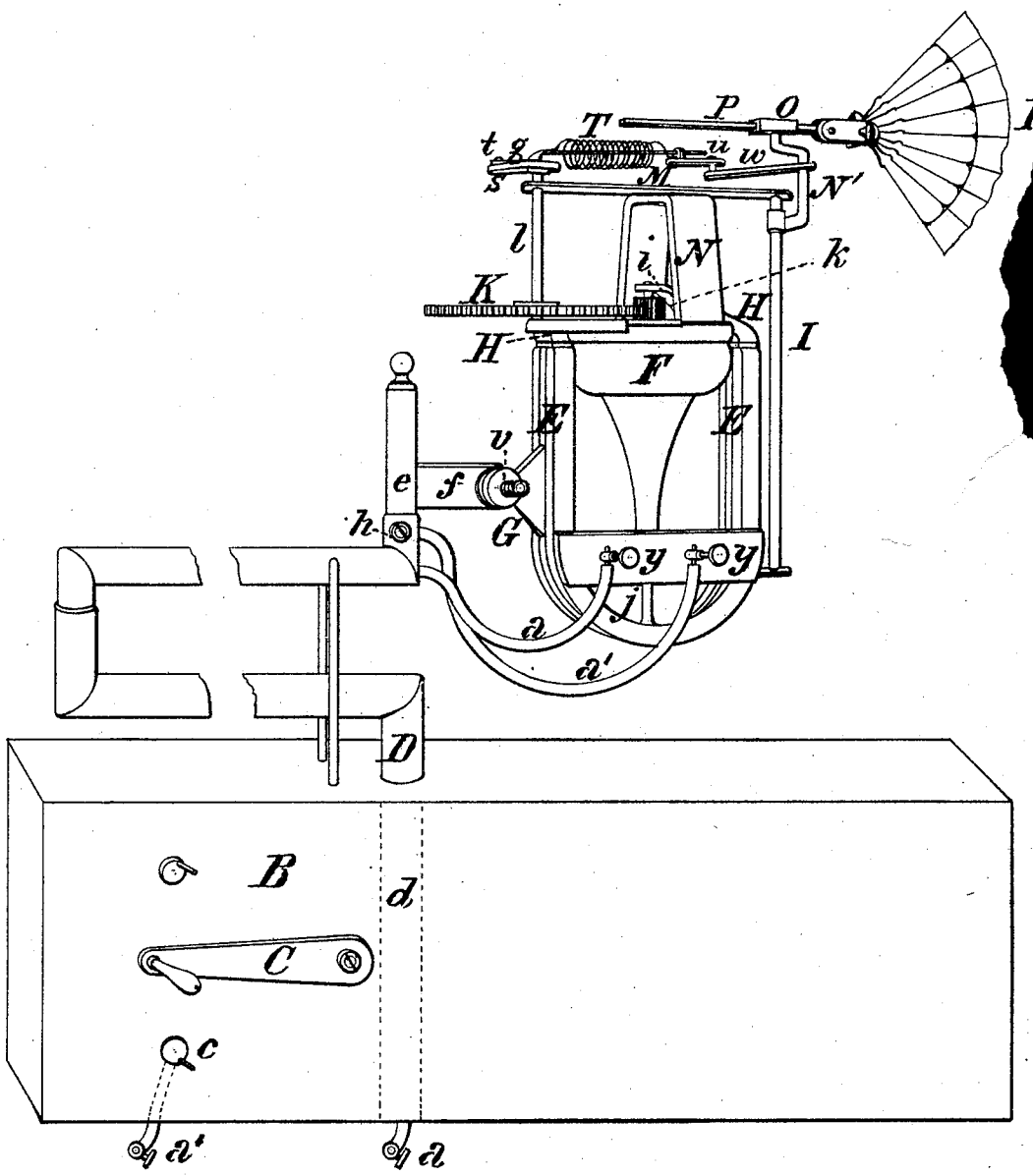
G. F. GREEN.

ELECTRO MAGNETIC FAN.

No. 171,122. Patented Dec. 14, 1875.



Witnesses.

B. F. Morse

E. C. Davidson

Inventor.

Geo F. Green

by his Atty

Wm D. Baldwin

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GEORGE F. GREEN, OF KALAMAZOO, MICHIGAN, ASSIGNOR TO SAMUEL S. WHITE, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ELECTRO-MAGNETIC FANS.

Specification forming part of Letters Patent No. **171,122**, dated December 14, 1875; application filed August 5, 1873.

CASE G.

