

United States Patent Office.

P. H. ROOTS AND F. M. ROOTS, OF CONNERSVILLE, INDIANA.

Letters Patent No. 73,654, dated January 21, 1868.

IMPROVEMENT IN ROTARY BLOWERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that we, P. H. Roots and F. M. Roots, of Connorsville, in the county of Fayette, and State of Indiana, have invented a new and improved Rotary Blower; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification.

Figure 1 represents a vertical transverse section of our improved rotary blower.

Figure 2 is a longitudinal sectional elevation of the same.

Figure 3 is a transverse section of a modification of the same, on a reduced scale.

Similar letters of reference indicate corresponding parts.

This invention relates to a new manner of constructing the shells of that class of rotary blowers and engines in which two revolving pistons, whose peripheries are formed by arcs of different diameters, connected by suitable sides, are arranged.

The invention consists in forming within the shell, at suitable distances apart, projecting packing-strips, against which the outer peripheries of the pistons work.

The object of the invention is, first, to overcome the necessity of boring out and adjusting the interior surface of the shell. As the pistons do not come in contact with the inner surface of the shell, but only with that of the packing-strips, the said surface of the case or shell may be left rough and unbored or undressed.

The object of the invention is, also, to reduce the friction, which is much less when only narrow sections of the pistons, instead of their whole exterior surfaces, are in contact with the shell.

The consequent object of the invention is, to reduce the expense of the apparatus, and to keep the same in repair, as it will certainly cost less to refit new packing-strips than to replace the whole interior surface of the case or shell when worn.

A B are two double-acting abutments, which are mounted on shafts, C C', respectively. Each abutment consists of two (or one) outer pistons, *a a'*, and two intervening recesses, *b b'*, and of a central cylinder, *c c'*, as shown in fig. 1, or as in fig. 3. The abutments are formed in the following manner: From two points, C C', which are the centres of the shafts, and which are taken at any desired distance apart, according to the size of the machine proposed to be constructed, are described two circles, *c c'*, of equal radii, each of which may be about one-fourth the distance the centres C C' are apart. These circles, however, may be described with a radius greater or less than that here stated, and may also be made operative, with unequal radii, if desired. The circles *c c'* constitute the central cylinders of the abutments. The radius for forming the outer pistons is the distance from the centres of one of the circles *c c'* to the nearest point in the periphery of the other circle. Of the peripheries of each of the circles *d d'* thus formed, two arcs, of about ninety degrees, are taken on opposite sides of the circles, as in fig. 1, or only one arc, as in fig. 3. The extremities of these arcs may either be connected by straight lines with each other, and the segments thus formed connected by suitable straight or curved arms with the cylinders *c c'*, or the connection may be formed by curved lines, as shown in figs. 1 and 3, forming concave recesses *b b'*.

Abutments may also be advantageously made for various purposes, unlike each other. For instance, the pistons of one abutment may be made consisting of arcs of sixty degrees, and the recesses of one hundred and twenty degrees, in which case the corresponding abutment must have its pistons consist of one hundred and twenty degrees, and its recesses consist of sixty degrees. Pistons consisting of one hundred and eighty degrees, as described in the exposed patent of Baker and Baldwin in 1839, may be used in this combination, as shown in fig. 3.

In fig. 1, two different modes of construction are shown, but the same may be varied at pleasure. Metal cross-heads, *k k*, are or may be arranged in the pistons, as described in our patent of July 24, 1866, and are covered with wood or suitable material. The shafts C C' of the abutments have their bearings in the heads of an oblong case or shell, D, and are connected by suitable cog-wheels, *e e*, as shown in fig. 2. The case D is constructed of two semi-cylindrical shells, connected by straight plates *ff*. In the interior of the shells are arranged packing-strips, *g g*, extending lengthwise from end to end of the case. These strips are either cast to the inner surface of the shells, as shown on the left-hand side in fig. 1, or they may be secured between joints of the plates forming the shells, as shown on the right-hand side in fig. 1, or they may be secured in grooves

arranged in the shells, or held in place by means of bolts fitted through the shells, or be otherwise secured, so as to project from the interior surface of the shells, as shown. The strips may be made of wood, metal, or other suitable material, and may, if desired, be lined with leather or other suitable substance, and should be adjusted so that their inner faces or edges come in contact with, or are close to, the external peripheries of the abutments. A much better and closer fit can be obtained where only narrow strips have to be adjusted, than where the whole interior surface of the case has to be fitted to the piston. By using the packing-strips *g g*, the case is rendered practically air-tight, while the parts between the strips may be in a rough or unworked condition, not being required to fit accurately the external surfaces of the abutments. Strips may in like manner be inserted in the ends of the abutments, to render them tight. It is most convenient to arrange the strips *g* longitudinally in the case *D*, but if desired they may be set in curved or inclined lines. The bearings for the axles are arranged in hubs *h*, projecting from the heads of the shell, as shown in fig. 2. In each or some of these hubs a recess may be made to receive the tubular boxing *i*. A space is left between the boxing and the hub, to receive the ring *j*, made of zinc or any suitable metal or alloy, which is cast around the boxing. Thus arranged, the boxing may be economically renewed if necessary.

The operation of the apparatus is as follows: When the abutments are made to revolve in the direction of the arrows in fig. 1, the air or water, or whatever fluid is acted upon, will be carried forward as the pistons approach each other, and will be forced through the discharge-pipe *E*, and as the connection is kept up between the two abutments during the entire revolution, any inward-backward escape of the fluid is prevented; and as, also, a continuous connection is kept between the pistons, and the packing-strips, there can be no backward escape of the fluid at the external surfaces of the pistons.

When the pistons are operated by machinery, to force water, air, or other liquid, the device is a rotary blowing-engine, or rotary pump, while it becomes a rotary steam-engine when the abutments receive motion from the liquid forced into the case or shell *D*.

We do not claim the form of the abutments which have been described in the Letters Patent, No. 60,365, granted to D. D. Hardy, of Cincinnati, Ohio, on the 11th day of December, 1866, nor that described in the Letters Patent to Baker and Baldwin, above referred to; but

We do claim, and desire to secure by Letters Patent—

1. The packing-strips *g g*, arranged substantially as herein shown and described, upon the interior surface of the case of a rotary blower, pump, or engine, to render the same tight.
2. The abutments *A B* or *A' B'*, in combination with an enclosing case, rendered tight by means of packing-strips, substantially as and for the purpose set forth.

Witnesses:

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