Sept. 14, 1948. L. B. GREEN 2,449,377

OSCILLATING FAN HEATER

Filed Jan. 17, 1945 2 Sheets-Sheet 1

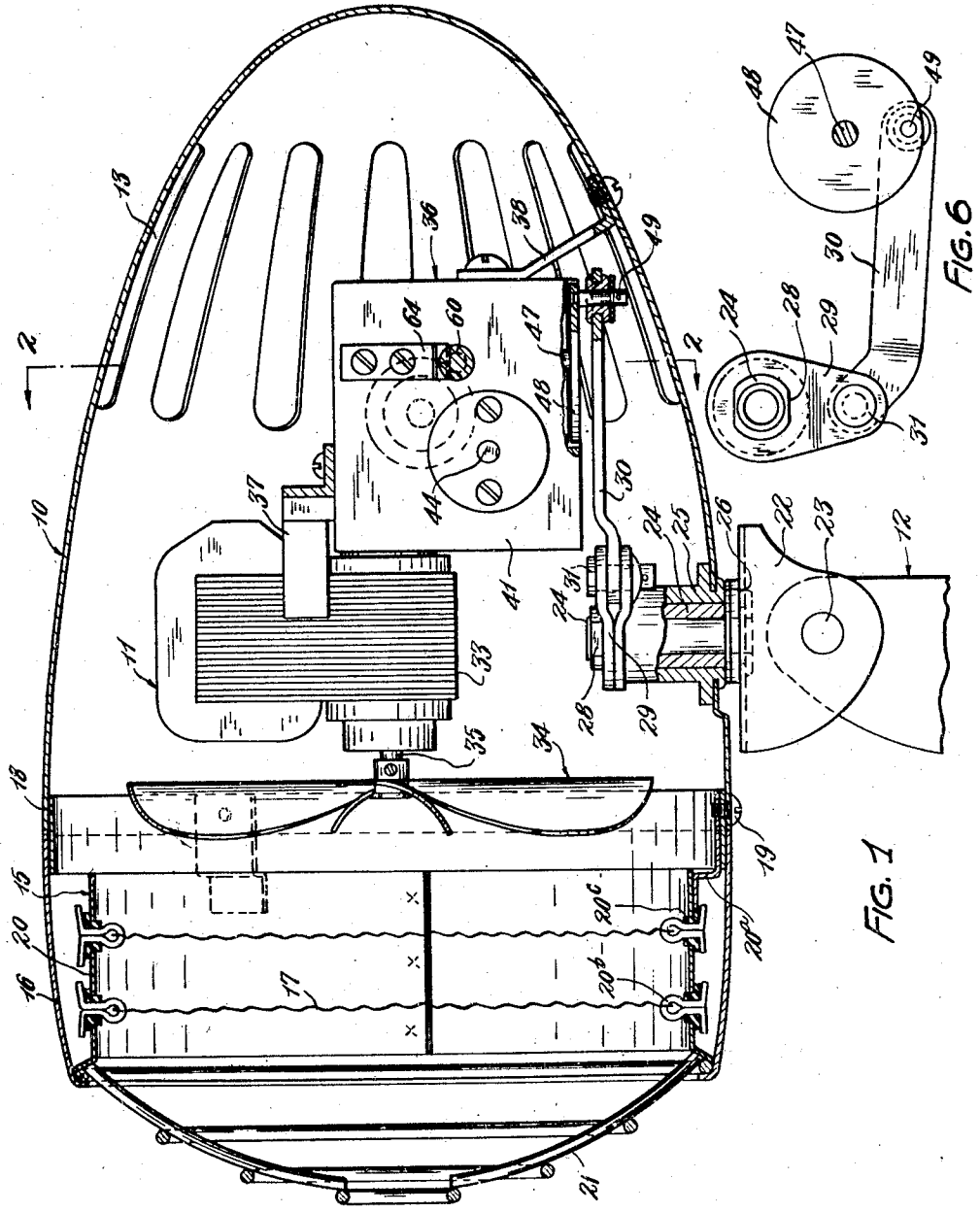


FIG. 1

FIG. 6

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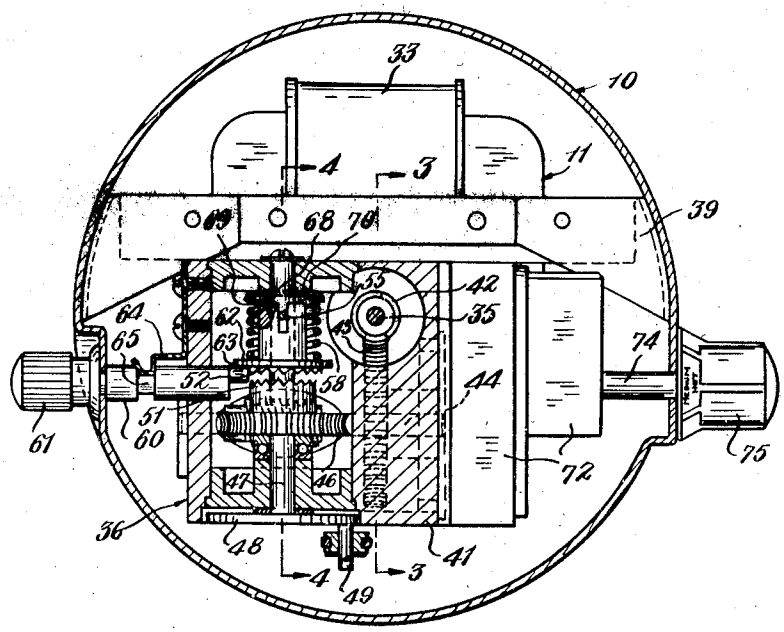


FIG. 2

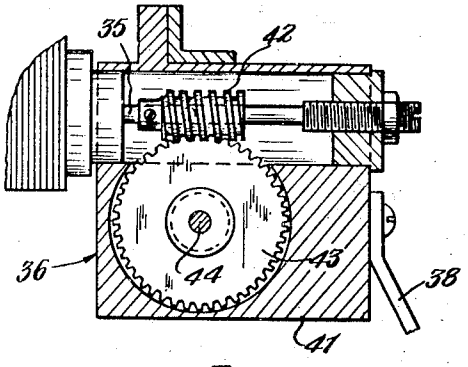


FIG. 3

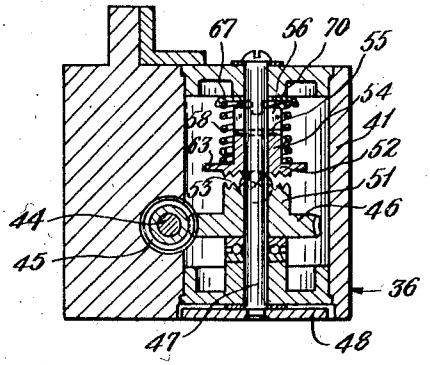


FIG. 4

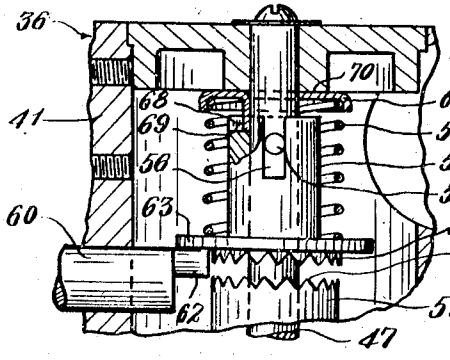


FIG. 5

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2,449,377

OSCILLATING FAN HEATER

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Application January 17, 1945, Serial No. 573,219

6 Claims. (Cl. 230—264)

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This invention relates to oscillating electric fans, electric heaters and the like and aims to provide an improved construction affording a more positive and satisfactory control for the oscillating movement of devices of this kind.

Another object of the present invention is to provide improved oscillating mechanism for an electric fan or the like, embodying protective means for preventing damages to the oscillating mechanism in the event that the device strikes an obstruction during its swinging movement.

