No. 687,854. Patented Dec. 3, 1901.

M. ROLLE.

ROTARY FAN.

(Application filed July 10, 1901.)

(No Model.) 3 Sheets—Sheet 1.

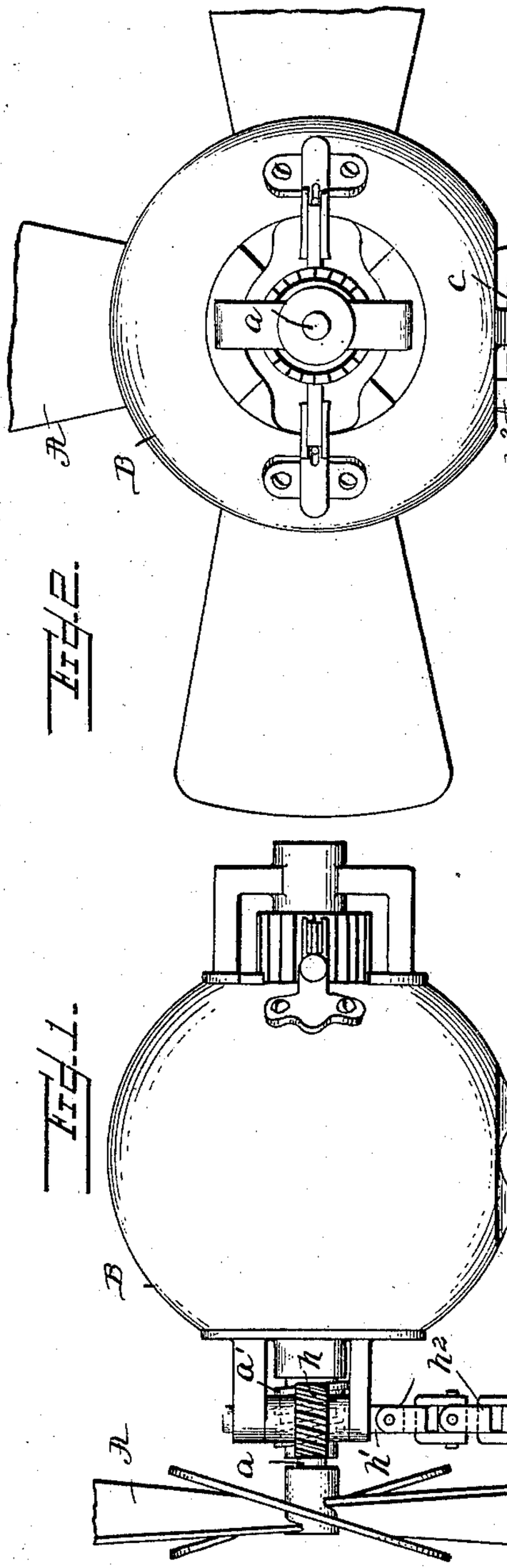

FIG. 2.