To all whom it may concern:

Be it known that I, GEORGE F. GREEN, of Kalamazoo, Michigan, have invented a certain new and useful Application of Power from an Electro-Magnetic Motor, of which the following is a specification:

My invention relates more especially to the automatic vibration of fans used during the performance of dental operation. Its objects are to secure a fan which may easily be adjusted in any desired position, and which may be worked by electro-magnetism. The subject-matter claimed is hereinafter specified.

The accompanying drawing represents a view in perspective of my improved apparatus. Through a base, B, I insert the stem *d* of a hollow metallic bracket, D, which turns horizontally on this stem over the base in any direction. Into the upper extremity of the bracket D I slide a stud, *e*, from which I project an elbow, *f*, with a clamp-joint, G, connecting it to a permanent magnet, E, which is upheld by the clamp-joint G, on which it is free to turn upward and downward, or the clamp may be fixed at any adjusted position by means of the jam-nut *v* upon it. The magnet may also be turned around in any horizontal direction, as the stud *e* is free to turn in the bracket D, and in any of these positions may be fixed by the set-screw *h*. I insulate the magnet E from the bracket D by interposing between the jam-nut *v* and the elbow *f* a washer of non-conducting material, such as rubber or pasteboard, for example. On the side of the magnet E opposite the joint G I solder a step, which affords a bearing for the lower end of a shaft, I. Between the poles of the magnet E I mount an electro-magnet, F, on a spindle, *j*, the lower end of which has a bearing in the bottom of the magnet E, while its upper end passes through and is sustained in the arm *i* of an open metallic frame, H, which extends across the magnet E and is secured to its poles. The magnet F is thus free to rotate between the poles of the magnet E. The upper end of the spindle *j* carries a pinion, *k*, between the arm *i* and the magnet F, and this pinion meshes into a gear-wheel, K, supported on a shaft, *l*, the lower end of which is supported in the frame H, and its upper end, as well as the upper end of the shaft I, supported in a cross-brace, M, which is in turn braced by being screwed down upon the stirrup N, which is mounted on the frame H. Near the upper end of the shaft I, which is pivoted in this cross-brace N, I solder a bent arm, N′, in the upper end of which I provide a socket, O, for the fan-shaft P, the fan-shaft being securely held in this socket by means of a set-screw, which permits the shaft to be slipped in or out as desired. The open fan R is secured in a vertical position to the outer end of the shaft. Upon the upper end of the shaft *l*, which projects through and above the cross-brace M, I mount a crank-wheel, S, and connect to the wrist-pin of this crank one end of a flexible or extendible connecting-rod, T, which is curved upward to admit of the crank-wheel passing under it, and also to allow a spiral spring to be coiled around the connecting-rod. The end of this connecting-rod passes through an eye in one end of a short link, *u*, and in the other end of this link is a wrist-pin, which is fastened in the rear end of a long crank, *w*, the forward end of this crank *w* being brazed around the crooked shaft N′. The small crank *g* is rotated by the power of the battery, and as it rotates it operates the long crank *w* through the connecting-rod *t* and link *u*, and through this connection the shaft N′ is vibrated, but not rotated, and the fan is swayed to and fro.

The power of the battery is transmitted from the wires *a a′* and the bracket D through the binding-posts *y y* and metallic contacts between them and the spindle *j* (as is well understood) to the electro-magnet F, which rotates between the poles of the permanent magnet E, and the electro-magnet rotates the pinion-shaft *j* and pinion *k*, and through it the gear-wheel K on the shaft *l*, which carries the crank and transmits the motion just described to the fan.

To admit of the intermission of the operation of the fan without disconnecting the wires *a a′*, I provide a circuit-breaker, C, which con-

sists of a metallic arm pivoted on the base B, and thus connected at one end with the circuit, which it keeps closed so long as it rests in contact with the stud *c* connected with the wire *a'*, as already described. When this arm is lifted from the stud *c* the circuit is broken, the arrangement and operation being such as is well understood by electricians in the category of telegraphic switches.

I claim as my invention—

1. The combination, substantially as hereinbefore set forth, of the rotating electro-magnet, its gearing, the fan-shaft, cross-brace M, and the cranked pitman-connections between the fan-shaft and gearing, whereby the fan is vibrated by the rotation of the magnet.

2. The combination of the fan, the electro-magnet, and its adjustable supporting-bracket, through which the circuit passes; these members being constructed and operating in combination, substantially as hereinbefore set forth.

3. The combination, substantially as set forth, of the electro-motor, the adjustable bracket, and the circuit-breaking lever, through which the current passes to the bracket.

4. The combination of the horizontally adjustable bracket, the electro-magnet, and the insulated vertically-adjustable joint between the bracket and magnet.

In testimony whereof I have hereunto subscribed my name.

GEORGE F. GREEN.

Witnesses:

LEVI TEAL,

WM. E. MORGAN.