

(No Model.)

C. E. PIERCE.

AUTOMATIC FAN.

No. 370,653.

Patented Sept. 27, 1887.

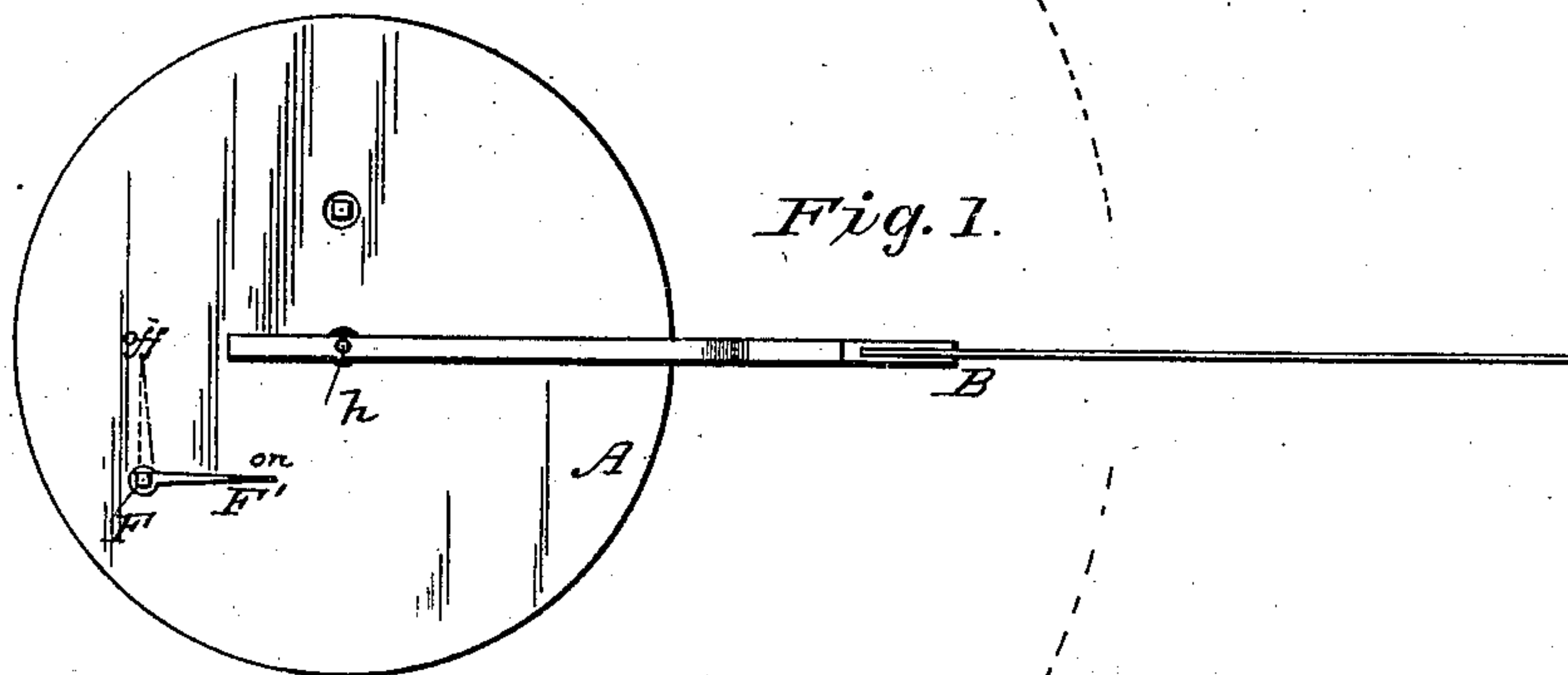


Fig. 1.

Fig. 2.