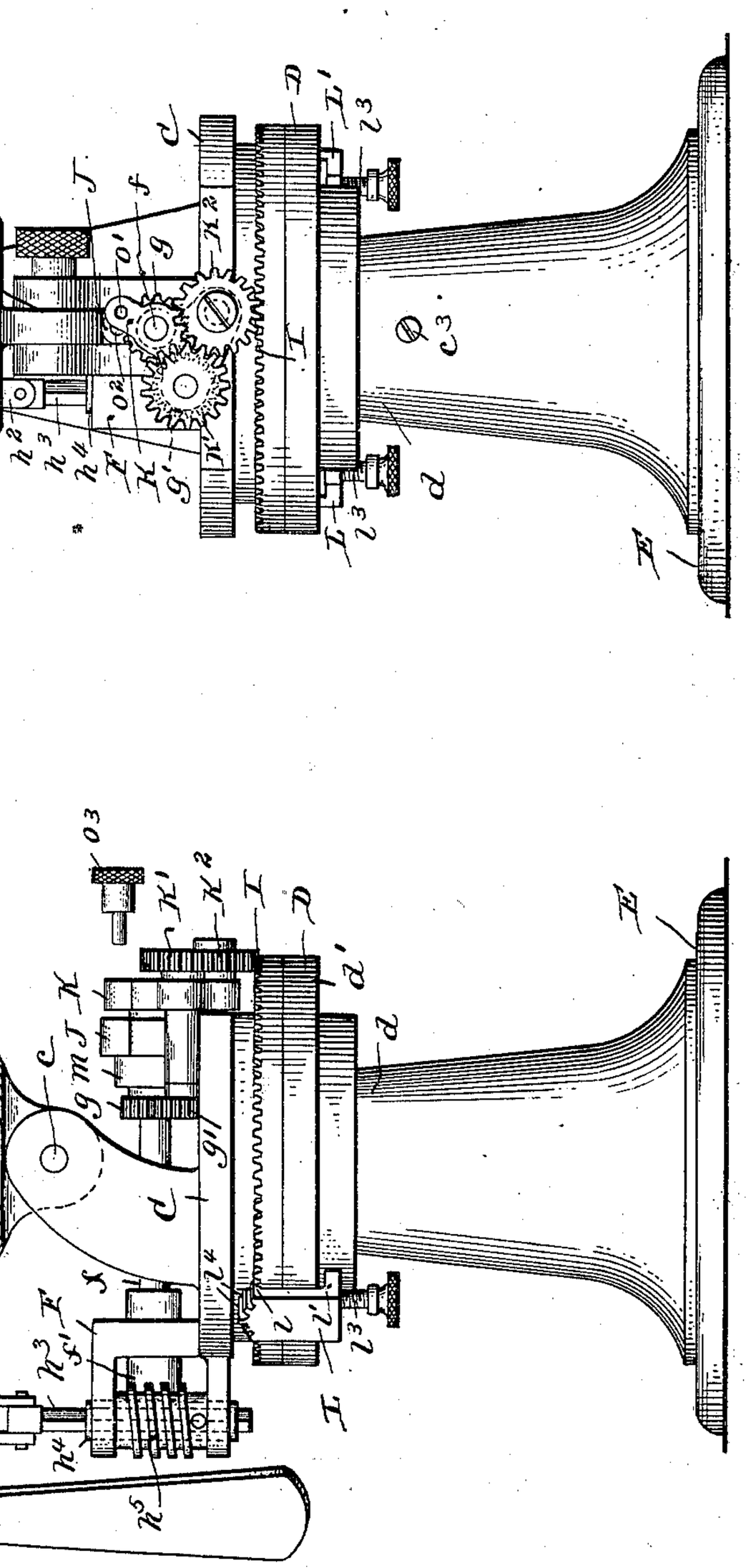

FIG. 1.

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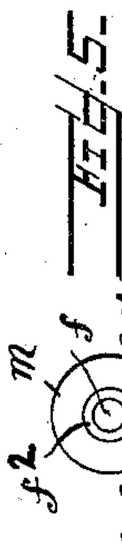