Another object of the invention is to provide an improved construction for a device of this character, in which the oscillating mechanism of the device embodies a releasable drive connection and positive means for preventing the oscillating movement when the drive connection is released.

Still another object of this invention is to provide an improved construction for devices of the character mentioned, in which the oscillating mechanism includes cooperating clutch members and novel actuating means for causing engagement or disengagement of the clutch.

A further object is to provide an oscillating fan or the like embodying an improved construction of the character mentioned, in which the holding means for preventing oscillation forms a slip connection which permits the device to be manually swung to any desired point or setting of the arc defining its path of oscillating movement, and in which the clutch can be immediately reengaged to resume the oscillating movement without requiring any manual shifting of the device from such selected point or setting.

The invention can be further briefly summarized as consisting in certain novel combinations and arrangements of parts hereinafter described and particularly set out in the appended claims.

The oscillating device of this application is an improvement of that disclosed in my earlier application Ser. No. 518,933 filed January 20, 1944, now Patent No. 2,391,964 granted January 1, 1946.

In the accompanying sheets of drawings

Fig. 1 is a longitudinal sectional view taken through an oscillating device embodying the present invention;

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a sectional detail view taken through the housing and oscillating mechanism as indicated by line 3—3 of Fig. 2;

Fig. 4 is another sectional view taken through the oscillating mechanism on line 4—4 of Fig. 2;

Fig. 5 is a partial transverse sectional view similar to Fig. 2 but showing the oscillation control means on a larger scale; and

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Fig. 6 is a detailed partial sectional plan view showing the oscillating linkage.

The particular embodiment of the invention illustrated in the drawings is in the form of an oscillating device embodying an electric fan and which is intended to operate either as an oscillating electric fan or as an oscillating electric fan heater. This device comprises in general a housing 10 containing a fan and motor unit 11, and a support or pedestal 12 upon which the housing is mounted for oscillating movement.

The housing 10 is here shown in the form of a sheet metal shell of a substantially bullet-like streamlined shape. The housing is provided adjacent the rounded rear end thereof with a plurality of air inlet openings or slots 13. The forward end of the housing is open for the delivery of air therefrom by the fan and motor unit 11.

When the device embodies an electric heating means 15 for heating the air being delivered, as shown in this instance, the housing 10 is provided with an extension 16 at its forward end in which is suitably mounted in insulated relation an electric heating element 17 of the resistance-wire type. The housing extension 16 is preferably of a size and shape to form a smooth continuation of the main housing 10 and may be attached to the latter by means of the sleeve or insert 18 and suitably spaced attaching screws 19. The electric heater extension 16 may include an inner shell or sleeve 20 which is held in place by the brackets 20a and is provided with spaced members 20b for supporting the heating element 17. The members 20b are of the split-stem or cotter key type and are mounted in insulating bushings 20c. The forward end of the main housing 10 or of the heater extension 16, as the case may be, is provided with a suitable guard or grill 21 which in this instance is in the form of a convex ornamental structure formed of wire.

The housing 10 may be mounted on the pedestal 12 by providing a bracket 22 on the pedestal and which pivotally supports the housing. The bracket 22 is mounted on a horizontal pivot 23 provided at the upper end of the pedestal and carries a vertical pivot 24 which extends into the housing 10. The bracket 22 also carries an annular seat 25 which surrounds the lower end of the pivot pin 24. The housing 10 is mounted on the pivot 24 for oscillating or swinging movement as by means of a bushing or sleeve 26 which is attached to the housing and whose lower end bears on the annular seat 25.

The upper end of the pivot pin 24 projects through the sleeve 26 and has opposed flat faces 28 thereon. An arm 29 mounted on such projecting portion of the pivot pin 24 is held stationary by the flat faces 28. A link 30 has one end thereof pivotally connected with the arm 29 by means of the pivot pin 31 and its other end is connected with the fan and motor unit 11 so that when pushing or pulling forces are applied to this link by the fan and motor unit they will cause oscillation of the housing 10.

