No. 874,430. PATENTED DEC. 24, 1907.

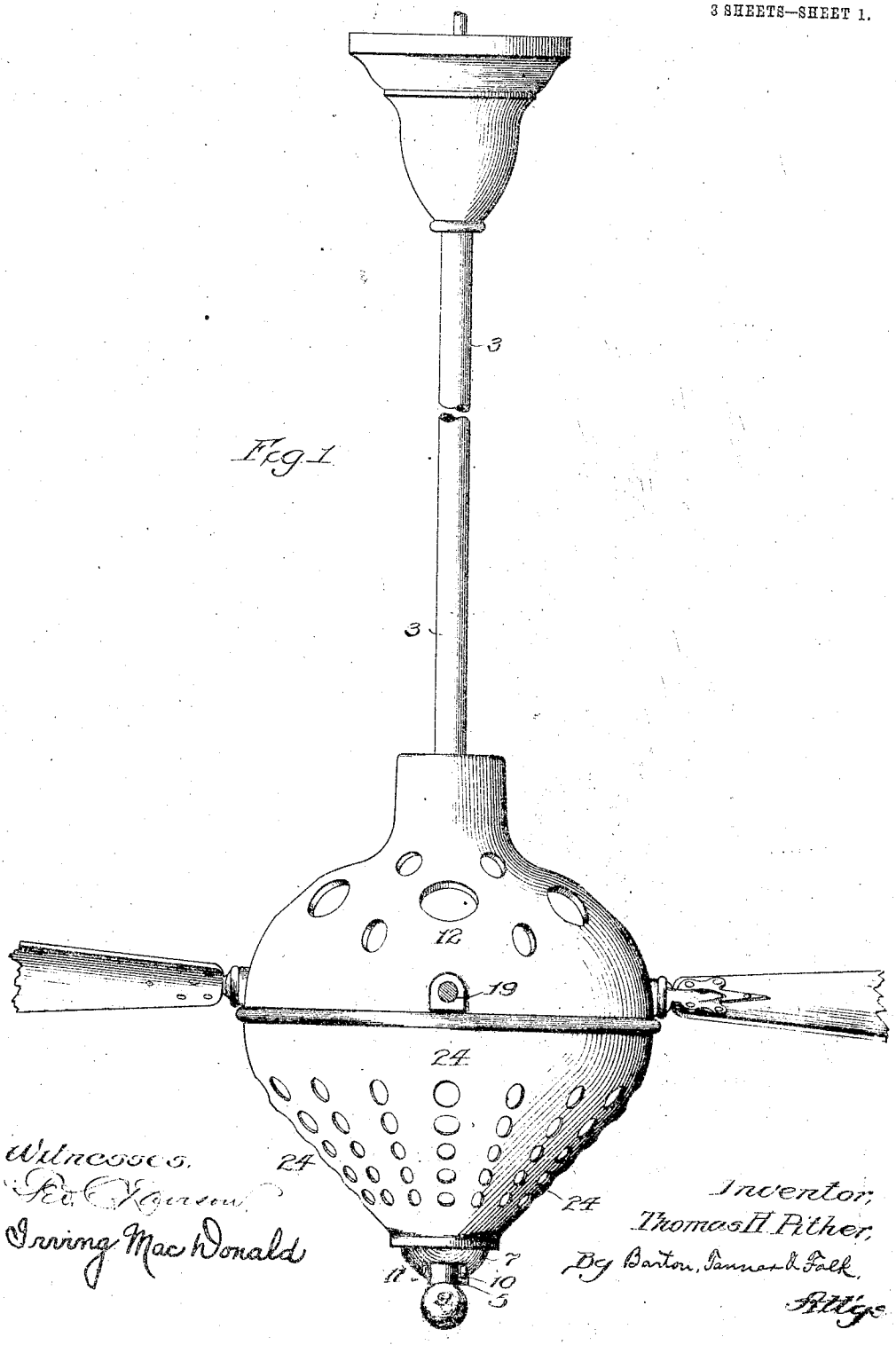
T. H. PITHER.

CEILING FAN MOTOR.

