To all whom it may concern:

Be it known that I, CLARENCE W. LE VELLE, a citizen of the United States, residing at Wichita, in the county of Sedgwick and State of Kansas, have invented a certain new and useful Improvement in Disappearing Electric Fans, of which the following is a full, clear, and exact description.

My invention relates to electrical "ceiling" fans, of the type wherein both the fan proper and its motor are mounted upon and supported by a pipe suspended from a ceiling, beam or the like.

My object is to provide a fan of this type in which the fan blades shall be invisible when not being driven by the motor. Accordingly, if the fan fixture be provided with electric-light receptacles, it will appear to be a plain electric lamp except when the fan is running; and if the fixture be without lighting receptacles it will not appear like a fan, except when the fan is in use.

My improved fans will be especially desirable for use in residences, clubs, and cafes of the better class.

My improved fan fixtures, when equipped with electric-light sockets, may be installed in the positions allotted to electricians, and will serve either as a fan or an electric lamp or as both at once.

A combination of a fan fixture and fan, constructed according to this invention, is illustrated in the accompanying three sheets of drawings, in which the same reference characters refer to the same parts throughout.

Fig. 1 is a side elevation of a combination fan fixture with the fan (blades) in running position, and the canopies in section;

Fig. 2 is a side elevation of the same fixture with the fan (blades) in stationary position;

Fig. 3 is a top plan view of the fan, the motor and the lower canopy, the blades in running position, the motor shaft in section;

Fig. 4 is a similar view of the same, the fan blades being in closed or folded position;

Figs. 5 and 6 are detail views of one of the blade-arms and its mounting, omitting the blade and its rivets, and showing the arm in closed and extended positions respectively;

Fig. 7 is a sectional detail view, on line VII of Fig. 8, of one form of antifriction bearing for the fan blades;

Fig. 8 is a sectional detail view, on line VIII of Fig. 7, omitting the bearing-balls;

Fig. 9 is a perspective detail view of one of the spring-adjusting devices, and

Fig. 10 is a perspective view of one of the ball bearing members.

The fan fixture support consists of a tubular hanger 1 which forms the non-rotary shaft of the motor 3, which is of the revolving-field type usually employed. The lower end of the hanger 1 supports a flanged nut 4 to which the lower canopy 5 is secured. The upper canopy 6, may be of lesser diameter than the lower, as is shown.

In the construction shown, a metal ring, 7, is rigidly mounted upon the motor field frame, in any suitable manner, and is driven thereby. As the manner in which this ring is secured to the motor is immaterial, this detail is not illustrated.

For each fan blade, 8, there is provided a bracket to, secured to the ring 7 by cap-screws 10. Each bracket 9 supports a vertical pintle 12, on which the associated blade is pivoted. The blade-hub might be mounted directly upon the pintle, but in order to reduce friction between these parts I prefer to provide a ball bearing construction, for example as shown in detail in Fig. 7.

The blade 8 is formed of sheet metal and with a suitable pitch as shown, for impelling the air downwardly. The blade is secured to a cast metal arm 13 with rivets 14. The upper end of pintle 12 has a forced fit in a hole in arm 13, and has a swaged head 12'. The lower end of pintle 12 is threaded and has a spline groove. Each bracket 9 is hollow, to provide space for a blade-retracting spring as 16. A circular shoulder, forming a flange 20, is cut in the lower face of the bracket, to receive a rotatably-fitted disc 17, provided with a series of radial holes 18. A locking-pin 19 is mounted slidably in a hole through the flange 20, and may enter any one of the holes 18. Disc 17 supports a stud 21, 100 tied to which is one end of a spiral spring 16 whose other end is tied to a stud 22 fixedly mounted on the arm 13. The tension of said spring tends to hold the arm 13 in closed position, or as shown on Fig. 4.

Each arm 13 and the top of its bracket are provided with ball-races 23 as shown, in which are a series of balls 24. The hole in disc 17 is larger than pintle 12, for clearance. A lower ball-bearing, which is neces-
sary, is provided by a series of balls 26, a race-plate 27, and a nut 28 on the pintle. Said race-plate is splined on the pintle by an integral key 29, taking into groove c. The 5 parts may be properly adjusted for use by adjusting the nut 28, which supports the race-plate 27.