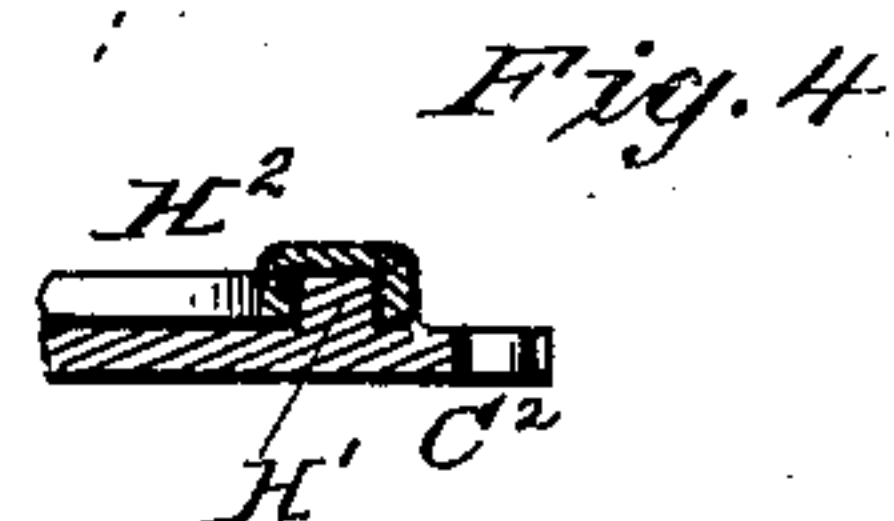
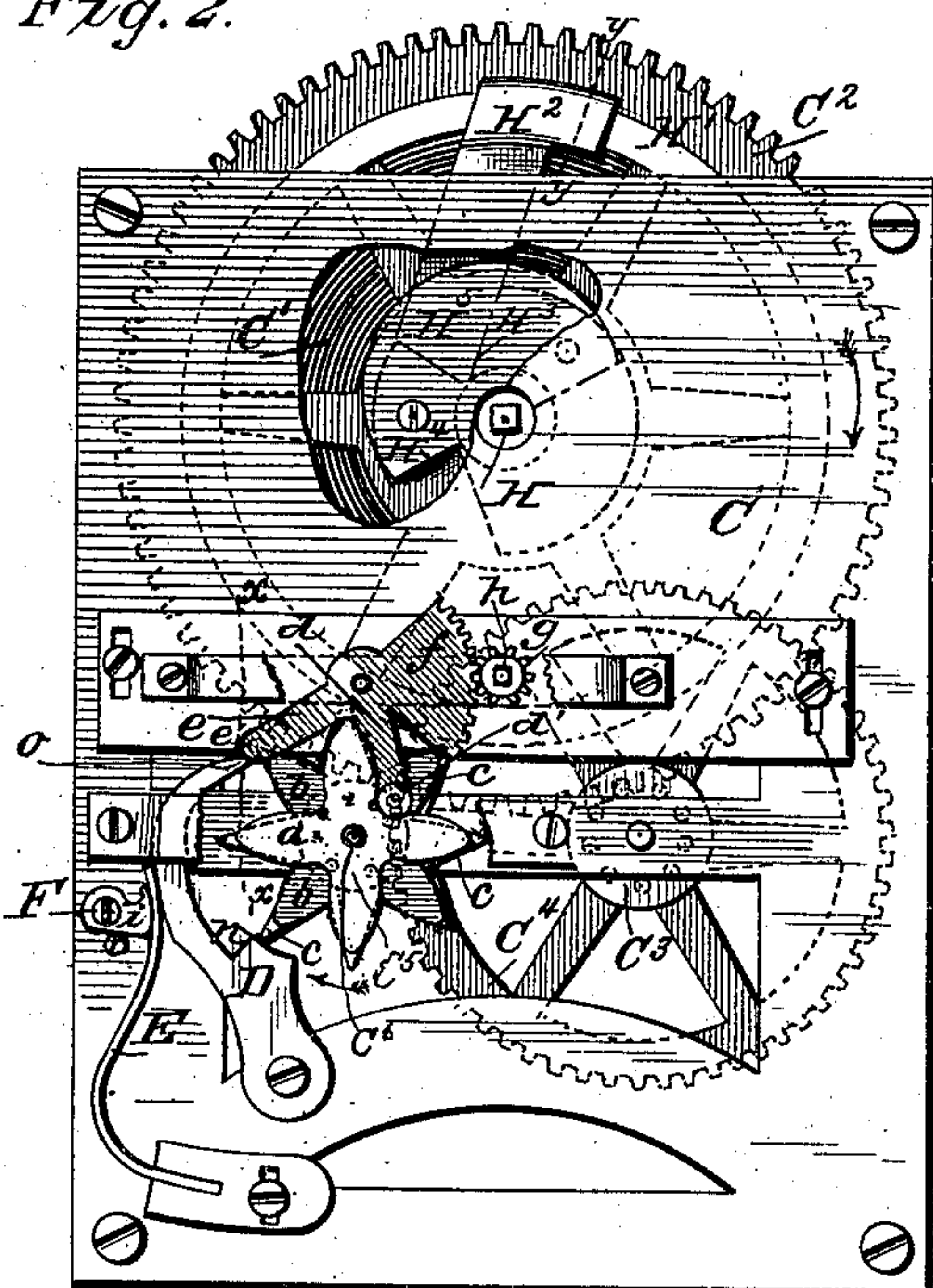