The fan and motor unit 11 comprises an electric motor 33 of a conventional construction, a propeller fan 34 mounted on the forward end of the shaft 35 of the motor and an oscillating mechanism 36 operatively connected with the other end of the shaft of the motor. The electric motor 33 and the oscillating mechanism 36 are more or less rigidly connected together by means of suitable clips 37, or the like, and the assembly unit formed by the fan, motor and oscillating mechanism is mounted in the housing 10 by means of suitable rear and side brackets 38 and 39.

The oscillating mechanism 36 comprises a closed housing or gear case 41 in which is located suitable reduction gearing for connecting the electric motor 33 with the thrust link 30, and a releasable drive connection for controlling the operation of the oscillating mechanism. In this instance the reduction gearing comprises a worm 42 carried by a rearward extension of the motor shaft 35 and which meshes with a worm gear 43 carried by a countershaft 44. The shaft 44 also carries a worm 45 which meshes with a second worm gear 46 which is mounted to rotate on a second shaft 47. The shaft 47 carries a disk or crank 48 having thereon a crank pin 49 with which one end of the link 30 is pivotally connected.

The releasable drive connection for controlling the operation of the oscillating mechanism comprises a pair of clutch elements 51 and 52 having cooperating clutch faces which are preferably provided with teeth or serrations 53 as here shown. The clutch element 51 is in the form of a sleeve or extension of the worm gear 46 and is freely rotatable on the shaft 47 and is driven continuously by the electric motor 33 while the latter is in operation.

The clutch element 52 is carried by a sleeve 54 which is rotatable with the shaft 47 and is axially slidable thereon for engaging or disengaging the clutch element 51. The drive connection between the sleeve 54 and the shaft 47 may be formed by a key or splines, or as here shown, by means of a pin 55 extending transversely through the shaft and engaging in a slot 56 of the sleeve. The clutch element 52 is normally biased toward engagement with the clutch element 51 by means of a compression spring 58 disposed around the sleeve 54.

The oscillating movement of the device is normally controlled by releasing or engaging the clutch formed by the cooperating clutch members 51 and 52 and, for this purpose, an actuating member 60 is provided having an actuating knob 61 located outside of the housing 10. The actuating member 60 is in the form of a shaft or spindle which is adapted to be rotated or oscillated by means of the knob 61 and which is provided at its inner end with an eccentric portion or pin 62. The eccentric pin 62 cooperates with a flange or collar 63 carried by the clutch element 52. A resilient detent or finger 64 engaging in a groove 65 of the actuating member 60 prevents axial shifting of the latter and also exerts a holding action on the actuating member enabling the latter to be retained in settings corresponding with an engaged or disengaged condition of the clutch elements 51 and 52.

Figs. 2 and 4 show the clutch element 52 as having been disengaged or separated from the clutch element 51 and being held in such disengaged condition by the eccentric pin 62. So long as the clutch element 52 is disengaged from the clutch element 51 the gear 46 rotates idly on the shaft 47 and the oscillating mechanism will not transmit any pushing or pulling forces to the link 30 and hence the housing 10 will not be oscillated or swung on the pivot 24 of the mount.

It should be explained at this point that the characteristics of the spring 58 are such that when the spring is compressed by the movement of the clutch element 52 to its disengaged position it will exert sufficient pressure on the disk 67 to produce the above-described drag or holding effect for the shaft 47 but when the clutch element 52 is in its engaged position the spring will exert only a light pressure on the disk 67. Because of the large number of teeth provided on the clutch elements 52 and 53 and the angle of their side faces only a light pressure of the spring 58 is needed for holding the clutch engaged and this spring pressure is not sufficient to produce an objectionable drag or braking effect at this time between the disk 67 and the abutment 70.

It will be noted in connection with the clutch elements 51 and 52 that the teeth 53 are of relatively low height and that their side faces have a relatively low or small slope angle. These teeth are fully effective, when held in meshing engagement by the spring 58, to transmit sufficient force to oscillate the housing 10 but if the housing strikes an obstruction the spring will yield sufficiently to permit the teeth of the clutch element 51 to ratchet over the teeth of the clutch element 52. So long as the obstruction exists this ratchet action will continue and will protect the oscillating mechanism from damage or breakage, and when the obstruction is removed the oscillating movement will be immediately resumed.