The tension of a spring 16 is adjustable by: inserting a socket wrench in the hexagonal recess 17' (Fig. 9), removing pin 19, and turning disc 17 in the proper direction by the wrench, then replacing the pin in the nearest hole 18 to the pin's position.

The inner end of each blade-arm 13 is provided with a stop-lug 30 (or its equivalent) adapted to impinge on the supporting bracket when the blade carried by the arm in question has attained a fully extended position by centrifugal force.

20 Referring now to Figs. 3 and 4: It will be seen that each fan blade is roughly crescentic in form; the outer end S' is not pointed however, but rounded. The inner contour-curve a of each blade is made to register with the periphery of the ring 7. The outer contour-curve b of each blade forms an arc of a circle of about the same diameter as that of the upper canopy, or, as shown, slightly smaller, so that when the blades are in this folded position they will not project beyond said canopy.

In fans that are to be provided with electric lights, the lamp sockets may artistically be suspended from the lower canopy, for example, as shown on Fig. 2.

When the motor is stationary, the fan blades 1 will be held by the springs 16 in the folded position shown by Figs. 2 and 4.

When the motor is first energized, as its speed increases the centrifugal force upon the fan blades will overcome the tension of said springs, and the blades will swing out to their operative positions without noise or sticking. When the stop-lugs 30 impinge on the respective brackets, the fans will then be positively driven by the motor. When the motor circuit is opened, the fan blades, as their velocity decreases, will fold inwardly.

This construction will permit easier starting of the fan motors, by the elimination of air-resistance to extended blades.

In regard to the appended claims, I wish said claims to be understood as covering all mechanical equivalents, both of single parts and of combinations, and for said claims to be construed as relating to either or both combination-fans and electrolizers and ceiling-fans per se.

An example of a mechanical equivalent which would not materially affect the operation of the fan, would be a construction in which the pintles are fixedly mounted on the bearing brackets or lugs, and the fan blade butts provided with ball-bearing hubs mounted upon these pintles.

Having described the invention, I claim as new and desire to secure by Letters Patent:

1. In a motor-driven fan, a motor having a vertical axis, a rotated element provided with bearings in circular arrangement, fan blades provided with pintles mounted in said bearings, each fan blade having an inner contour curvature adapted to fit said rotated element, and also having an outer contour curvature substantially concentric with said inner contour curvature, and yielding means for retracting the fan blades inwardly against said rotated element.

2. In a motor driven fan, a motor having a vertical axis, a rotated element provided with fan-blade bearings, a lower canopy, a hanger supporting said motor, element and canopy, fan blades pivotally mounted on said bearings respectively, each of said blades being so shaped as to fold into a space above and within the periphery of said canopy, and yielding means for holding said blades in such folded positions when the motor is at rest.

3. In a motor driven fan, a vertical hanger, a motor concentrically mounted thereon, a ring encircling the motor and rotated thereby, a canopy of larger diameter than said ring, supported by said hanger below the motor, spaced bearings mounted upon said ring, fan blades having vertical pintles mounted in said bearings, each of said blades being so shaped as to fold into a space above and within the periphery of said canopy, and yielding means for holding said blades in such folded positions when the motor is at rest.

4. In a motor driven fan, a vertical hanger, a motor concentrically mounted thereon, a ring encircling the motor and rotated thereby, a canopy of larger diameter than said ring, supported by said hanger below the motor, a bearing bracket mounted on said ring, said bracket having a chamber therein, a fan-blade arm, a pintle passing through said arm and bracket, studs held by said bracket and arm respectively, and a spring within said chamber and tied to said studs in a manner to urge said arm inwardly toward said ring, one edge of the fan blade being recessed in a curve to fit the curvature of said ring, the greatest breadth of said fan blade being approximately equal to the difference between the radii of the canopy and of the ring.

In testimony whereof, I hereunto affix my signature.

CLARENCE W. LE VELLE.