Fig. 4.

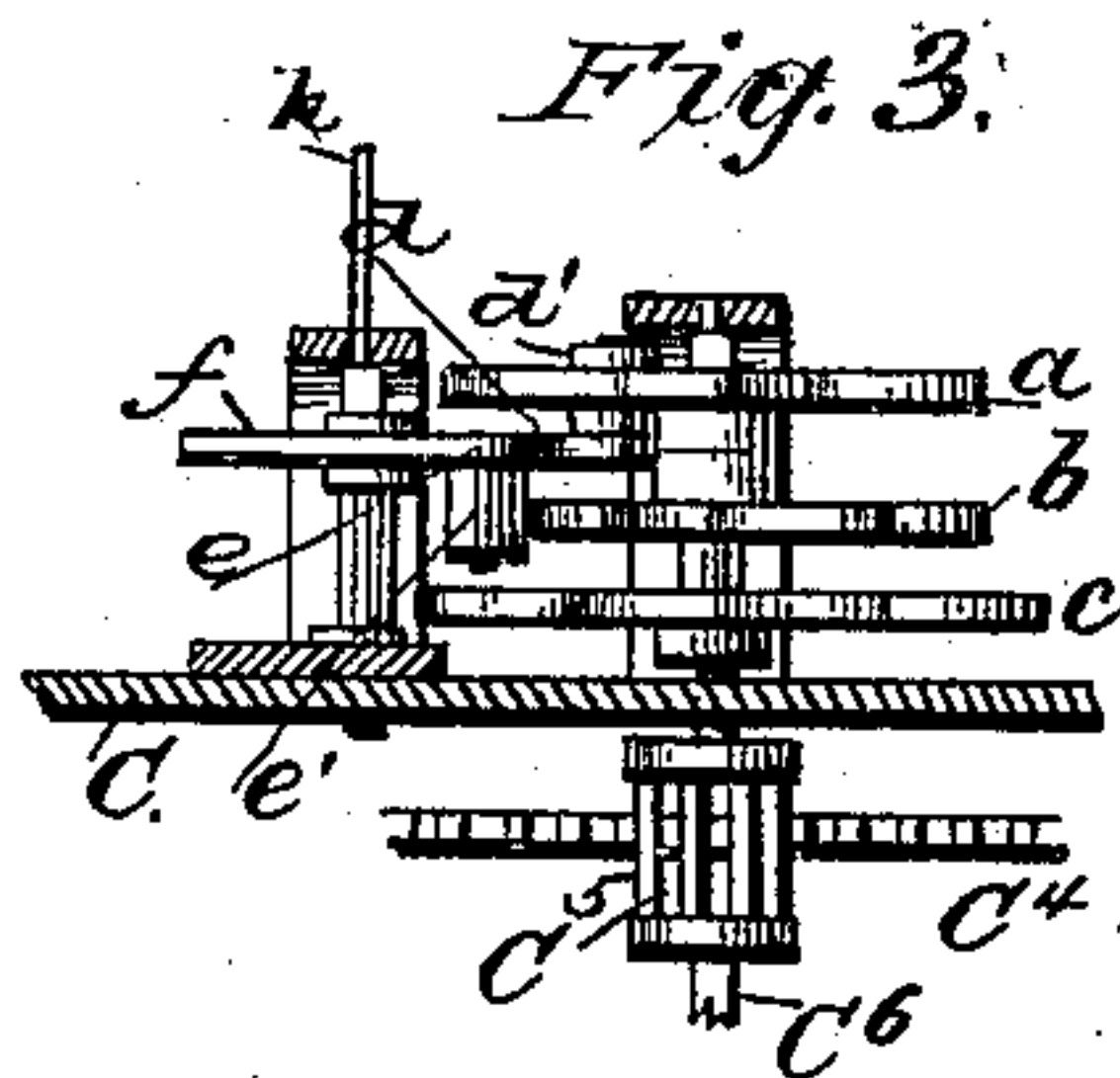


Fig. 3.

WITNESSES:

Fred G. Dietrich
Edw. W. Byrn.

INVENTOR:

C. E. Pierce
BY *Munn & Co.*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

CHARLES E. PIERCE, OF NEW YORK, N. Y.

AUTOMATIC FAN.

SPECIFICATION forming part of Letters Patent No. 370,653, dated September 27, 1887.

Application filed October 16, 1886. Serial No. 216,434. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. PIERCE, of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Automatic Fans, of which the following is a specification.

The object of my invention is to provide an automatic fan for driving away flies or other troublesome insects and producing a pleasant current of cool air, and designed for use in the sick-room, upon the dinner-table, the sewing-machine, sleeping-cars, and in many other applications.

To this end it consists in the peculiar construction and combination of gears and a prime mover, in connection with an escapement and brake, as will be hereinafter fully described.

Figure 1 is a plan view. Fig. 2 is a plan view with the casing removed and parts broken away, the view being on a larger scale than Fig. 1. Fig. 3 is a vertical sectional elevation through line *xx* of Fig. 2, and Fig. 4 is a detail cross-section through line *yy* of Fig. 2.

A represents the outer case, which is of circular form and designed to rest upon a horizontal surface—such as a table, mantel-piece, shelf, &c.; but which may be made of any other shape and adapted to be hung up against a wall, the head-board of a bed, or to occupy any other position. In the top of this case there is a hole, through which the sleeve of the fan-arm is inserted and made to fit over the square shaft of the driving mechanism within. This fan B is given by the shaft an oscillatory motion, swinging back and forth through an arc of about one-third of a circle.