APPLICATION FILED AUG. 22, 1907

3 SHEETS—SHEET 1.

Fig. 1



Witnesses.
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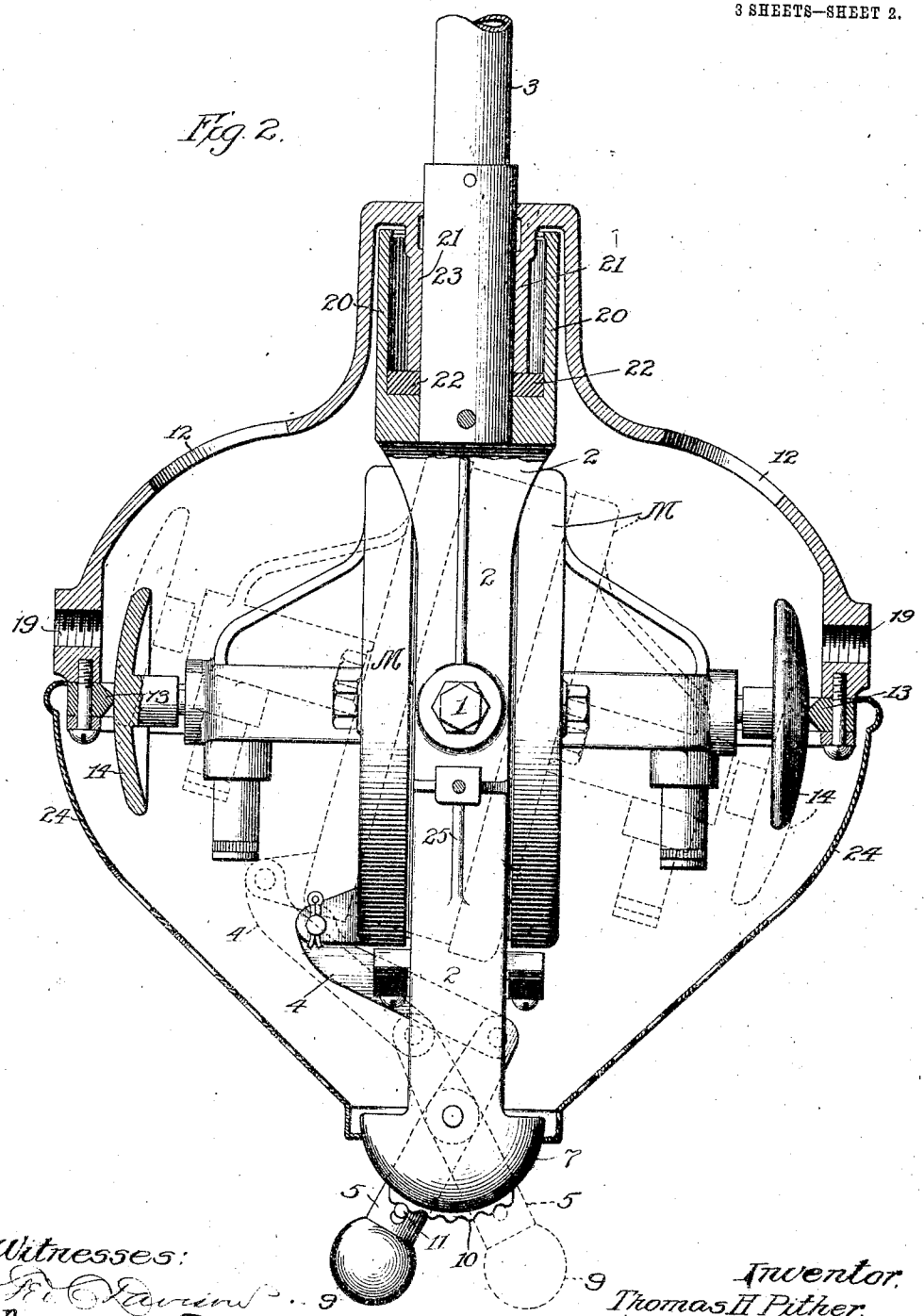
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APPLICATION FILED AUG. 22, 1907.

3 SHEETS—SHEET 2.

Fig. 2.



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No. 874,430. PATENTED DEC. 24, 1907.

T. H. PITHER.

CEILING FAN MOTOR.

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3 SHEETS—SHEET 3.

Fig 3.

