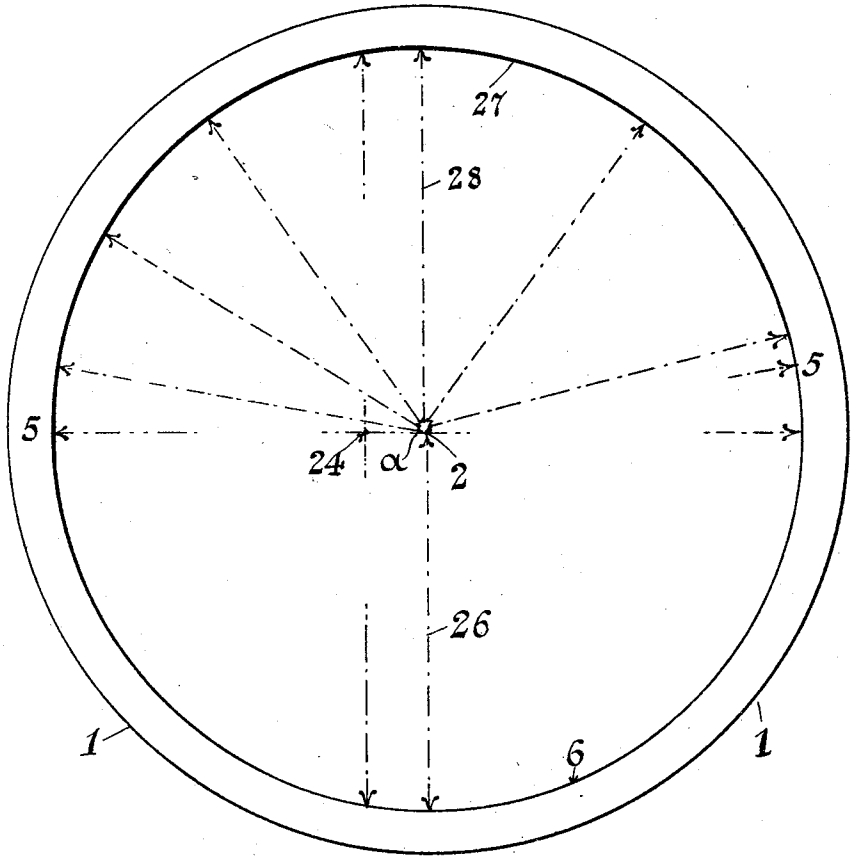
(No Model.) 2 Sheets—Sheet 1.

G. CROWELL.

CYLINDER FOR ROTARY BLOWERS OR ENGINES.

No. 475,301. Patented May 24, 1892.

Fig. 1.