The driving mechanism is mounted upon the back plate or bottom board of the case, and consists of a metal frame, C, one or more strong coil-springs, C', a gear-wheel, C², meshing with a pinion, C³, a gear-wheel, C⁴, on the same shaft as pinion C³ and meshing into pinion C⁵ on the shaft C⁶.

The winding mechanism for winding up the spring resembles that of an ordinary clock mechanism, except that the shaft H is not rigidly connected to a ratchet-wheel which is engaged by a pawl on the main gear-wheel, but is provided with a noiseless winding mechanism, as follows: The main wheel has a raised

flange, H', on its side, and over it fits loosely a slide, H², whose arm extends toward the center, but not in a radial line, and rests in a notch, H³, in a hub or boss, H⁴, rigidly attached to the shaft. The inner end of this slide is housed in said notch by a plate, H⁵. Now, when the shaft to which the spring is attached is turned in the direction of the arrow, the slide H² moves freely over the flange on the wheel to wind the spring; but when a strain is exerted in the opposite direction the boss or hub cramps the slide on the flange of the wheel, and the wheel and spring must both turn together. This makes a noiseless winding mechanism, and one which is perfectly positive in its clutching action in holding the spring against flying back.

Rigidly fixed on the shaft C⁶ above the metal frame-work are three wiper-wheels, *a b c*, occupying planes one above the other. The two upper wheels, *a* and *b*, have each four prongs or cam-points, and the points of one occupy a position exactly half-way between the points of the other. The lower wheel, *c*, has eight prongs or points, or the same number as both the other wheels put together.

