(No Model.)

G. CROWELL.

ROTARY PRESSURE BLOWER.

No. 388,639. Patented Aug. 28, 1888.

FIG. 1.

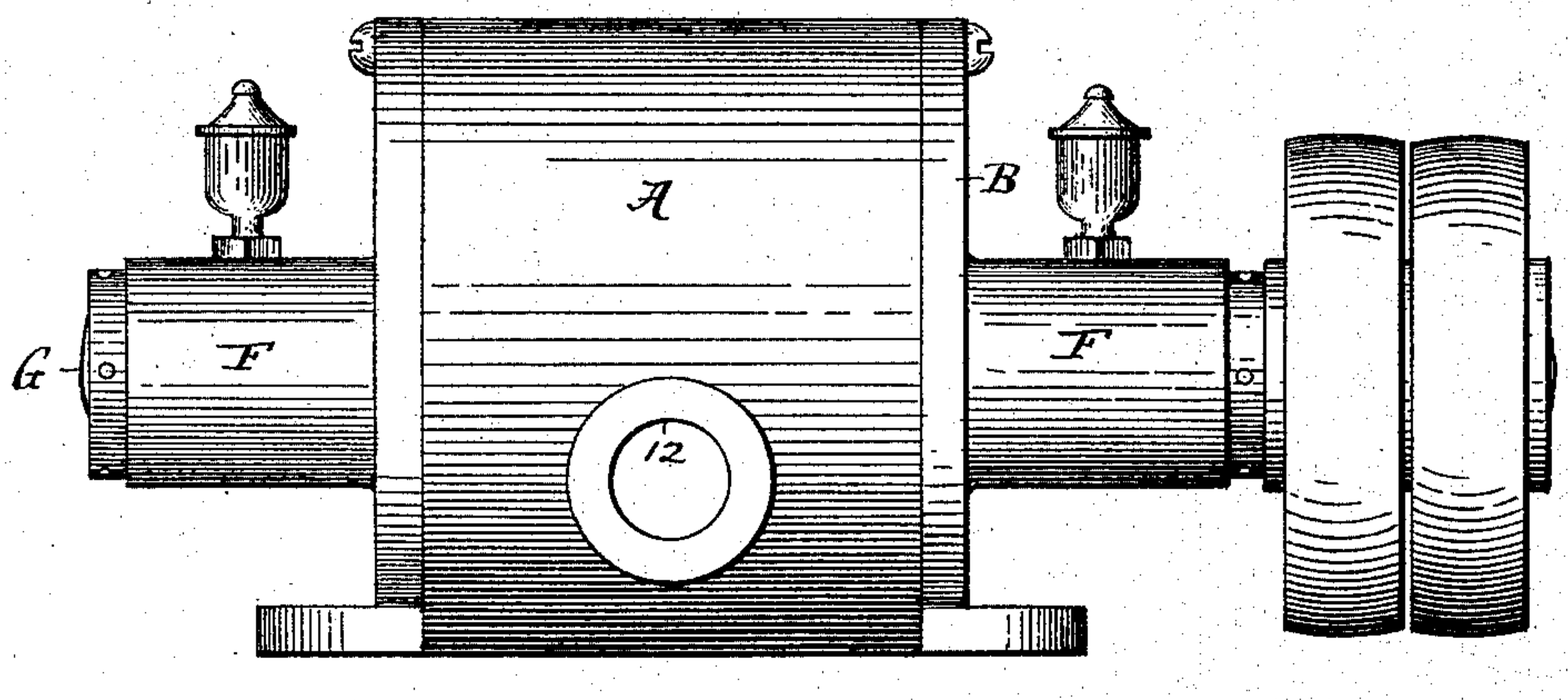


FIG. 2.

