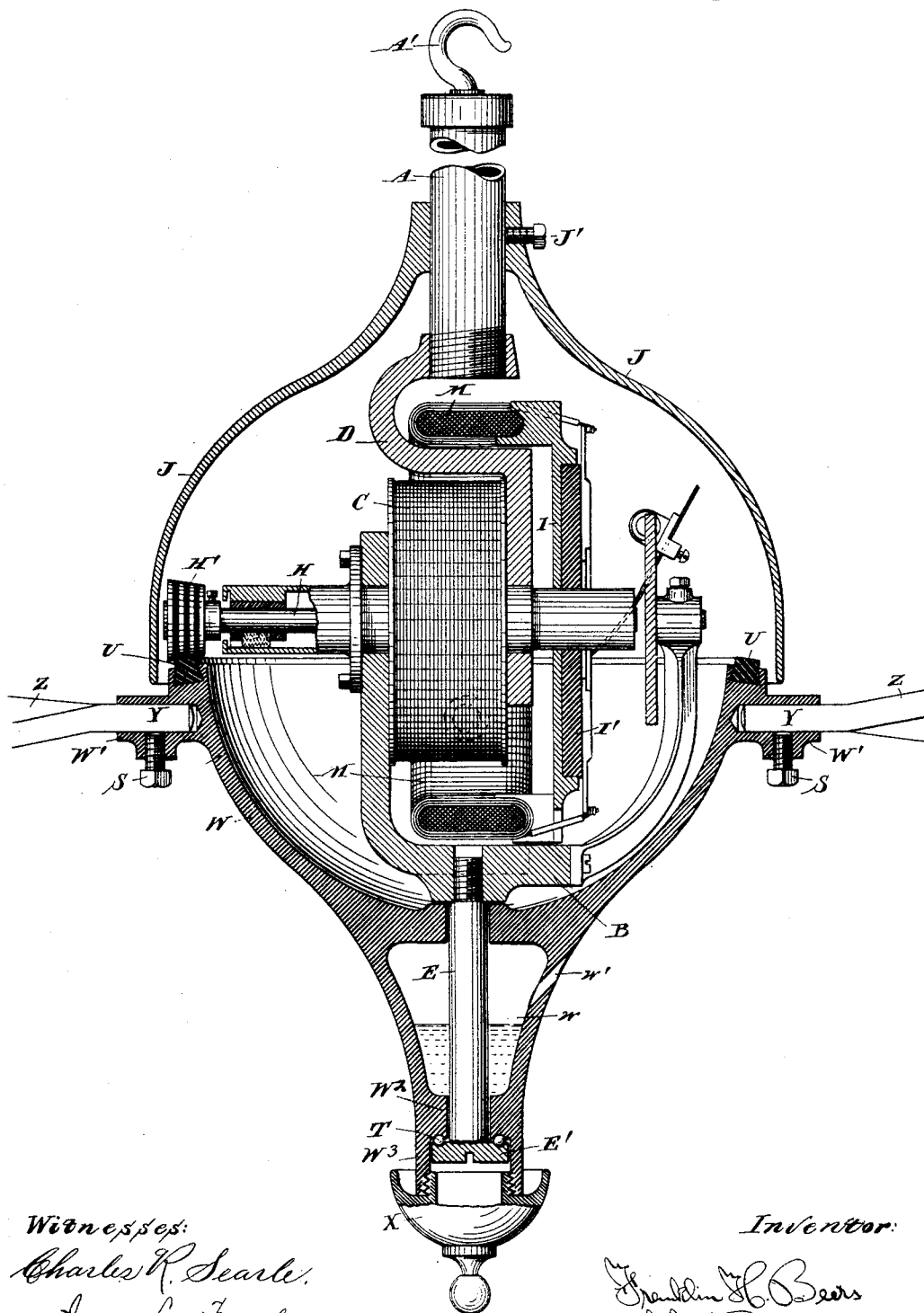


(No Model.)

F. H. BEERS.
ELECTRIC FAN.

No. 481,646.

Patented Aug. 30, 1892.



Witnesses:
Charles R. Searle.
Jose L. Fingleton.

Inventor:
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UNITED STATES PATENT OFFICE.

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ELECTRIC FAN.

SPECIFICATION forming part of Letters Patent No. 481,646, dated August 30, 1892.

Application filed February 26, 1892. Serial No. 422,875. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN H. BEERS, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Electric Fans, of which the following is a specification.

My improvement applies to the class of fans employed during the hot season to maintain a comfortable condition in apartments by an active circulation of the air.

I have shown the invention applied to a large four-bladed screw-fan revolving horizontally and driven by friction from a more-rapidly-revolving armature actuated by a sufficiently strong electric current and subjected to the proper conditions for generating and maintaining a high velocity of rotation. The proportions of the beveled friction-wheels are such that the motor revolves twelve or some other considerable number of times in each revolution of the fan-shaft. I mount the electric motor in a suitable central position and construct the main shell of the revolving portion so as to partially or entirely inclose it, the motor and the connecting mechanism being sunk within a cup formed by the said shell. Arms carrying the screw-wings are set in suitable sockets on the revolving shell. The whole is suspended to a rod extending downward from the ceiling. I provide a cover sufficiently extended to shield the motor and mount it on such vertical rod with provisions, as a pinching-screw, for holding it in an elevated position on such rod to allow for examination or for oiling or other attention required by the motor and the connected gearing. I make the conical friction-gears each of a series of layers of different material, as soft vulcanized rubber and leather. I equip the upper edge of the wheel with a rim of rubber extending continuously around and engaged by dovetailing in a corresponding groove turned or otherwise produced in such rim and projecting sufficiently above the metal of the rim to receive the action of a converse-ly-coned friction-pulley fixed on the horizontal shaft of the motor and partaking of its rapid revolutions.