Co-operating with the two upper wiper-wheels is a vibrating escapement consisting of a sleeve having two arms, *d e*, set at about right angles to each other, and a segmental gear, *f*. The arm *d* has an upwardly-projecting pin and roller, *d'*, that works in the plane of and co-operates with the upper wiper-wheel, *a*. The arm *e* has a downwardly-projecting pin and roller, *e'*, that works in the plane of and co-operates with the lower wiper-wheel, *b*. The shaft C⁶, bearing these wiper-wheels, it will be seen, revolves continually from the strain imparted by the spring through the intermediate gears in one direction, as shown by the arrow, and, as a prong of the upper one of the wiper-wheels bears against the roller *d'* of the upper arm, *d*, it throws the escapement to the right until the point passes the roller. At this moment a prong of the lower wiper-wheel, *b*, bears against the roller *e'* of the other arm, *e*, of the escapement and throws the escapement to the left, so that the continued rotation of these wiper-wheels imparts an oscillatory motion to the escapement, the roller of

one arm being on the point of one wheel at the same moment that the roller of the other arm is in the angle of the other wheel. The oscillatory motion of the escapement, however, is of very slight amplitude, and to increase this and give the fan a sufficient swing the segmental gear *f* is attached to the escapement and made to move with it, and into this segmental gear a small pinion, *g*, is made to engage, which pinion is rigidly fixed upon the square shaft *h*, that receives the sleeve of the fan-arm.

When the wiper-wheels are in such position that their points are just about to pass the rollers, it will be seen that the leverage is much greater than it is when the rollers are in the hollow or angle between the prongs, and this is the occasion of a slight lack of uniformity in the escapement. This I rectify by bringing a spring-pressure to bear on the shaft bearing these wheels, which pressure acts in unison with the driving mechanism and helps the points of the wheels past the rollers. For this purpose I provide the lower wheel, *c*, with eight prongs, and in the plane of this wheel I pivot an arm, *D*, to the metal frame, and this arm has two bearings, *n o*, for the wheel *c*, and is forced up against the prongs of the same by a spring, *E*. As the wheel *c* revolves, one of the prongs bears against the curved surface *n* and forces it back against the spring until said point passes off the bearing, and at this instant, when the leverage of the wiper-wheels above is increasing, the other bearing, *o*, of arm *E* presses, by reason of the spring, against the rear side of one of the teeth of wheel *c*, and by a cam action supplements the power of the mainspring and helps the point of the wiper-wheels past the roller of the escapement-arm. This same mechanism—the arm *D* and spring *E*—is made to subserve the office of a brake for stopping the fan by means of a shaft, *F*, extending through the case, and a lug, *i*, fixed upon said shaft and adapted to be turned so as to rigidly press arm *D* against the wheel *c* to stop the mechanism, or to be

turned out of the way to allow the arm *D* to yield against its spring when the fan is in motion. The shaft *F* is provided outside the case with an index hand or pointer, *F'*, to indicate how it is to be adjusted to set the fan in motion or stop it.

In making use of my invention I do not confine myself to a spring; but may employ a weight or other prime mover, and when a weight is used it is preferably inclosed in a vertical tube, and the fan in that case may be constructed upon a permanent and independent stand to be moved about the room as a piece of furniture.

Having thus described my invention, what I claim as new is—

1. An automatic fan consisting of a vibrating arm with fan attached, an oscillating shaft bearing a pinion, an escapement composed of a segmental gear engaging with the pinion, and two arms, *d* and *e*, having, respectively, the upwardly and downwardly projecting rollers *d' e'*, and the two wiper-wheels *a b*, mounted upon a shaft, respectively, in the planes of said rollers and connected by gears with the prime mover, substantially as described.

2. The combination, with the fan-shaft and pinion, the segmental gear and attached arms *d e*, the wiper-wheels *a b*, and the subjacent wheel *c*, having the same number of teeth as both wiper-wheels together, the pivoted arm *D*, and spring *E*, for rendering the escapement uniform in its action, as described.

3. The combination of shaft *F* with pointer *F'* and lug *i*, the spring *E* and arm *D*, the wheels *c b a*, and the escapement consisting of arms *d e*, segment *f*, and the fan-shaft having a pinion, substantially as described.

The above specification of my invention signed by me in the presence of two subscribing witnesses.

CHARLES E. PIERCE.

Witnesses:

EDW. W. BYRN,
 SOLON C. KEMON.