Witnesses
Chas Hanimann
N. Marler

Inventor
Gilmer Crowell
By his Attorney
Geo. H. Graham

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

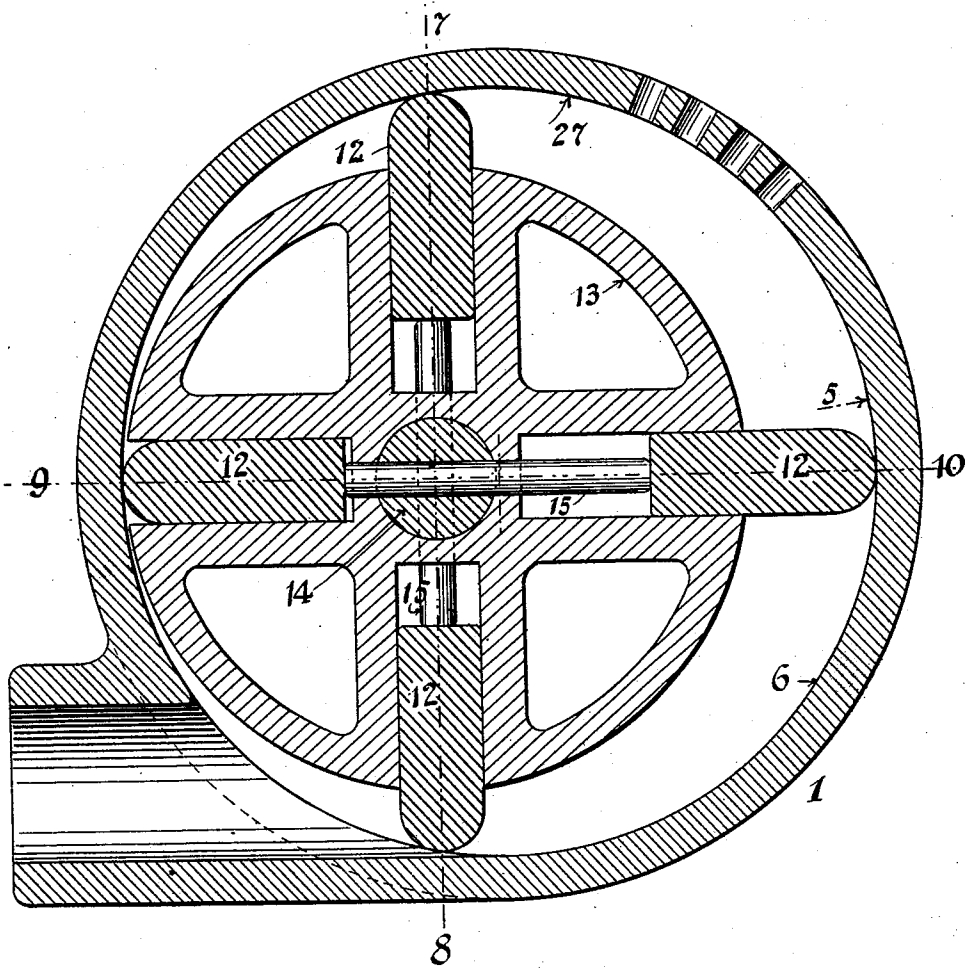
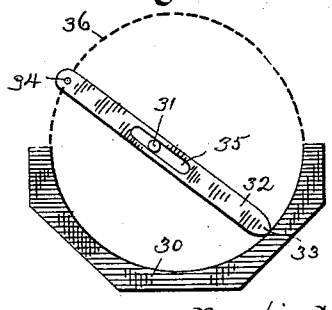


Fig. 3.



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UNITED STATES PATENT OFFICE.

GILMER CROWELL, OF BROOKLYN, NEW YORK.

CYLINDER FOR ROTARY BLOWERS OR ENGINES.

SPECIFICATION forming part of Letters Patent No. 475,301, dated May 24, 1892.

Application filed April 11, 1891. Serial No. 388,448. (No model.)

To all whom it may concern:

Be it known that I, GILMER CROWELL, of the city of Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Cylinders for Rotary Blowers or Engines, fully set forth in the following description and represented in the accompanying drawings.

This invention relates generally to cylinders employed in rotary engines, blast-fans, blowers, or the like, wherein the radially-sliding pistons or blades are carried by a rotating hub or drum set eccentric to the approximate center of the cylinder. In this type of blower or engine it is exceedingly difficult to obtain perfect and satisfactory results from the fact that there are points in the diameter of the stationary cylinder where both ends of the piston do not accurately fill the cylinder, in consequence of which leakage and loss of power or pressure result. For this reason a sliding piston having no springs or packings or followers and carried by a drum eccentrically journaled in a cylindrical case has never, so far as I know, been practically used for any considerable length of time.

The objects of my invention are to avoid the above objections, to provide a novel construction whereby the radially-sliding pistons or blades touch and accurately fit diametrically-opposite points at every part of the internal caliber of the stationary cylinder without employing springs or packings or followers, and to provide a novel fan-blade or piston for this special type of blower or engine.

To accomplish these objects my invention involves the novel cylinder bored to provide a common diameter taken on lines through a predetermined point eccentric to the approximate center of the cylinder, the internal periphery of which cylinder is formed one half semi-cylindrical and the other on a curve formed by a plurality of arcs with a gradually changing radius from the center of rotation of the piston, as fully hereinafter described and claimed, reference being made to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of the internal caliber of a cylinder, illustrating its oval contour and the moving centers from which it is bored. Fig. 2 is a vertical central sectional view of sufficient of an air-blast, blower, or engine to exhibit the improvements claimed. Fig. 3 shows a scriber, by which the contour of the cylinder may be obtained, which device, however, or the general method of obtaining the contour, is not claimed in the present specification.