The accompanying drawing forms a part of

this specification and represents what I consider the best means of carrying out the invention. It is a central vertical section.

Referring to the drawing, A is a vertical rod connected by the hook A' to an eye (not shown) fixed in the ceiling, or this rod A may be fixed to the ceiling by other means. The motor has a circular armature M, which revolves rapidly, carrying with it the spider I I' and shaft H. It has a field-magnet C, with a pole B, exterior to the armature on the lower side, and a pole D, interior to the armature on the upper side, these parts being rigidly connected and constituting a sufficiently stout frame supported by the rod A, and in its turn supporting a rod E, which extends down below the motor and terminates in a collar E'.

W is a revolving part capable of rotating in a horizontal plane, mounted on the rod E, and formed at its upper end into an approximately semispherical shell extending nearly up to the motor-shaft H. On the exterior of this wheel W are sockets W', which receive each the inner end of a horizontal arm Y, carrying a properly-inclined screw-blade Z. Pinching-screws S hold these arms. Whenever it is desired to change the inclination of these screw-blades Z these pinching-screws may be relaxed, the inclination of the blades changed as required, and the screws again tightened. A groove of dovetail section is turned or otherwise produced in the upper edge of this shell W, into which groove is fitted a ring of soft rubber U, filling such groove and retained by it and extending upward sufficiently above the metal to form a proper yielding bearing to receive motion frictionally from the cone H'. A strong current of electricity, forming a circuit through the several coils in the motor and traversing through wires (not shown) connecting the motor with a suitable dynamo, induces a continuous rapid rotation of the shaft H. This through the cone H' and the finished rubber surface U correspondingly rotates the wheel W, and thereby through the fan-blades Z induces the required agitation of the air in the apartment. I circularly groove the upper surface of the collar E' and correspondingly groove the un-

der surface of the internal lip W^2 near the base of the wheel W , and introduce in the grooves thus formed a series of nicely-finished metallic balls T . This anti-friction device
 5 supports the weight of the wheel W and the connected parts, which are allowed to be revolved with no appreciable resistance, except that due to the air.

I construct the conical wheel H' of a central tube of iron or other metal, with a pinching-screw for holding it reliably, and a series of rings or washers, alternately leather and soft rubber, cemented together and to the metal. The periphery being turned to the
 10 proper conical form and the portion of the rubber U projecting above the rim of the wheel W being properly beveled to match therewith, the friction-cones work together smoothly, and the wear being mostly on the
 20 small wheel H' , which is fortified by the leather, the parts are capable of enduring a rapid and continuous action for a very long period. The deep portion of the wheel W below the motor is formed with two bearings
 25 matching closely to the rod A , with a considerable chamber w between, which is supplied with oil at intervals through a hole w' , and lubricates the bearings. A rim W^3 extends downward from the wheel W around the lip
 30 W^2 , and is tapped to receive a correspondingly-threaded piece X , which is adapted to serve both as a tight-fitting plug to retain oil and as an ornament to give a finish.

J is a cover, a thin shell of cast-iron or other
 35 suitable material, having an approximately semispherical form, with its open end downward and sufficiently large to inclose the upper portion of the motor and extend down somewhat below the upper edge of the wheel
 40 W . The neck at the upper portion of this cover is fitted on the rod A and is equipped with a pinching-screw J' , by which it may be secured at any desired elevation on the rod

A . In the position shown it serves as a protection for the mechanism. Whenever it is
 45 desired to give any attention to the motor or to the friction connections this cover may be lifted and held up by the pinching-screw J' .

Modifications may be made without departing from the principle or sacrificing the ad-
 50 vantages of the invention. I can use other forms of electric motor. I can use a greater or less number of arms Y and screw-blades Z .

I do not in this application claim a motor having one pole or one set of poles on the exterior of the armature and another pole or
 55 set of poles on the interior thereof. Such is made the subject of a separate application for patent of even date herewith.

I claim as my invention—

1. An electric fan having the fan-blades attached to a revolving shell encompassing the driving-motor, as herein specified.

2. An electric fan having the fan-blades attached to a revolving shell encompassing the
 65 driving-motor, in combination with such motor and with bevel friction-gear for communicating motion therefrom to such shell, and with a movable cover, all arranged to serve
 70 substantially as herein specified.

3. The fan-driving mechanism comprising a motor having a rapidly-revolving armature and shaft, a conical friction-pulley carried thereby, a shell capable of revolving and carrying the fans turning on a central fixed rod,
 75 and provisions for storing and supplying oil to the supporting-bearing, all arranged for joint operation, as herein specified.

In testimony that I claim the invention above set forth I affix my signature in presence of two witnesses.

FRANKLIN H. BEERS.

Witnesses:

CHARLES R. SEARLE,
 JOSE L. FINGLETON.