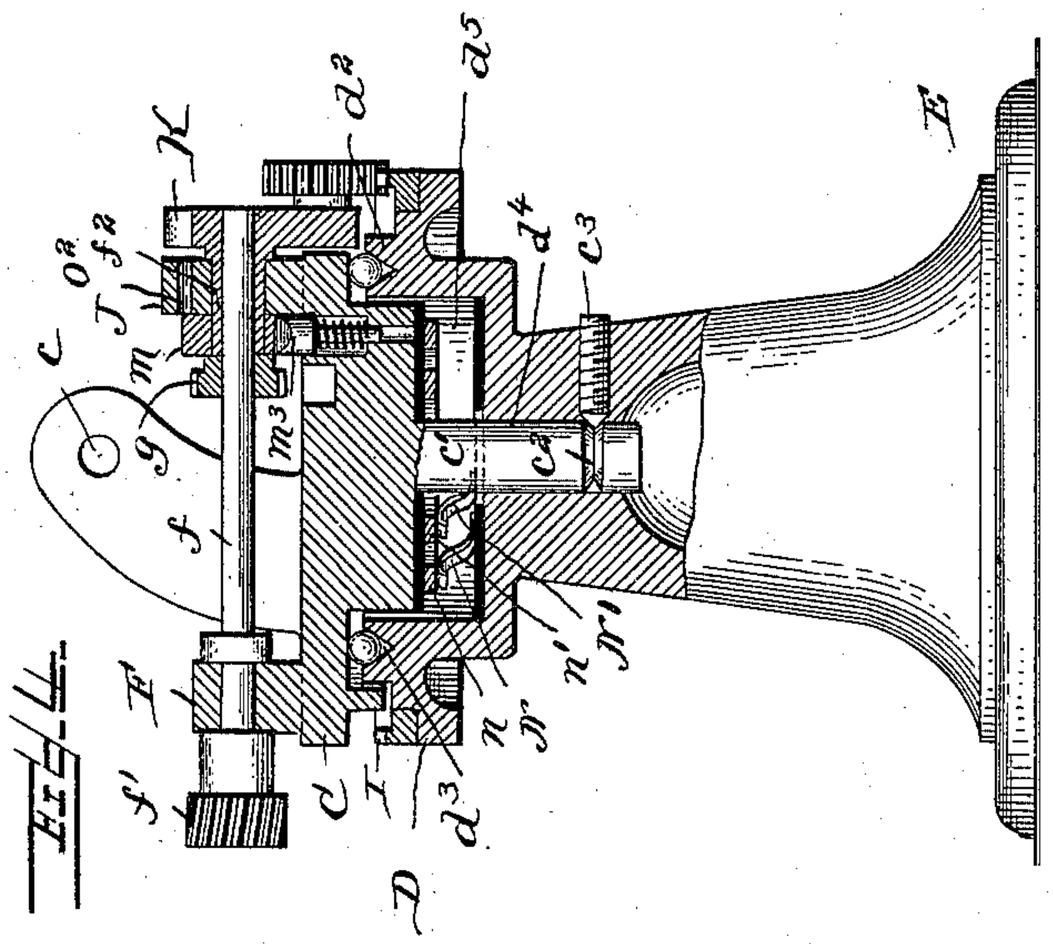

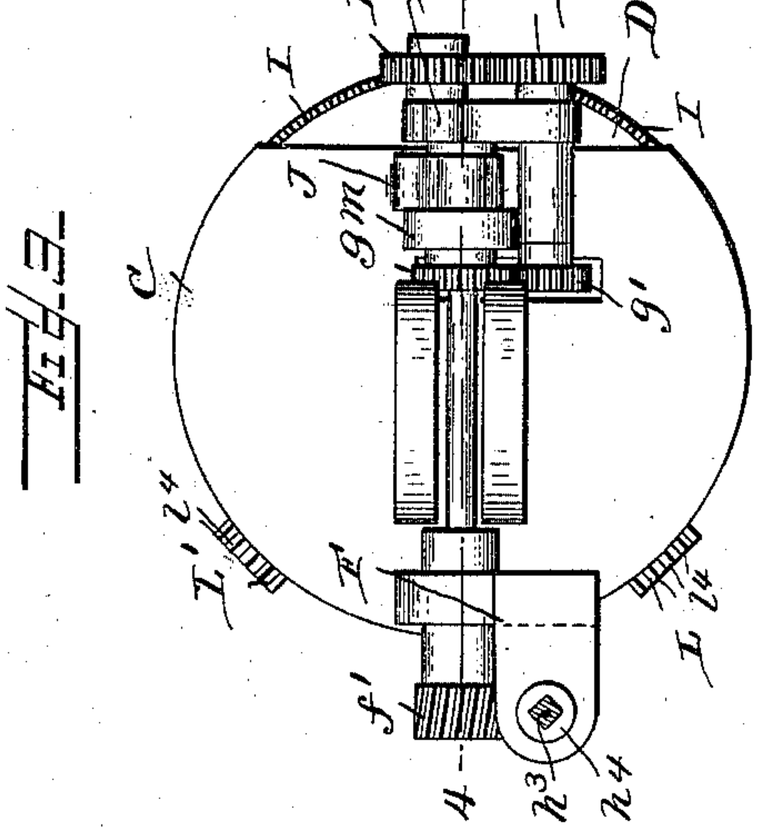

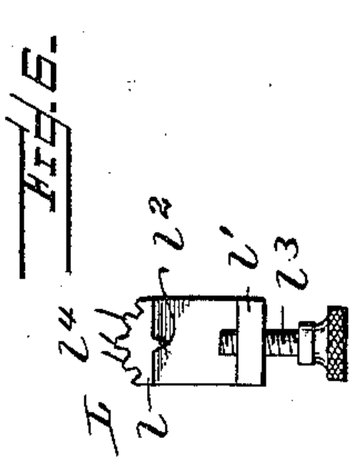

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(No Model.) 3 Sheets—Sheet 3.