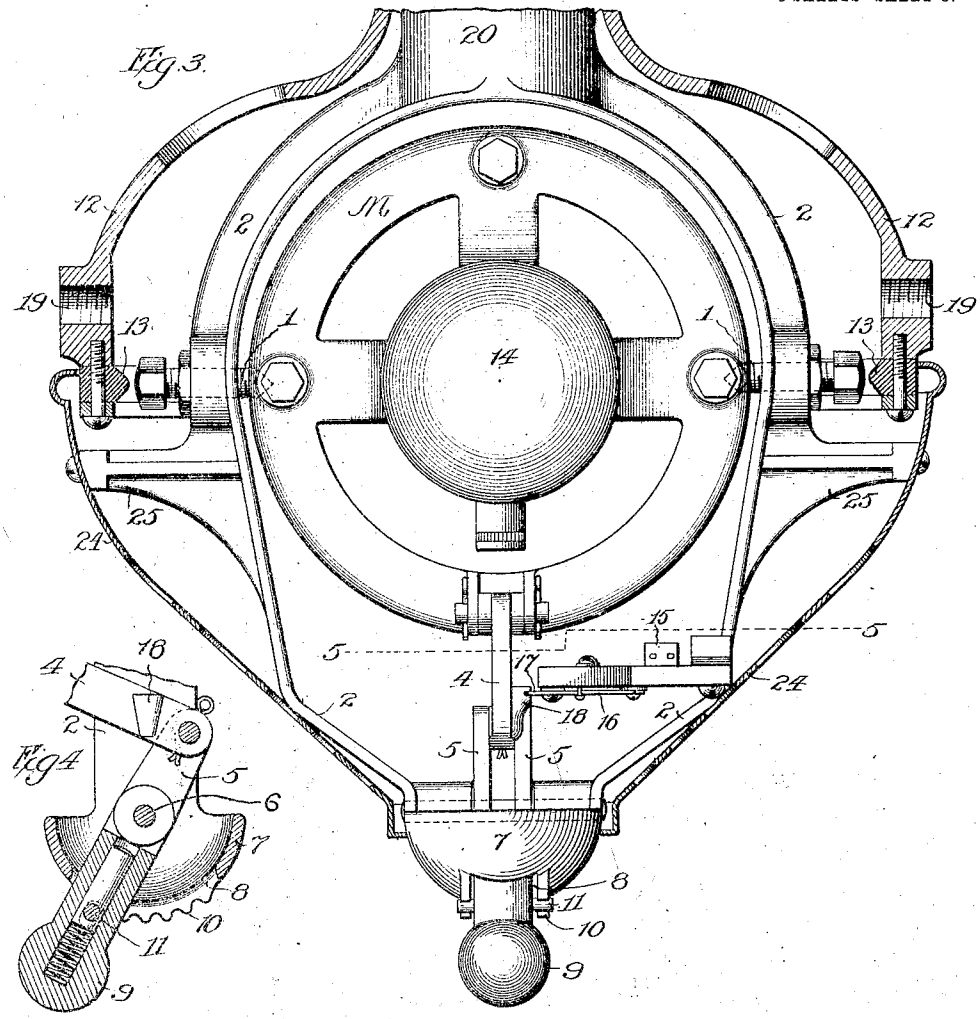
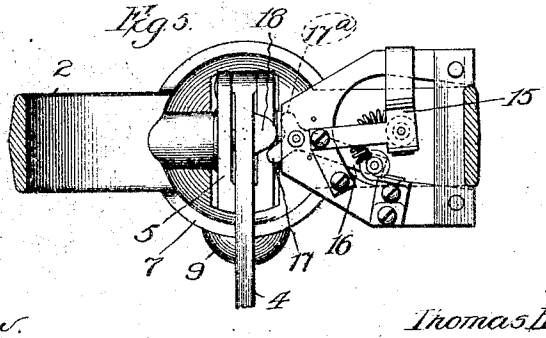


Fig 4.

Fig 5.



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UNITED STATES PATENT OFFICE.

THOMAS H. PITHER, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CEILING-FAN MOTOR.

No. 874,430. Specification of Letters Patent. Patented Dec. 24, 1907

Application filed August 22, 1907. Serial No. 389,621.

To all whom it may concern:

Be it known that I, THOMAS H. PITHER, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Ceiling-Fan Motors, of which the following is a full, clear, concise, and exact description.

My invention relates to motor-driven mechanism of the type wherein the driven member surrounds the driving member and is rotated thereby.

The object of my invention is to provide a simple and compact structure, having a maximum efficiency, with a minimum of weight.

