Oct. 16, 1928. 1,687,996

F. J. SIRL

SPRING DRIVEN FAN

Filed June 15, 1926 2 Sheets-Sheet 1

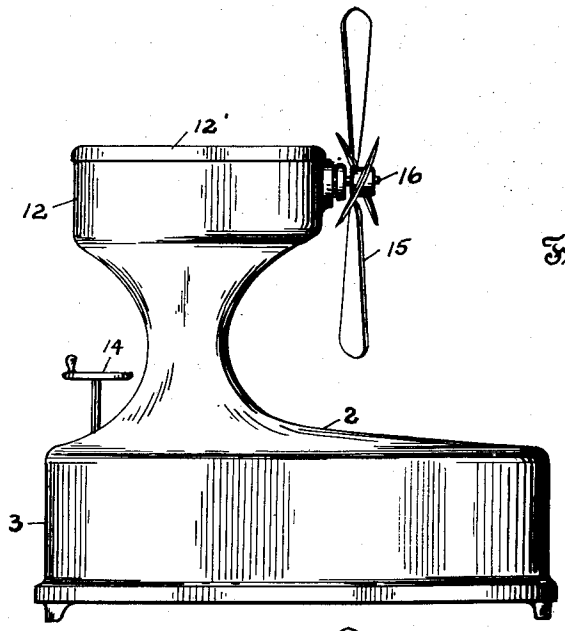


Fig. 1.

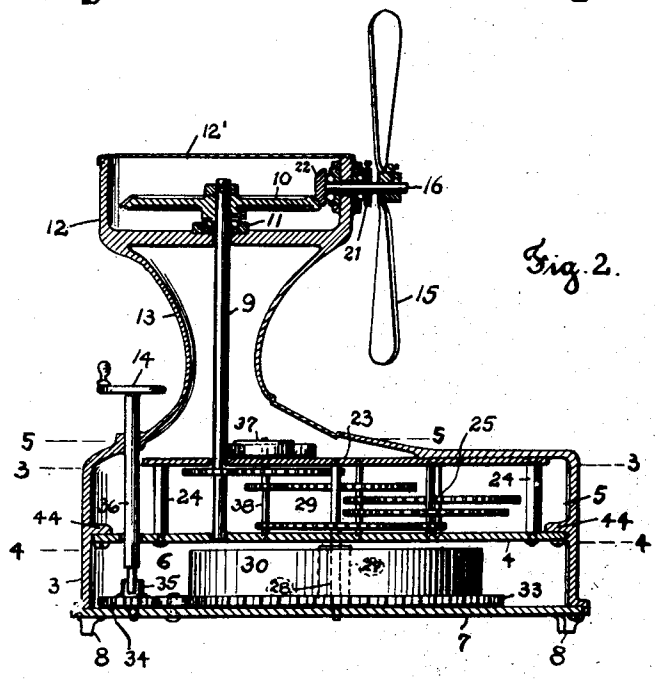


Fig. 2.

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Fig. 3.

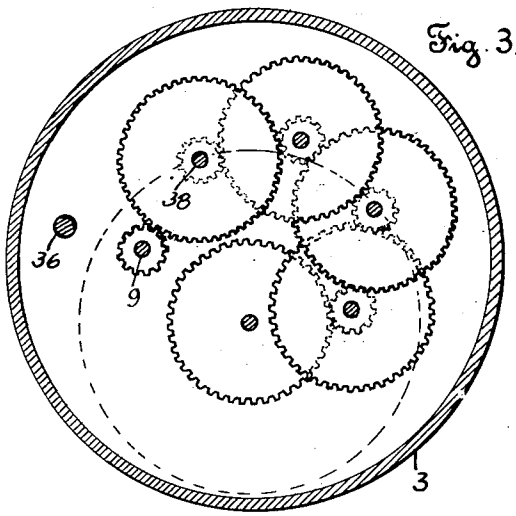


Fig. 4.