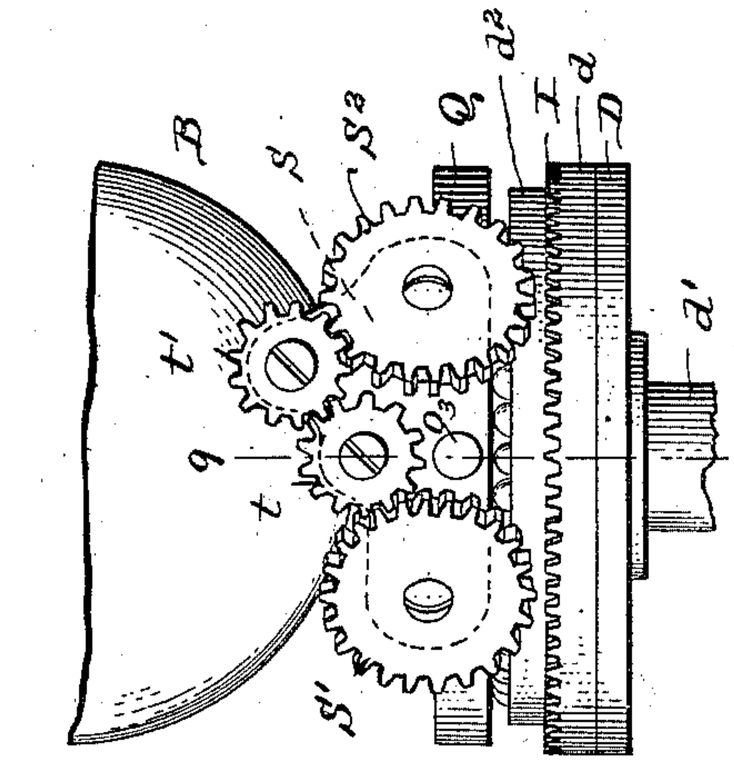

FIG. 4.

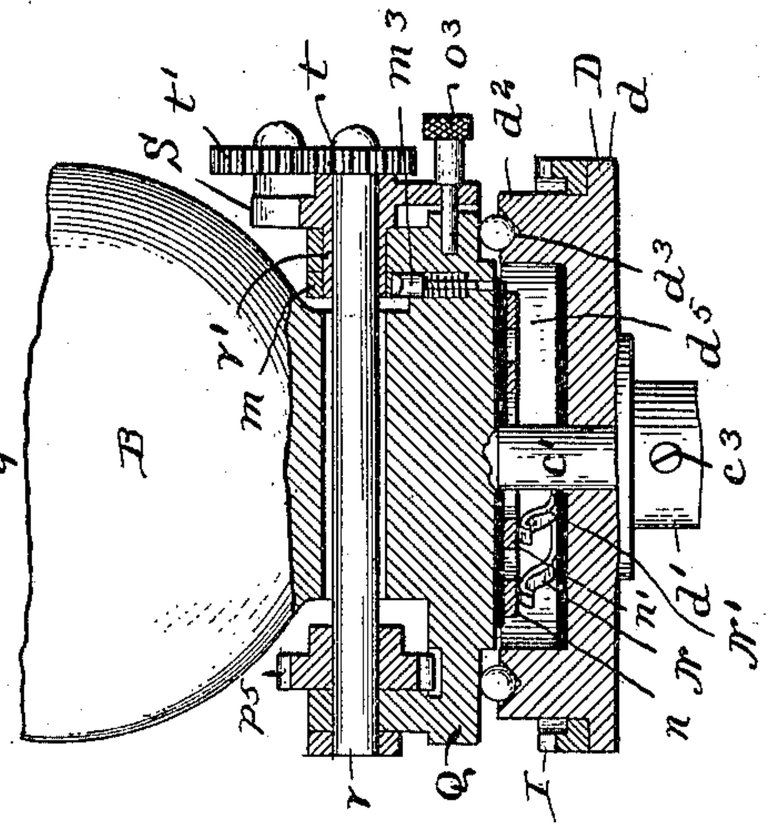

FIG. 5.