During the time that the oscillating mechanism is intentionally rendered ineffective by disengagement of the clutch element 52 from the clutch element 51, it is desirable that the housing 10 be prevented from swinging on the pivot 24 so that the housing can be set or maintained at a selected point of the oscillation path for the delivery of air in a desired direction by the fan and motor unit 11. This is accomplished by incorporating a holding means in the oscillating mechanism 36, and in this instance, the holding means comprises a disk 67 having a lug or detent 68 adapted to engage in a slot or recess 69 of the sleeve portion 54 of the clutch element 52. The disk 67 is disposed around the shaft 47 and also forms a spring plate or seat which is pressed against an annular seat or abutment 70 of the gear case 41 by the spring 58.

When the clutch element 52 is disengaged from the clutch element 51 by the actuating member 60, as above explained, the axial movement of the clutch element 52 causes the recess 69 of the sleeve 54 to engage the lug 68 of the disk 67. The engagement of the sleeve 54 with this lug causes the clutch element 52 to be connected

with the disk 67 which then acts as a drag or holding means for resisting or preventing rotation of the shaft 47. The cooperating surfaces of the disk 67 and the seat or abutment 70 of the gear case 41 may be of a frictional character so that under the pressure of the spring 58 these surfaces will tend to hold the disk and the clutch element 52 against rotation. When the shaft 47 is thus held against rotation, the crank pin 49 will cooperate with the link 30 for holding the housing 10 against swinging on the pivot 24 in either direction.

Although the disk 67 is intended to serve as a holding means for the shaft 47 during the time that the clutch elements are disengaged, it is desirable that this disk be capable of some slippage on the seat 70 of the gear case. This slippage of the disk 67 will permit the housing 10 to be manually grasped and forcibly swung on the pivot 24 without any damage being done to the oscillating mechanism. Such manual swinging of the housing 10 is often desirable for the purpose of adjusting the same in a lateral plane so that the fan 34 will deliver its air stream in a desired direction. The frictional engagement of the disk 67 with the seat 70 will cause the housing 10 to be held in the desired position or setting to which it has been forcibly swung in the manner just described.

It will also be seen that when the actuating member 60 is rotated in a direction to permit the clutch element 52 to reengage the clutch element 51, the drive connection for the oscillating mechanism will be established and the oscillating movement of the housing 10 will be immediately resumed. If the housing 10 has been manually swung or adjusted after the clutch element 52 has been disengaged, it is not necessary to return the housing to the position which it occupied at the time of clutch disengagement because the clutch can be reengaged to cause immediate resumption of oscillating movement regardless of the position occupied by the housing at the time the clutch is to be reengaged.

A suitable switch 72 is provided for controlling the electric motor 33 and the heating element 17. This switch is located in the housing 10 and may be mounted on the gear case 41 of the oscillating mechanism, as shown in Fig. 2. An actuating means is provided for the switch in the form of a shaft 74 having a knob 75 located outside of the housing. The switch 72 may be a snap switch of a conventional type having four positions which include an off position for deenergizing both the motor and heating element, a position for energizing the motor alone, and positions for energizing the motor simultaneously with energization of the heating element at either high or low heat.

From the foregoing description and the accompanying drawings it will now be readily understood that the present invention provides an improved construction for an oscillating electric fan or heater wherein novel means is employed for controlling the oscillating movement and for holding the device in a desired position or adjustment when the oscillating mechanism has been rendered ineffective.

While I have illustrated and described the improved oscillating device of the present invention in considerable detail, it will be understood of course that the invention is not intended to be correspondingly limited in scope, but is regarded as including all changes and modifications coming within the spirit of the invention and the scope of the appended claims.