My invention provides a structure wherein a high speed motor may be used and any desired variation of speed of the driven member obtained without complicated gearing and with simple mechanical arrangements.

My invention consists of a rotatable member surrounding a motor and driven thereby, the driving element of the motor being movably adjustable with relation to the rotatably-driven member to control the gearing engagement therewith and thereby to control the speed at which the rotatable member is driven.

In the preferred embodiment of my invention, the motor is pivoted in a frame to swing on a horizontal axis and the driven member comprises a casing rotatably mounted on the frame and having an annular portion in engagement with a driving gear carried on the end of the motor shaft. The engagement of the gear with the annular portion of the casing is thus rendered adjustable by swinging the motor on its pivots.

A further feature of my invention consists in the means of mounting the casing on the supporting frame or bracket, the bearing for the rotatable casing comprising an oil-cup mounted upon the supporting frame.

Another feature of my invention consists in the particular means employed for swinging the motor on its pivots, said means comprising a link and ratchet mechanism by means of which the motor may be adjusted and held in its adjusted position.

In the accompanying drawings I have shown my invention embodied in a ceiling fan.

The various features of the invention may be readily understood by reference to said drawings, in which

Figure 1 is a side elevation of a ceiling fan; Fig. 2 is a side elevation showing, by full and dotted lines respectively, two positions of the adjustable elements, the casing being shown in section; Fig. 3 is a view similar to Fig. 2, but taken at right angles thereto; Fig. 4 is a fragmentary detail sectional view of the link and ratchet mechanism for adjusting the motor; and Fig. 5 is a section on the line 5—5 of Fig. 3.

Like parts are designated by similar characters of reference throughout the several views.

The electric motor M is mounted on horizontal pivots 1, 1, upon diametrically opposite sides of a ring-like frame or bracket 2, which is suspended in the usual manner upon the lower end of a standard or hanger 3. The means for swinging or adjusting the motor upon its pivots comprises a toggle lever or link connection, the upper member 4 of which is pivoted at its free end to the frame of the motor and the lower member 5 is pivoted intermediate its ends upon a pin 6 in the lower portion of the frame 2.

The lower end of the frame 2 has the exterior curvature of a sphere, the center of which is the pivotal point 6. The lower end of the lever 5 extends through a slot 8 in the part 7, and forms a handle 9 for operating the toggle-lever. Ratchet teeth 10 are provided upon each side of the slot 8. The lever 5 carries a pawl comprising a pin 11, slidable longitudinally of the lever and having a spring-thrust engagement to hold it in its adjusted position between the teeth 10. By operating the handle 9, therefore, the toggle lever may be operated to swing the motor to any desired position and the parts will be held in their adjusted positions.

The driven member carrying the fan blades preferably comprises a hemispherical or bell-shaped casing 12, surrounding the motor M and frame 2 and journaled at its apex upon said frame 2. I also preferably secure upon the periphery of the casing an annular rim 13 of leather, paper or other suitable substance, which has frictional engagement with the driving gear 14 of the motor.

The driving gear shown in the drawings is the well-known spring-thrust steel disk 14 carried upon the end of the motor shaft.

Two of these, upon opposite ends of the shaft, may be employed, and their arrangement thus, 180° apart, equalizes the load and insures uniform turning movement.

In the position of the parts shown in full lines in Fig. 2, the center of the disk 14 is in engagement with the rim 13 in which position the motor receives no current, since, as shown in Fig. 4, the switching mechanism 15 is in its open position. Said switching mechanism is preferably of the type of snap-switch shown in United States Letters Patent No. 820,327, to Harold R. Wellman, issued May 8th, 1906, and hence needs no detailed description. I adapt said snap-switch for use in connection with my invention by providing the link 16 thereof with a bifurcated end, or with prongs 17, 17ª. In the normal or inoperative position of the fan, a lug 18 upon the link 4 lies between said prongs. In moving the handle 9 one notch or to the first operative position, said lug engages with the prong 17, moving said prong out of the path of said lug, and throwing the switch 15 into its closed position. At the same time, said movement of the link 16 on its pivot throws the prong 17ª in position to be engaged by the lug 18 in its return movement, and hence in moving the handle 9 to its initial position from its first or slowest speed position the switch 15 is thrown open and the parts restored to the positions shown in Fig. 5. By this simple arrangement, the first movement of the operating handle in one direction closes the switch, and the last movement in the reverse direction opens the same.