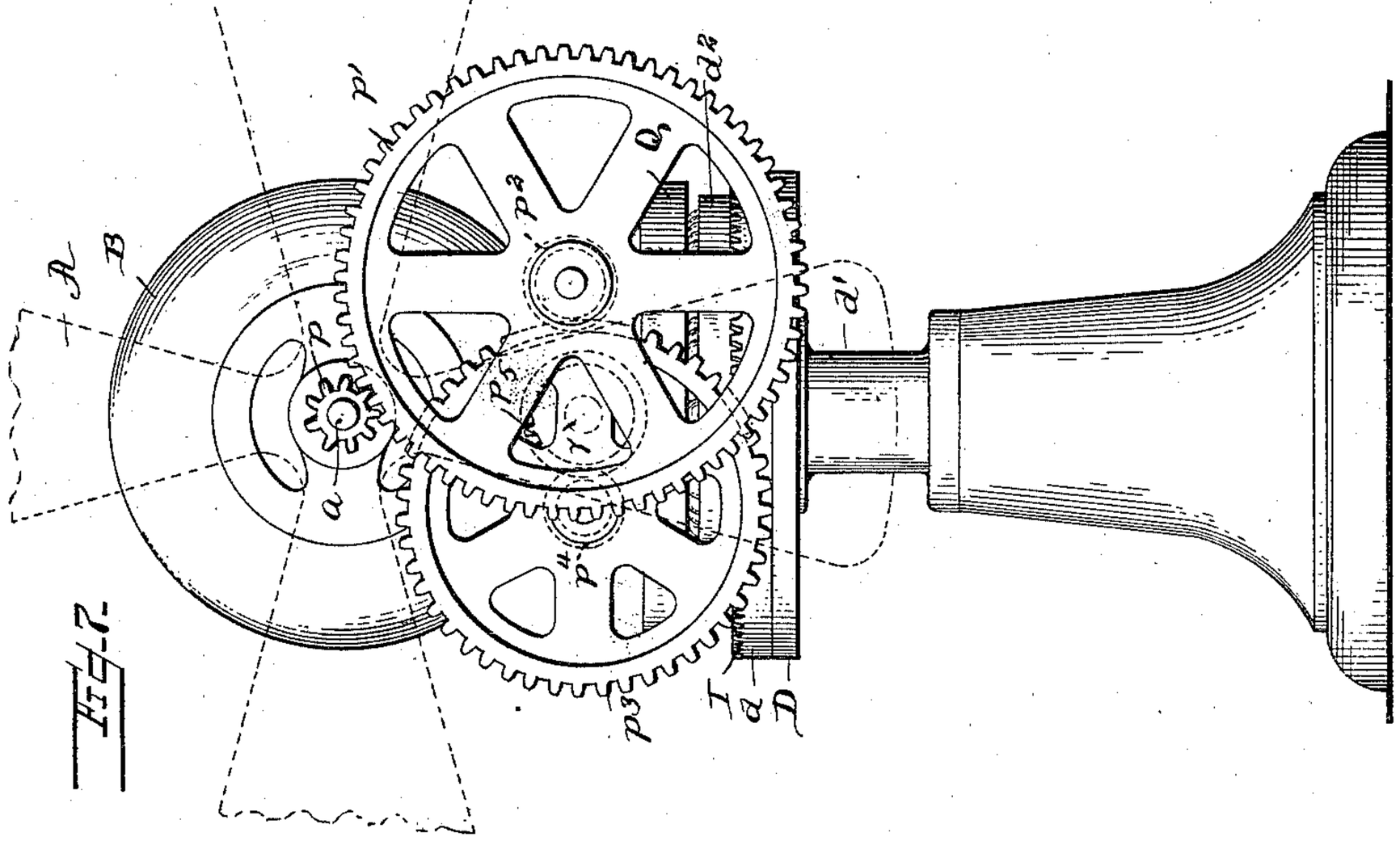

FIG. 6.

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UNITED STATES PATENT OFFICE.

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ROTARY FAN.

SPECIFICATION forming part of Letters Patent No. 687,854, dated December 3, 1901.

Application filed July 10, 1901. Serial No. 67,742. (No model.)

To all whom it may concern:

Be it known that I, MAX ROLLE, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Rotary Fans, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to rotary fans of the character ordinarily operated by an electric motor, and has for its object the provision of means whereby the fan may have imparted to it, in addition to a rotation on its axis, a bodily movement of rotation in a horizontal plane, so as to direct a current of air toward every desired part of the room or apartment which it is desired to ventilate.