In order to enable those skilled in the art to make and use my invention, I will now describe the cylinder of the novel contour, referring now to Fig. 1. The bore of the cylinder 1 has in general an oval contour consisting in the main of an arc 6, described by a radius 26 and having the point 2 for its center, which arc 6 constitutes substantially one-half of a circle. It may extend for a distance slightly greater than one-half of the cylinder—as, for instance, between the points 5 indicated on the arc. The bounding chord of this half-circle is situated substantially on a line drawn through the center of rotation of the piston—viz., the point 24. The remaining and in this case lesser arc 27 of the cylinder is inscribed from a moving center moving in the path indicated by the oval line of dots *a*, with substantially the line 28 as a radius. From the foregoing it will be apparent that the center of the boring-tool, when a movable tool is used, instead of moving cylindrically will inscribe the oval *a*, resting for a time at the point 2 to inscribe the arc 6, and then constantly moving to inscribe the irregular arc 27, until it again reaches the point 2. The effect of this is to provide an irregularly-formed oval-bored cylinder, irregular so far as the contour or arc 27 is concerned, and which arc, with the other arc 6, provides a contour adapted to a piston or blade set to revolve from an axis 24, eccentric with respect to the approximate center of the cylinder, whereby the extremities of such piston or blade will preserve accurate and close contact or fit throughout the diameter of the internal caliber of the cylinder.

With this general understanding of the nature of the cylinder and one manner in which it may be bored, I will now proceed to describe its use in an air-blast, blower, or other engine in detail, referring to Fig. 2, wherein—

The numeral 1 designates the stationary cylinder, which in practice is bored in the manner just explained.

The radially-sliding pistons or blades 12 are

carried by a rotating drum 13, journaled eccentrically in the stationary cylinder on the axis 24. As there is a positive measured distance across the cylinder on the line 7 8 which is co-ordinate to the distance across the cylinder on the line 9 10, the opposite extremities of the pistons or blades 12 will in their revolution preserve accurate and close contact or fit throughout the diameter of the internal caliber without liability of leakage at any point past a blade, whereby I attain, by actual demonstration, twenty per cent. increased power or pressure in the working of the blower or engine. Whether the fan or piston-blades be driven or serve to drive is immaterial, and therefore I do not enter into further detailed illustration and explanation in this respect, as it is not essential for the proper understanding of my improvement.

I have shown in Fig. 3 a means by which the contour of the cylinder may be readily obtained.

30 is a base-piece having an interior curved surface formed on a radius which is substantially that of the cylinder to be produced. This surface is a half-circle.

31 is an eccentrically-situated guide-pin having the position of the center of revolution of the piston or blade in the finished cylinder. The parts 30 and 31 may be fixed in place upon any suitable surface.

32 is a bar, which is of a length from its end 33 to a scriber-point 34, with which it is provided, equal to the definite diameter hereinbefore referred to and equal in length to the piston or blade. Said bar is formed with a slot or other guide 35, adapted to engage the pin 31. In using the scriber the end 33 of the bar 32 is held firmly in contact with the base-piece 30 and revolved around the pin 31. This will cause the point 34 to describe a curve 36, which, together with the curve of the base-piece 30, will constitute the pattern for the entire contour of a cylinder whose shaft or center of rotation of the piston is to be situated at the point 31.

It has been proposed to strike the internal caliber of a cylinder from three different centers; but the construction has never been worked in consequence of the impossibility of obtaining fan-blades or pistons that will practicably operate conjointly therewith and avoid leakage without using spring followers or packings and the like, for the working fluid will at points in the cylinder blow past the extremities of the pistons.

The axis of the rotating drum in my construction is composed of a through-shaft 14, journaled eccentrically in the cylinder-heads, and that the fan-blades may be practically continuous in a radial line the pins 15 are provided, each passing through perforations in the shaft with either end in contact with the end of a piston or blade, there being a pair of pins for each pair of blades, the whole free to slide back and forth with respect to the axis.

While the drum is journaled eccentrically in the cylinder and the internal diameter thereof is formed by a plurality of arcs struck from a moving center, still the extremities of the fan-blades accurately fit the cylinder at every point in the revolution of the fan, and there is no possibility of the air or other fluid blowing past the extremity of a blade, whereby the power of the engine is enlarged and good results attained.

Having thus described my invention, what I claim is—

1. The herein-described cylinder, the internal periphery of substantially one-half of which is semi-cylindrical and the other portion of which is on a curve formed by a plurality of arcs with a gradually-changing radius from the center of rotation of the piston, substantially as set forth.

2. The herein-described cylinder, the internal periphery of one-half of which is semi-cylindrical and the other portion of which is on a curve formed by a plurality of arcs with a gradually-changing radius from the center of rotation of the piston, the bounding chord of the semi-cylindrical portion being situated substantially on a line drawn through said center of rotation, substantially as set forth.

In witness whereof I have hereunto set my hand, this 8th day of April, A. D. 1891, in presence of two witnesses.

GILMER CROWELL.

Witnesses:
GEO. H. GRAHAM,
N. MARLER.