As shown most clearly in Fig. 2, the movement of the handle 9 operates the toggle links and swings the motor on its horizontal pivotal axis, thus changing the radial engagement of the disks 14 with the annular flange or rim 13. The more said motor is tilted, the faster the speed at which the casing 12 is rotated, as is readily apparent.

As is well-known, a high-speed motor is of simpler construction, more compact, and cheaper to manufacture than a low-speed motor. With the arrangement described I am enabled to employ a high-speed motor of, for example, 1000 to 1500 revolutions per minute and to drive the fan-carrying casing with, for example, a speed of from 20 to 180 revolutions per minute, according to the position at which the handle 9 is adjusted.

As before stated, I preferably employ a hemispherical or bell-shaped casing 12 surrounding the motor and the supporting frame 2, said frame having threaded openings 19 for receiving the fan blades. An oil cup 20 mounted on the top of the frame 2 and preferably cast integral therewith forms a bearing for the rotatable casing 12. The apex of said casing surrounds the exterior of said cup, and has a tubular flange 21 which extends downward into the cup and rests upon a washer 22. Said flange 21 surrounds a tubular sleeve 23 secured to frame 2 and by means of which said frame is suspended from the hanger 3.

The lower half of the operating parts may be surrounded by the usual casing 24 fixedly mounted by screws or otherwise upon bracket arms 25 extending outwardly from the frame 2.

While I have described the preferred embodiment of my invention, it is apparent that wide variations in detail may be made without departing from my invention.

I claim:—

1. The combination with a frame, of a motor adjustably mounted therein, a driving gear driven by said motor, a casing mounted to rotate about said frame, said casing having an annular portion engaging with said driving gear, and means for adjusting said motor and thereby adjusting the engagement of said driving gear with said annular portion.

2. The combination with a frame, of a motor mounted therein, a driving gear driven by said motor, a casing rotatably mounted about said frame, said casing having an annular portion coöperating with said driving gear, said driving gear being adjustably mounted with relation to said casing, to adjust its engagement with said annular portion, and thereby to control the speed of rotation of said casing, and means for adjusting said driving gear.

3. The combination with a frame, of a motor pivotally mounted therein, a driving gear driven by said motor, a casing rotatably mounted about said frame, said casing having an annular portion in engagement with said driving gear, said driving gear being adjustable through the adjustment of said motor on its pivots to control the speed at which said casing is driven, and means for adjusting said motor on its pivots.

4. The combination with a frame, of a motor pivotally mounted therein, a driving gear driven by said motor, a rotatable casing having bearings in said frame, and provided with an annular flange having frictional engagement with said driving gear, and means for adjusting said motor on its pivots to vary the adjustment between said driving gear and said flange to control the speed of rotation of said casing.

5. The combination with a ring-like frame, of a motor adjustably mounted therein, a driving disk carried upon the end of the motor shaft, a casing mounted to rotate about said frame, said casing having an annular portion frictionally engaging with said driving disk, and means for adjusting said motor and thereby adjusting the radial engagement of said driving disk with said annular portion.

6. The combination with a ring-like frame, of a motor mounted therein, a driving disk

driven by said motor, a casing journaled on said frame to rotate about the same, an annular flange projecting inwardly from said casing and having frictional engagement with said driving disk, said driving disk being pivotally mounted with relation to said casing to adjust its radial engagement with said annular flange and thereby to control the speed of rotation of said casing, and means for pivotally adjusting said driving disk.

7. The combination with a ring-like frame, of a motor pivoted horizontally therein, a driving disk carried upon the end of the driving shaft, a rotatable casing journaled in said frame upon a vertical axis, an annular flange upon said casing, said flange frictionally engaging with said driving disk, said driving disk being adjustable through the adjustment of said motor on its pivots to control the radial engagement of said disk with said flange, and thereby to regulate the speed at which said casing is driven, and means for adjusting said motor on its pivots.

8. The combination with a ring-like frame, of a motor pivoted horizontally therein, a driving disk carried upon the end of the motor shaft, a rotatable casing having bearings in said frame and provided with an annular flange having frictional engagement with said driving disk, and means for adjusting said motor on its pivots to vary the radial engagement between said driving disk and said flange to control the speed of rotation of said casing.