It also has for its object the provision of means whereby the fan may be brodly rotated through any desired arc of a circle and automatically reversed at the desired end of its movement in each direction.

It also has for its object, broadly, the provision of means whereby the above-described objects may be attained, but which will at the same time permit the fan to be adjusted at any desired angle to the horizontal.

In the drawings, Figure 1 is a side view of the preferred form of the invention. Fig. 2 is a rear view of the same. Fig. 3 is a plan view of the same with the motor removed. Fig. 4 is a detail sectional view on the line 4 4 of Fig. 3. Fig. 5 is a detail sectional view of the spring-actuated stop. Fig. 6 is a front view of one of the reversing-stops. Fig. 7 is a front view of a modified form of the invention. Fig. 8 is a partial rear view. Fig. 9 is a detail section on line 9 9 of Fig. 8.

A is a fan, and *a* the shaft thereof, which also carries the armature of the motor. (Not shown.)

B is the motor-casing, spherical in form and having bearings at front and rear of the shaft *a*.

C is a rotatable platform, to which the motor-casing is pivoted at *c*.

D is a stationary support having the part *d* of smaller diameter and the part *d'* of greater diameter. The part *d'* has an annular flange d^2, on the top of which is the circular ball-bearing raceway d^3. Located centrally of the support is the bearing d^4. Between the bearing d^4 and flange d^2 is thus formed an annular chamber d^5. Projecting downwardly from the rotatable platform C is a post c', which extends into the bearing d^4. This post has near its end the circular groove c^2. Extending through the wall of the part *d* is a screw c^3, which engages the groove c^2.

It will be understood from the foregoing description that the platform C, which carries the motor and fan, is free to rotate upon the support D. The support D is secured to the top of the base E.

Secured to the rotatable platform C is a bracket F. Supported in bearings on platform C and bracket F is the shaft *f*.

a' is a worm on the front of shaft *a*. Meshing therewith is a worm-wheel *h* on the upright shaft h', rotating in a bearing on the motor-casing B. Pivoted on the lower end of shaft h' is one end of a pair of links h^2, the other end of which is forked and pivoted on the upper end of a square shaft h^3. This shaft passes through the sleeve h^4, rotatable in bearings on the bracket F. Secured to the sleeve h^4 is a worm h^5. The worm and sleeve are prevented from moving in the direction of their axes by being confined between the two arms of the bracket F.

f' is a worm-wheel on shaft *f* and meshes with the worm h^5. As the motor rotates rotation is transmitted to the shaft *f* through the worm *h*, shaft h', link h^2, shaft h^3, worm h^5, and worm-wheel f'.

Loose on the shaft *f* near its rear end is a sleeve f^2. The sleeve f^2 extends through a bearing in a bracket J on the rotatable platform C. Secured to the rear end of the sleeve f^2 is a frame K.

g is a gear on the rear of shaft *f*. This gear meshes with a gear g' of equal size on a shaft supported on frame K. On the shaft of gear g' is a larger gear K', which meshes with a gear K^2 on a shaft supported on frame K. Rotation of shaft *f* thus causes gear K' to rotate in one direction and gear K^2 in the other direction, the sleeve f^2 and frame K normally being stationary.

On the circumferential rim of the part *d'*

of support D is a circular rack I, adapted to be engaged by either of the gears K′ or K². It is evident that if frame K is tilted so that gear K′ engages rack I the platform C, together with the motor and fan, will be rotated in one direction, while if frame K is tilted toward the opposite side, so that gear K² engages rack I, the platform C, together with the motor and fan, will be rotated in the opposite direction.

In order to automatically reverse the direction of rotation of the platform C, I provide the following mechanism:

L L′ are stops adapted to be secured to the rim of the part d' of support D in the following manner: Each stop has a smooth straight outer face, while its inner face is recessed, the height of the recess corresponding to the width in a vertical direction of the rim of the part d' of support D. This forms an inwardly-extending upper shoulder l and an inwardly-extending lower shoulder l'. Projecting downward from the upper shoulder l is a tooth l^2, which passes between two adjacent teeth of the rack I when the stop is placed in position on the rim.

l^3 is a screw, which extends through the lower shoulder and engages the under face of part d' of support D near the edge thereof. By tightening the screw the stop is held in place. On the upper beveled edge of the upper shoulder is formed a tooth or series of teeth l^4.