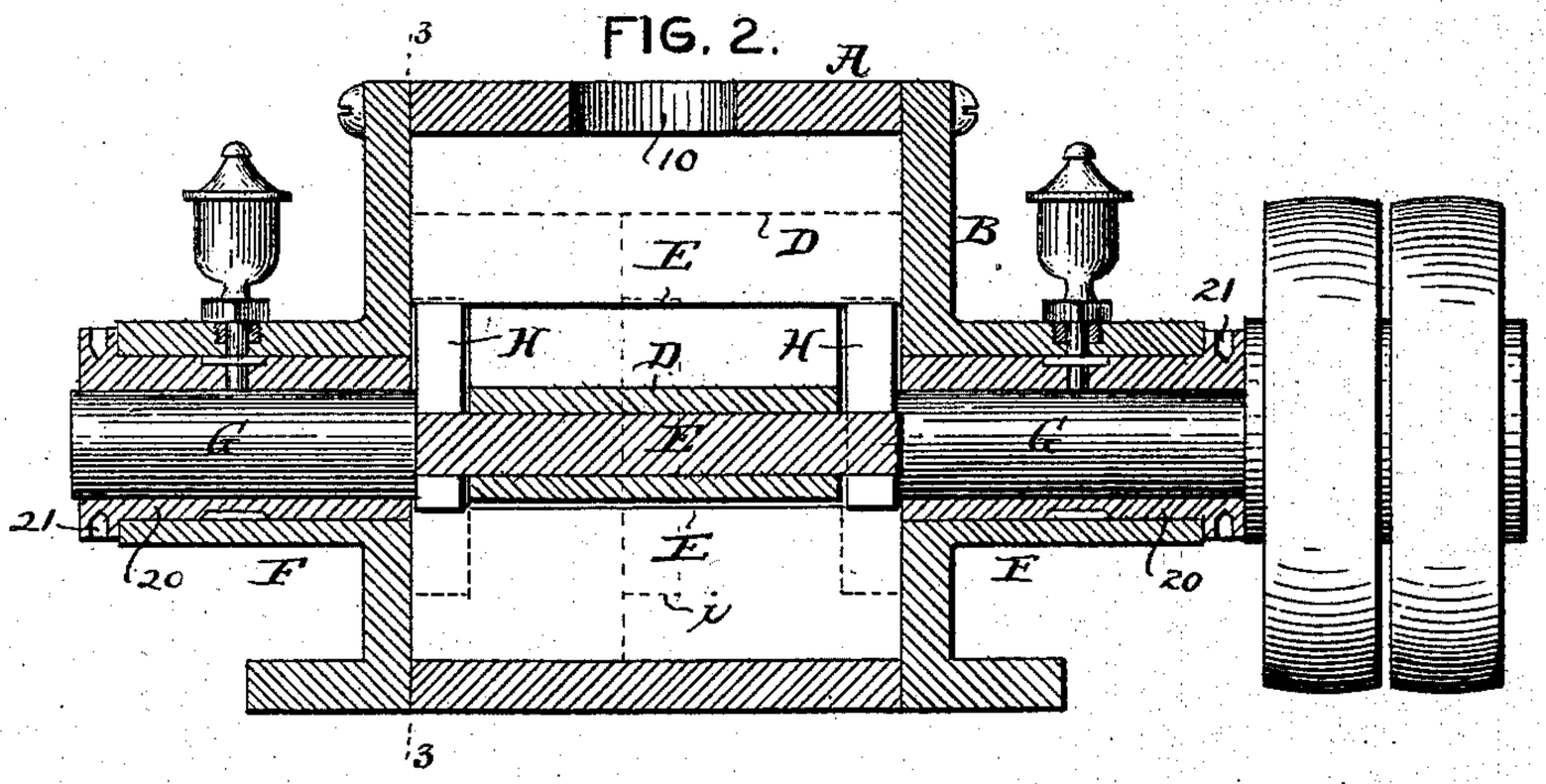


FIG. 3.

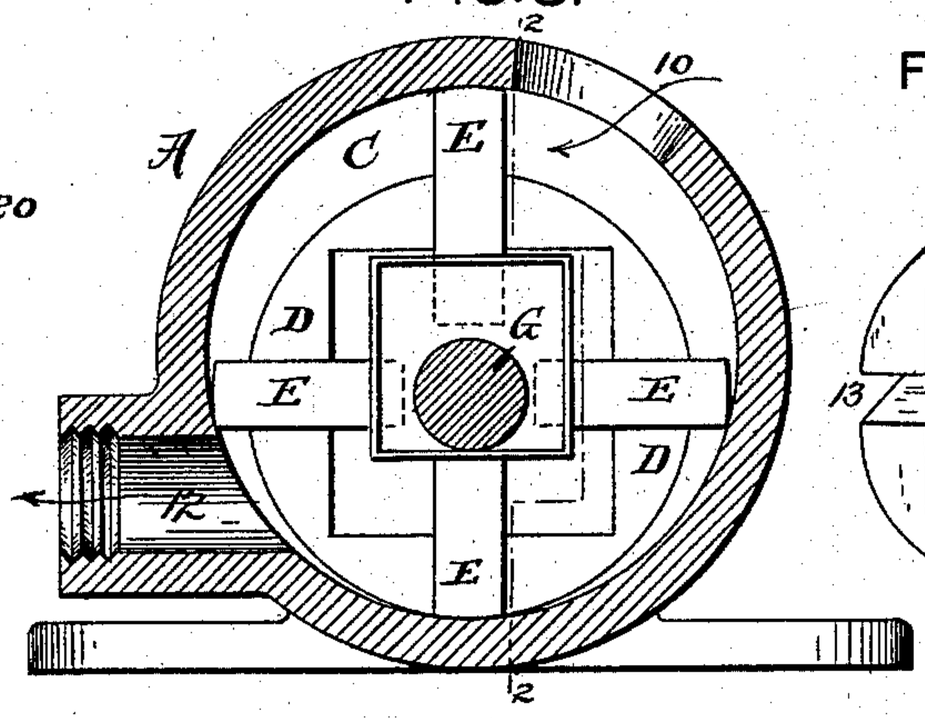


FIG. 6.