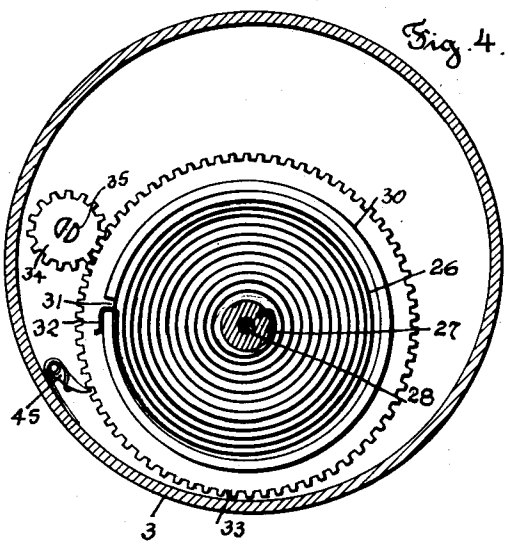


Fig. 6.

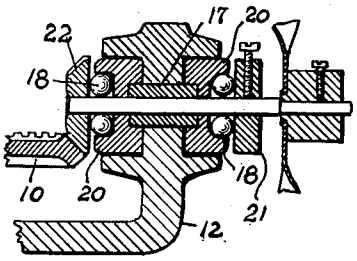
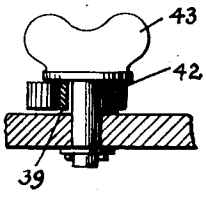


Fig. 7.



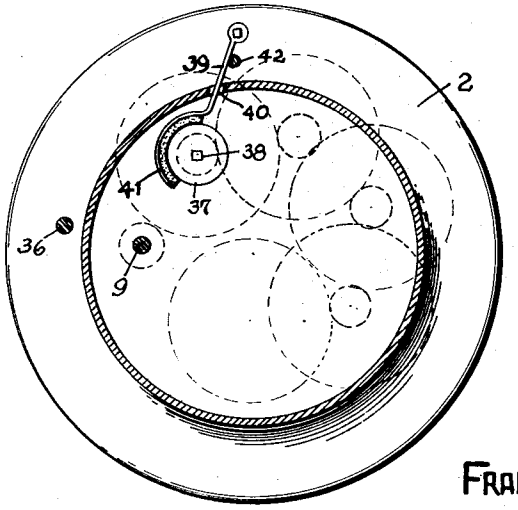


Fig. 5.

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Patented Oct. 16, 1928. 1,687,996

UNITED STATES PATENT OFFICE.

FRANK J. SIRL, OF LAKEWOOD, OHIO.

SPRING-DRIVEN FAN.

Application filed June 15, 1926. Serial No. 116,090.

My invention relates to an improvement in spring driven fans, and my object in general is to provide suitable spring and gear mechanism adapted to rotate a small fan at a relatively high rate of speed for a substantial period of time. To obtain the necessary power for a long run and effective operation, and to facilitate the assembling and housing of the working parts I construct and arrange the working parts and the winding means in a particular way and mount the same in an advantageous manner in a compartmented casing substantially as herein shown and described and as set forth more particularly in the claims.

Thus, in the accompanying drawings, Fig. 1 is a side view of my improved fan; and Fig. 2 is a vertical section centrally through the fan casing, showing the driving mechanism in side elevation. Fig. 3 is a horizontal section on line 3—3 of Fig. 2, showing the gearing within the upper chamber in the base portion of the casing. Fig. 4 is a horizontal section on line 4—4 of Fig. 2, showing the spring and winding gears in the lower chamber of the base part of the casing. Fig. 5 is a horizontal section on line 5—5 of Fig. 2 showing the friction device for stopping the fan. Fig. 6 is an enlarged vertical section through the fan shaft bearings, and Fig. 7 is an enlarged section and side view of the thumb piece for controlling the friction stopping device.