If we suppose that the gear K′ is in engagement with the rack I, the operation is as follows: The gear K′ is feeding toward the stop L. When it reaches the stop, the gear K′ leaves the rack and climbs up the toothed edge of the stop L. This tilts the frame K, (and sleeve f^2,) throwing the gear K² into engagement with rack I. The platform C now rotates in the opposite direction until the gear K² reaches the stop L′, whereupon the gear K² leaves the rack and climbs up the toothed edge of the stop L′, thereby tilting the frame K (and sleeve f^2) in the opposite direction and throwing the gear K′ again into engagement with the rack I.

In order to insure that the frame K shall tilt to the extent necessary to cause one or the other of the gears to be thrown into engagement with the rack, I provide the following mechanism:

m is a collar secured on sleeve f^2. This collar has two notches m' and m^2 on its lower side.

m^3 is a spring-pressed pin seated in an orifice in the platform C and engaging one of the notches in the collar. When the frame K is tilted in one or the other direction, the collar m turns and forces the pin m^3 out of one notch into the other. It is necessary to tilt the frame K positively only to an extent necessary to turn the collar m just beyond the dead-center, whereupon the pin m^3 will at once spring into the bottom of the other notch and turn the collar m (and consequently sleeve f^2 and frame K) a distance sufficient to throw the hitherto idle gear K′ or K² into engagement with the rack.

The brushes that engage the commutator of the motor are electrically connected with the two annular plates n and n' on the bottom of the rotatable platform C.

N and N′ are spring-metal brushes secured to the floor of the chamber d^5. These brushes N and N′ engage, respectively, the annular plates n and n' and are respectively secured to the two terminals of an electric circuit. This arrangement maintains the motor at all times in circuit, whether it is stationary or turning.

It is sometimes desirable that the motor be held stationary. This I provide for by the following means:

o' is an orifice in the frame K.

o^2 is an orifice in bracket J.

The holes o' and o^2 are in such positions that when the frame K is swung to a central position, so as to lift both gears K′ and K² out of engagement with the rack I, the two holes will be exactly opposite each other. By inserting a pin o^3 through these holes the frame K is maintained in a central position, both gears K′ and K² are held out of engagement with the rack I, and the motor will revolve without turning on a vertical axis.

If it is desired to have the fan direct a current of air in a direction inclined to the horizontal, this can be done by adjusting the motor on its pivot c. This adjustment of the motor will cause the square shaft h^3 to slip up or down within the sleeve h^4, but will not disturb the driving connections.

In Figs. 7, 8, and 9 I have shown a modified construction in which no provision has been made for adjusting the inclination of the motor to the horizontal, as just described. In this construction the motor-shaft a is provided on its front end with a pinion p. This pinion drives a large gear p' on a shaft turning in bearings secured to the rotatable platform Q. On the shaft of gear p' is a pinion p^2, which drives another large gear p^3 on a shaft also turning in bearings secured to the rotatable platform. On the shaft of gear p^3 is a pinion p^4, which drives a pinion p^5 on a shaft r, corresponding to the shaft f of the preferred construction. On this shaft is a sleeve r', to which is secured a frame S, corresponding to sleeve f^2 and frame K of the preferred construction. On the end of shaft r is a gear t, meshing with a gear t' of equal size turning in bearings on the frame S. The gear t drives a larger gear S′, and the gear t' a larger gear S². These two gears correspond to the gears K′ and K² of the preferred construction and operate in exactly the same manner. It is impossible in this modification to adjust the angle of inclination of the motor without disrupting the driving connections, and the motor is simply secured rigidly on the rotatable platform. In other respects the details of construction of the modification are the same as

those described in relation to the preferred construction.

I do not limit myself to any specific devices hereinbefore described, except wherein such devices are expressly claimed, as it is obvious that various details of structure may be modified without departing from the invention.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

1. The combination, with a fan, of a motor for rotating the same about its own axis, a rotatable platform upholding the motor and fan, a stationary support upon which said platform is adapted to rotate, a circular rack on said support, a pair of gears, driving connections between the motor and the gears adapted to drive them in opposite directions, and means to move either of said gears into engagement with said rack, substantially as described.