9. The combination with a frame, of a motor adjustably mounted therein, a driving gear driven by said motor, a casing surrounding said frame and motor, a bearing extending upwardly from said frame and in which said casing is rotatably mounted, an annular rim mounted upon said casing and frictionally engaging with said driving gear, and means for adjusting said motor and thereby adjusting the engagement of said driving gear with said annular rim.

10. The combination with a ring-like frame, of a motor adjustably mounted therein, a driving disk carried upon the end of the motor shaft, a bearing comprising an oil cup mounted upon said frame, a bell-shaped casing surrounding said frame and motor, the apex of said casing surrounding the exterior of said bearing and being provided with a tubular flange fitting the inside of said cup, the rim of said casing frictionally engaging with said driving disk, and means for adjusting said motor and thereby adjusting the radial engagement of said driving disk with said rim.

11. The combination with a ring-like frame, of a motor pivotally mounted therein, a driving gear driven by said motor, a casing surrounding said frame and motor, a bearing extending upwardly from said frame in which said casing is rotatably mounted, an annular rim mounted on said casing and frictionally engaging with said driving gear, said driving gear being adjustable through the adjustment of said motor on its pivots to control the speed at which said casing is driven, and means for adjusting said motor on its pivots.

12. The combination with a ring-like frame, of a motor pivoted horizontally therein, a driving disk carried upon the end of the motor shaft, a bearing comprising an oil-cup carried by said frame, a bell-shaped casing surrounding said frame and motor, the apex of said casing surrounding the exterior of said bearing and being provided with a downwardly extending tubular flange fitting the inside of said cup, the rim of said casing frictionally engaging with said driving disk, said driving disk being adjustable through the adjustment of said motor on its pivots to control the radial engagement of said disk with said flange and thereby to regulate the speed at which said casing is driven, and means for adjusting said motor on its pivots.

13. The combination with a frame, of a motor pivoted therein to swing on a horizontal axis, a casing surrounding said frame and motor, a bearing extending upwardly from said frame in which said casing is rotatably mounted, an annular rim upon the casing, a driving disk carried upon the end of the motor shaft and frictionally engaging said annular rim, and means for swinging said motor and holding the same in its adjusted position.

14. The combination with a ring-like frame, of a motor pivoted horizontally therein, a bearing comprising an oil-cup mounted upon said frame, a bell-shaped casing surrounding said frame and motor, the apex of said casing surrounding the exterior of said bearing and being provided with a downwardly extending tubular flange fitting the inside of said cup, a driving disk carried upon the end of the motor shaft, and having frictional engagement with the rim of said casing, and means for pivotally adjusting said motor to control the radial engagement of said disk with said rim.

15. The combination with a frame, of a motor pivoted therein to swing on a horizontal axis, a casing surrounding said frame and motor, a bearing carried by said frame in which said casing is rotatably mounted, an annular rim upon the casing, a driving disk carried upon the end of the motor shaft and frictionally engaging said annular rim, and a toggle lever, one member of which is pivoted to said motor and the other to said frame for pivotally adjusting said motor.

16. The combination with a frame, of a motor pivoted therein to swing on a horizontal axis, a casing surrounding said frame and motor, a bearing carried by said frame in which said casing is rotatably mounted, an annular rim upon the casing, a driving disk carried upon the end of the motor shaft and

frictionally engaging said annular rim, a toggle lever, one member of which is pivoted to said motor and the other to said frame for swinging said motor on its pivots, and a pawl and ratchet mechanism for holding said lever in its adjusted position.

17. The combination with a frame, of a motor pivoted horizontally therein, a driving disk carried upon the end of the motor shaft, a rotatable casing having bearings in said frame, an annular flange carried by said casing and having frictional engagement with said driving disk, a toggle lever having an upper member pivoted at its outer end to said motor and a lower member pivoted intermediate its ends in said frame, said frame being provided with a slot through which said lower member extends, ratchet teeth arranged in the arc of a circle having the pivotal point of said lower member as a center, and a spring-pressed pawl longitudinally slidable with relation to said lower member and adapted to engage the said ratchet teeth to hold the parts in their adjusted positions.

In witness whereof, I, hereunto subscribe my name this 19th day of August, A. D., 1907.

THOMAS H. PITHER.

Witnesses:
RALPH G. JOHANSEN,
ROY T. ALLOWAY.