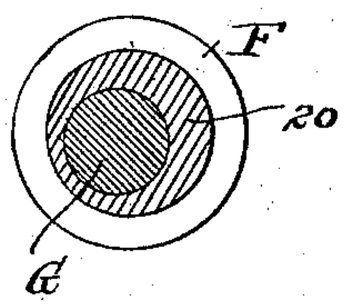


FIG. 4.

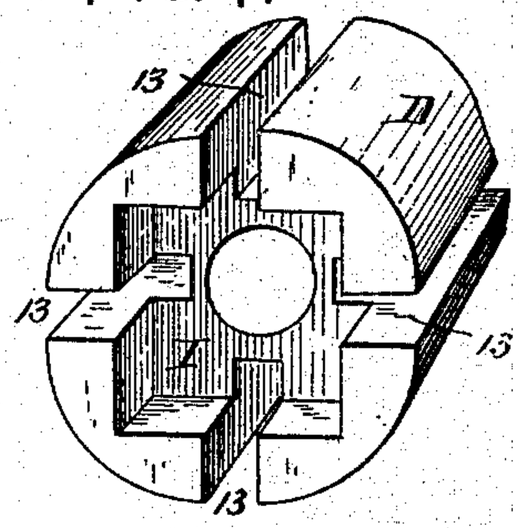
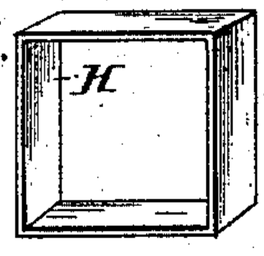


FIG. 5.



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UNITED STATES PATENT OFFICE.

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ROTARY PRESSURE-BLOWER.

SPECIFICATION forming part of Letters Patent No. 388,639, dated August 28, 1888.

Application filed November 25, 1887. Serial No. 256,146. (No model.)

To all whom it may concern:

Be it known that I, GILMER CROWELL, a citizen of the United States, residing at Brooklyn, Kings county, and State of New York, have invented certain new and useful Improvements in Rotary Pressure-Blowers, fully set forth in the following specification and represented in the accompanying drawings.

The present invention relates generally to rotary air blowing engines, and particularly to that class wherein the piston consists of two or more blades or fans mounted in a hub set eccentrically within a casing or cylinder and provided with air inlet and outlet orifices.

It has for its object, among other things, to improve the structure of this class of blowing-engines, whereby the blades or fans revolve and vibrate with less friction against the inner surface of the cylinder, and to provide means whereby the degree of pressure in holding said blades or fans against the interior of the cylinder may be finely adjusted.

As a better understanding of the present improvements may be had by a detailed description of a practical embodiment thereof, further preliminary reference thereto will be omitted, and such description will now be given in connection with the accompanying drawings, in which—

Figure 1 is an elevation of a rotary blower embodying the improvements, looking at the outlet side thereof. Fig. 2 is a longitudinal vertical section of the same, taken on the line 2 2 of Fig. 3. Fig. 3 is a cross-sectional elevation thereof, taken on the line 3 3 of Fig. 2. Fig. 4 is a perspective view of the hub supporting the blades or fans, the latter being removed. Fig. 5 is a similar view of the spring for causing the blades or fans to travel in contact with the interior surface of the cylinder, and Fig. 6 is a diagram illustrating the effect of the eccentric bushing.

Referring to these illustrations, it will be understood that A represents the cylinder or casing of the blowing-engine, having heads B secured thereto and forming an interior cylindrical chamber, C, in which rotates a hub, D, of a diameter considerably less than that of said chamber, and carrying with it in its rotations two or more blades, E.

The heads B of the cylinder are provided with extended bosses F, forming bearings at each end of the cylinder for the shaft G, to which the rotating hub D is firmly secured. These bearings for the shaft G are set eccentric with respect to the center of the cylinder or its chamber C, and preferably to such an extent as to create little or no space at one point between the surface of the hub D and that of the chamber, as shown in Fig. 3, thus forming considerable space on the opposite side of the hub for the passage of air or other fluid. The casing or cylinder A is also provided with an induction-opening, 10, for the admission of air, &c., to the chamber, and with an eduction-orifice, 12, for the passage of the air, &c., that is being forced from the chamber by the rotations of the blades E.