2. The combination, with a fan, of a motor for rotating the same about its own axis, a rotatable platform upholding the motor and fan, a stationary support upon which said platform is adapted to rotate, a circular rack on said support, two gears, driving connections between the motor and the gears adapted to drive them in opposite directions, a swinging frame on which said gears are mounted whereby said frame may be tilted to throw either of said gears into engagement and the other gear out of engagement with said rack, and stops on said rack adapted to be engaged by the gear in engagement with the rack to throw the same out of engagement and the other gear into engagement with said rack, substantially as described.

3. The combination, with a fan, of a motor for rotating the same about its own axis, a rotatable platform upholding the motor and fan, a stationary support upon which said platform is adapted to rotate, a circular rack on said support, two gears, driving connections between the motor and the gears adapted to drive them in opposite directions, a swinging frame on which said gears are mounted whereby said frame may be tilted to throw either of said gears into engagement and the other gear out of engagement with said rack, and stops on said rack, said stops having a toothed upper edge in the same vertical plane as the rack, substantially as described.

4. The combination, with a fan, of a motor, for rotating the same about its own axis, a rotatable platform upholding the motor and fan, a stationary support upon which said platform is adapted to rotate, a circular rack on said support, two gears, driving connections between the motor and the gears adapted to drive them in opposite directions, a swinging frame on which said gears are mounted whereby said frame may be tilted to throw either of said gears into engagement and the other gear out of engagement with said rack, and adjustable stops on said rack, said stops having a shoulder in the same vertical plane as the rack, the upper edge of the shoulder being inclined and provided with teeth while the lower edge is provided with a tooth adapted to extend between two adjacent teeth of the rack, substantially as described.

5. The combination, with a fan, of a motor for rotating the same about its own axis, a rotatable platform upholding the motor and fan, a stationary support upon which said platform is adapted to rotate, a circular rack on said support, two gears, driving connections between the motor and the gears adapted to drive them in opposite directions, a swinging frame on which said gears are mounted whereby said frame may be tilted to throw either of said gears into engagement and the other gear out of engagement with said rack, substantially as described.

6. The combination, with a fan, of a motor for rotating the same about its own axis, a rotatable platform upholding the motor and fan, a stationary support upon which said platform is adapted to rotate, a circular rack on said support, two gears, driving connections between the motor and the gears adapted to drive them in opposite directions, a swinging frame on which said gears are mounted whereby said frame may be tilted to throw either of said gears into engagement and the other gear out of engagement with said rack, a bracket on the platform having an orifice and the swinging frame also having an orifice so located that when the swinging frame is swung to a central position to lift both gears out of engagement with said rack the said orifices are opposite each other, and a pin adapted to be extended through both orifices, substantially as described.

7. The combination, with a shaft and a fan and motor on said shaft, of a rotatable platform, a casing containing the motor having bearings for said shaft and pivoted on said platform, a support upon which said platform is adapted to rotate, a circular rack on said support, a gear engaging said rack, a universal joint and driving connections from said shaft to said universal joint and from said universal joint to said gear, whereby the motor and fan-shaft can be adjusted to an inclined position without disrupting the driving connections, substantially as described.

8. The combination, with a shaft, and a fan and motor on said shaft, of a rotatable platform, a casing containing the motor having bearings for said shaft and pivoted on said platform, a support upon which said platform is adapted to rotate, a circular rack on said support, two gears, a swinging frame on which said gears are mounted whereby said frame may be tilted to throw either of said gears into engagement and the other gear out of engagement with said rack, and driving connections between said shaft and gear adapted to drive them in opposite directions, and a universal joint interposed in said driving connections, substantially as described.

9. The combination, with a fan, of a motor for rotating the same about its own axis, a

rotatable platform upholding the motor and fan, a stationary support upon which said platform is adapted to rotate, a circular rack on said support, two gears, driving connections between the motor and the gears adapted to drive them in opposite directions, a swinging frame on which said gears are mounted whereby said frame may be tilted to throw either of said gears into engagement and the other gear out of engagement with said rack, a collar connected to said swinging frame having notches, and a spring-pressed pin adapted to engage said notches, whereby, when said swinging frame is tilted beyond a dead-center in either direction said pin will be forced into the bottom of one of said notches and complete the throw of the frame, substantially as described.

In testimony of which invention I have hereunto set my hand at Philadelphia on this 8th day of July, 1901.

MAX ROLLE.

Witnesses:
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M. M. HAMILTON.