The fan structure comprises a casing 2 having a relatively large round base 3 which is hollow and subdivided by a horizontal partition 4 to provide separate chambers 5 and 6 above a bottom plate 7 having legs 8 to support the casing. Bottom plate 7 and partition 4 are secured in place by screws and separately removable to permit access to the operating mechanism therein within chambers 5 and 6, which mechanism is employed to drive a vertical shaft 9 carrying at its upper end a large bevel gear 10. A ball race and bearing 11 supports gear 10 and shaft 9, and bearing part 11 is seated upon the bottom of a round hollow head 12 which forms an integral but smaller part of casing 2, being supported at a suitable elevation in an off-center position above hollow base part 3 by a hollow neck 13 through the center of which shaft 9 extends. This neck is of reduced diameter at its middle to provide room at the rear thereof for a winding crank 14 diametrically opposite the rotatable fan member or propeller 15, thus permitting hand winding of the crank without danger of contact with the revolving fan blades. Fan member 15 is secured to the outer end of a short horizontal shaft 16 which extends through a bushing 17 in the circular wall of head 12, the shaft being supported by separate sets of anti-friction balls 18 confined within separate bearing or ball races 20 seated within pockets at opposite sides of said wall, see Fig. 6. A collar 21 is fixed to shaft 16 against the outer set of balls, and a bevel gear 22 is secured to the inner end of the shaft in bearing engagement with the other or inner set of balls, thus supporting the shaft for rotatable movement and end thrust in a very simple anti-friction way within the casing wall with the small gear 22 in mesh with the larger bevel gear 10. A flanged cover plate 12′ is removably attached to head 12 to permit assembly, oiling, etc.

Vertical shaft 9 extends downwardly the center of neck 13 and passes through an opening in a bearing plate 23 which is secured to the partition by tie and spacing members 24. Bearing plate 23 and partition 4 provide a frame for a set of power transmitting gears 25, and a relatively large number of reduction gears are used in chamber 5 to operate shaft 9, together with a powerful coiled spring 26 which is confined in chamber 6. The inner coil of spring 26 is connected to a central mandrel 27 which is detachably sleeved upon the square extension 28 of a main driving shaft 29 for said gearing. Spring 26 is confined within an open drum 30 having a slot 31 in its side walls through which the hooked extremity 32 of the outer coil of the spring is projected and detachably connected with said wall. A gear or toothed flange 33 forms part of drum 30 and these parts rest in rotatable position upon bottom plate 7 together with a winding pinion 34. A slotted hub 35 on pinion 34 is adapted to be engaged and rotated by the flat or angular extremity of a short shaft 36 of winding crank 14, and this crank member and shaft may be bodily removed from the casing after winding the spring. A brake member or stopping device for the fan is also provided, comprising a brake drum 37 secured to the shaft 38 of the last set of operating gears in chamber 5. Brake drum 37 is located on top of plate 23 within hollow neck 13, and a spring arm 39 extends through an opening 40 in one side wall of the neck, which arm carries a brake shoe 41 adapted to engage and stop the rotation of the drum and its connected operat-

ing mechanism. A rotatable cam 42 is mounted on base 3 at one side of spring arm 39, which cam has a wing or finger piece 43 to turn the cam and throw the brake shoe into or out of contact with the brake drum.

As constructed, the power spring and its winding gearing may be bodily removed from the casing together with bottom plate 7 without detaching the operating gearing and the supporting partition and frame therefor, although such parts may also be removed from the casing by removing the screws which secure partition 4 to the lugs 44 within the base of the casing. Bottom plate 7 also carries a spring pressed pawl 45 in stop engagement with the teeth of the large winding gear 33 for spring drum 30.

What I claim, is:

1. A spring driven fan, comprising a casing having a hollow base subdivided by a horizontal partition and formed with a hollow head and hollow relatively long neck surmounting said base, a rotary fan supported upon said head, drive gearing in said head for said fan, an operating shaft for said gearing extending a substantial distance downwardly through said hollow neck into the upper subdivision of said base, power transmitting gearing mounted upon said partition and forming a removable gearing unit therewith, a spring motor within the lower subdivision of said hollow base having operating connection with said shaft by means of said gearing unit, and means for winding said spring motor.

2. A spring driven fan, comprising a casing having a hollow base, a horizontal partition subdividing said base into separated and superposed chambers, a bottom plate for said hollow base, a rotary fan mounted upon said casing having operating gearing confined within the upper chamber and mounted upon said horizontal partition and removable therewith, and a power spring and winding means for the spring within the lower chamber, mounted upon said bottom plate and removable therewith.

3. A spring driven fan, comprising a hollow casing having a relatively long cylindrical neck in offset relationship to said casing, and a chambered head surmounting said neck, a rotary fan mounted upon said head having driving gears confined within said chambered head, a vertical shaft for said gearing extending through said neck, a gearing unit for said shaft removably mounted within the upper part of the base of said casing, a power spring for driving said shaft removably mounted within the lower part of the base of said casing, means for winding said spring, and a device for stopping operation of said gearing and fan.

In testimony whereof I affix my signature.

FRANK J. SIRL.