The blades E, while they may be of any material, are preferably formed of wood, and are set in and carried by the hub D in such manner that they may reciprocate in and out of said hub. As shown, and it is the preferred construction, the hub D is provided with radial slots or grooves 13, the opposite slots set diametrically opposed to each other, and the blades are set in these slots, which are of such depth as to receive all or a greater portion of the blade in one position of the hub. It is well recognized that these blades should be seated in these slots, so that as one blade is projected from the hub the blade opposed thereto will be correspondingly moved into the hub, while at the same time they should be borne upon by slight spring-pressure tending to force each blade outward, and thus cause the outer face of the blade to constantly travel in contact with the interior surface of the chamber. This has been effected in some structures, and so far as this part of this invention is concerned the structure now to be described is an improvement thereupon.

Instead of providing holes in the inner side of the blades for the reception of rods projecting from the diametrically-opposed blades carrying spiral springs which bear upon the bottom of the holes and against shoulders on the rods, I dispense with such holes, rods, and spiral springs and substitute a pair of springs of peculiar form adapted to be borne upon simultaneously by each of the four blades E. These springs H are of rectangular form (see

Figs. 3 and 5) and made of sheet or leaf steel, having perfectly smooth faces, so that the springs may be moved across the inner sides of the blades as they move in and out of the hub. These springs H may be mounted in or adjacent to the hub D in any manner, so that they will bear upon the inner or rear sides of the blades; but, as shown, the hub is provided with a countersunk recess in each end, arranged centrally thereof and around its shaft G. The slots or grooves 13 for the blades of course extend far enough into the hub and past the limits of the recesses to permit the springs to bear upon the blades. If this is not done, projections may be left upon the opposite ends of the inner sides of the blades, so that they may project into the recesses and be borne upon by the springs, as will be understood. These recesses will be of greater diameter than that of the spring, so as to leave space for the movement thereof, as it is being moved from one side to the other in the movements of the blades.

In the smaller sizes of blowers it is to be observed that only one such rectangular spring, H, may be requisite to provide the blades with the desired spring-pressure, and when only one is employed, the recess for the spring should be formed in the center of the hub, as shown by dotted lines *i*, Fig. 2, in which case, it is to be remarked, the hub will be formed in two pieces, the recess formed in one of them, and the pieces secured together after the insertion of the spring.

The use of this rectangular spring, it will be seen, provides an exceedingly simple structure and adapted to serve for each of the blades simultaneously. The degree of its pressure may be regulated to a nicety either by the "temper" or by using thicker or thinner leaf-steel, and they are accessible and may be readily removed and replaced by others without taking the hub and its blades from the cylinder by removing one or both of its heads B.

The use of wooden blades in place of cast-iron ones, which are usually employed, is of great benefit to this class of blowers in that the wear on the inner side of the chamber C is greatly lessened, the noise of the rotating blades obviated and the structure materially lightened.

In order to prevent the blades from carrying the air around past the eduction-orifice 12, the space between the hub and the cylinder at one point should be nil. This is exceedingly difficult to accomplish unless the parts are accurately fitted. To dispense with the necessity of accuracy within certain limits, there is provided an eccentric bushing, 20, fitted around the shaft in each of the bearings formed by the bosses F, (see Fig. 2,) and they may be provided with means—such as the wrench-holes 21—by which they may be turned around the shaft to raise or lower it as occasion may require, as will be readily understood by referring to Fig. 6. Thus, if it is found that the hub D as the parts are fitted sets a distance away from the side of the cylinder at the point where it should contact, or nearly so, (the lower side of the cylinder, as shown,) the eccentric bushings will each be turned so as to lower the ends of the shafts and the hub to bring the latter to the proper working position within the cylinder.

I do not wish to be understood as limiting the features of my invention to use with air-blowing engines, as it is obvious that they are equally applicable to rotary engines in general, whether it be the prime mover or be driven by a prime mover.

What I claim is—

1. In a rotary engine, the combination, with its casing, hub, and blades, of a spring of hollow polygonal form adapted to bear upon each of the blades, substantially as described.

2. The herein-described spring, consisting of a plurality of leaves connected together in hollow polygonal form, each leaf constituting an independent spring.

3. In a rotary engine, the combination, with its casing, its revoluble hub, and four blades carried thereby, of a spring of hollow polygonal form adapted to bear upon each of the blades, and also to be moved independently thereof, substantially as described.

4. The combination of a cylinder or casing, a hub revoluble therein, carrying two or more blades adapted to reciprocate with respect to the hub, and said hub provided with a recess, I, and a spring of hollow polygonal form seated in said recess to bear upon said blades, substantially as described.

5. The combination, with a cylinder, a hub provided at its ends with recesses I, and in its periphery with radial slots, and blades seated in said slots and adapted to reciprocate independent of the hub, of a spring of hollow polygonal form seated in each of said recesses and adapted to bear upon the blades, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GILMER CROWELL.

Witnesses:
ISAAC ROBERTS,
WILLARD K. EAMES.