Having thus described my invention, I claim:

1. In a device of the character described, a support, a housing pivoted on said support, an electric motor in said housing, a fan connected with said motor to be driven thereby, a reduction gear device in said housing and connected with said motor to be driven thereby and including a closed gear casing, linkage located in the housing and connected with said support and reduction gear device so as to cause oscillation of said housing, said reduction gear device having a releasable drive connection located in said gear casing and comprising cooperating toothed members one of which is shiftable to engage or disengage the other, a spring in said gear casing tending to hold the teeth of said members in meshing engagement, the form of said teeth and the pressure of said spring being such as to permit temporary slippage between said members when movement of said housing is obstructed, and a manually operable member projecting from said housing and also having an actuating portion extending into said gear casing for causing engagement or disengagement of said toothed members.

2. In an electric fan or the like, a fan and motor unit, means mounting said unit for oscillating movement, oscillating mechanism driven by said unit and including a closed gear casing containing gearing and also having therein a rotatable shaft and a pair of cooperating relatively shiftable toothed clutch elements on said shaft, one of said elements being rotatable relative to said shaft and the other being rotatable with said shaft and axially shiftable, a spring in said gear casing acting to cause engagement of said other element with said one element, and a rotatable control member having an eccentric portion extending into said gear casing and engageable with said axially shiftable element for causing disengaging movement thereof.

3. In an electric fan or the like, a fan and motor unit, means mounting said unit for oscillating movement, oscillating mechanism driven by said unit and including a closed gear casing containing gearing and also having therein a rotatable shaft and a pair of cooperating relatively shiftable toothed clutch elements on said shaft, one of said elements being rotatable relative to said shaft and the other being rotatable with said shaft and axially shiftable, holding means in said gear casing and adapted to be engaged by said other clutch element for holding said unit against oscillating movement, a spring in said gear casing acting to cause said other element to be shifted in a direction to engage said one element and disengage said holding means, and a movable control member having a portion extending into said gear casing and engageable with said other element for shifting the same in the opposite direction and adapted to hold said other element disengaged from said one element and in engagement with said holding means.

4. In a device of the character described, a fan and motor unit, pivot means mounting said unit for oscillating movement, oscillating mechanism operably connected with said unit and including a closed gear casing containing rotatable shaft and a pair of clutch elements, one of said clutch elements being rotatable relative to said shaft and the other clutch element being rotatable with said shaft and axially shiftable, a fixed abutment

in said gear casing, a holding member engaging said abutment, a spring in said gear casing acting to press said holding member against said abutment and urge said shiftable clutch element toward said one clutch element, and means extending into said gear casing for actuating said shiftable clutch element so as to disengage said one clutch element and engage said holding member, said abutment and holding members providing a frictional slip connection which permits said unit to be manually swung on said pivot means to a desired setting.

5. In an electric fan or the like, a fan and motor unit, means mounting said unit for oscillating movement, oscillating mechanism driven by said unit and including a rotatable shaft and a pair of cooperating relatively shiftable toothed clutch elements thereon, one of said elements being rotatable relative to said shaft and the other being rotatable with said shaft and axially shiftable, holding means in said oscillating mechanism and adapted to be engaged by said other clutch element for holding said unit against oscillating movement, a spring acting to cause said other element to be shifted in a direction to engage said one element and disengage said holding means, and a movable control member having a portion engageable with said other element for shifting the same in the opposite direction and adapted to hold said other element disengaged from said one element and in engagement with said holding means, said other clutch element having a sleeve portion provided with a recess and said holding means having a detent engageable in said recess.

6. In a device of the character described, a fan and motor unit, pivot means mounting said unit for oscillating movement, oscillating mechanism operably connected with said unit and including a rotatable shaft and a pair of clutch elements, one of said clutch elements being rotatable relative to said shaft and the other clutch element being rotatable with said shaft and axially shiftable, a fixed abutment, a holding member engaging said abutment, a spring acting to press said holding member against said abutment and urge said shiftable clutch element toward said one clutch element, and means for actuating said shiftable clutch element so as to disengage said one clutch element and engage said holding member, said abutment and holding members providing a slip connection which permits said unit to be manually swung on said pivot means to a desired setting, said shiftable clutch element having an annular portion provided with a recess and said holding member being a disk disposed around said shaft and having a detent engageable in said recess.

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