

April 27, 1937.

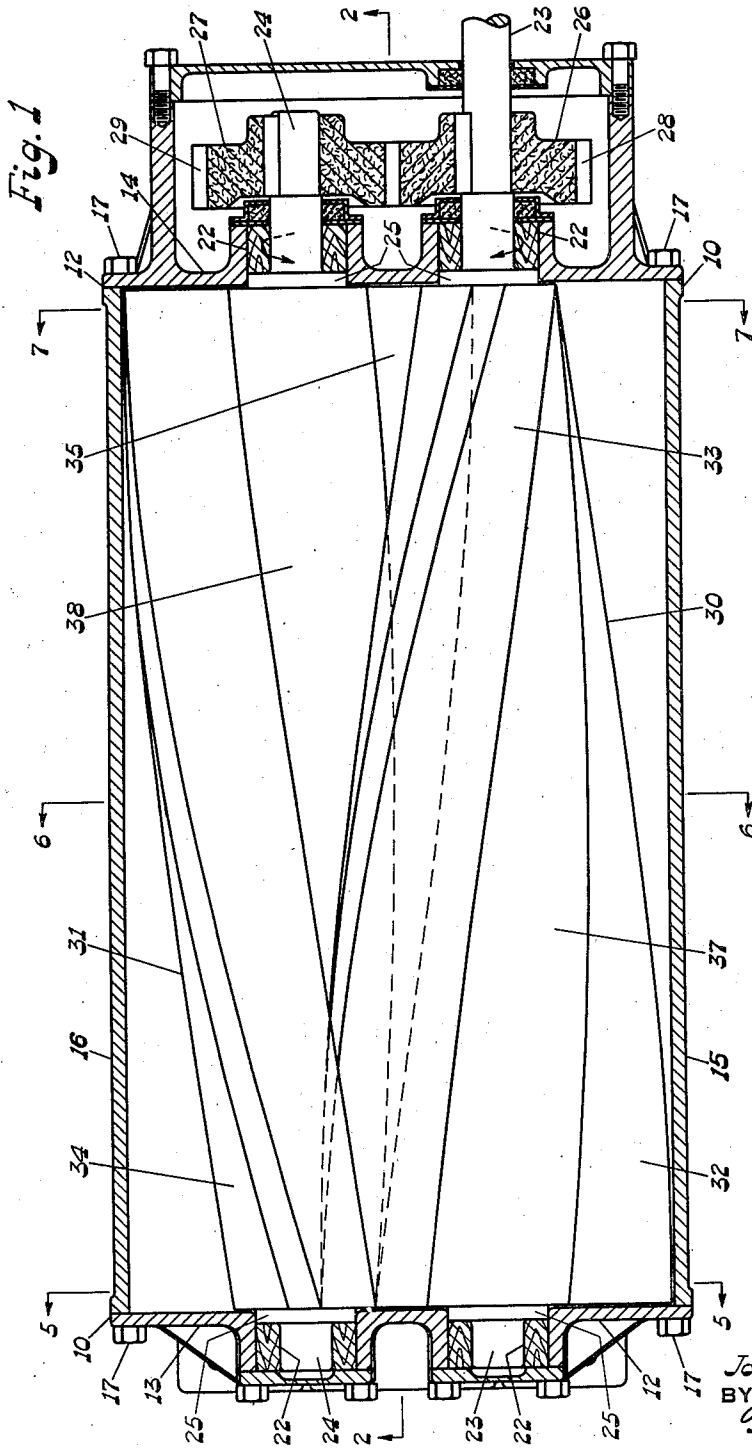
J. A. MARTOCELLO

2,078,334

BLOWER

Filed March 28, 1935

5 Sheets-Sheet 1



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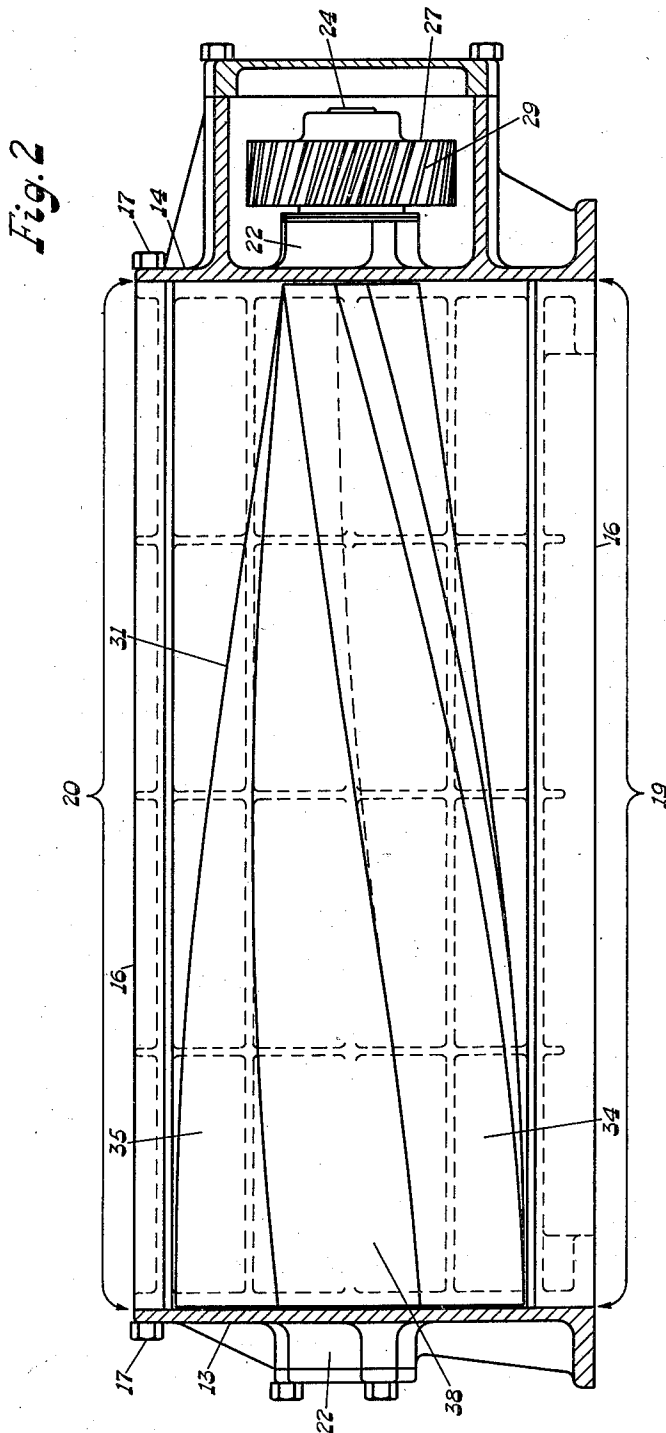
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5 Sheets-Sheet 2



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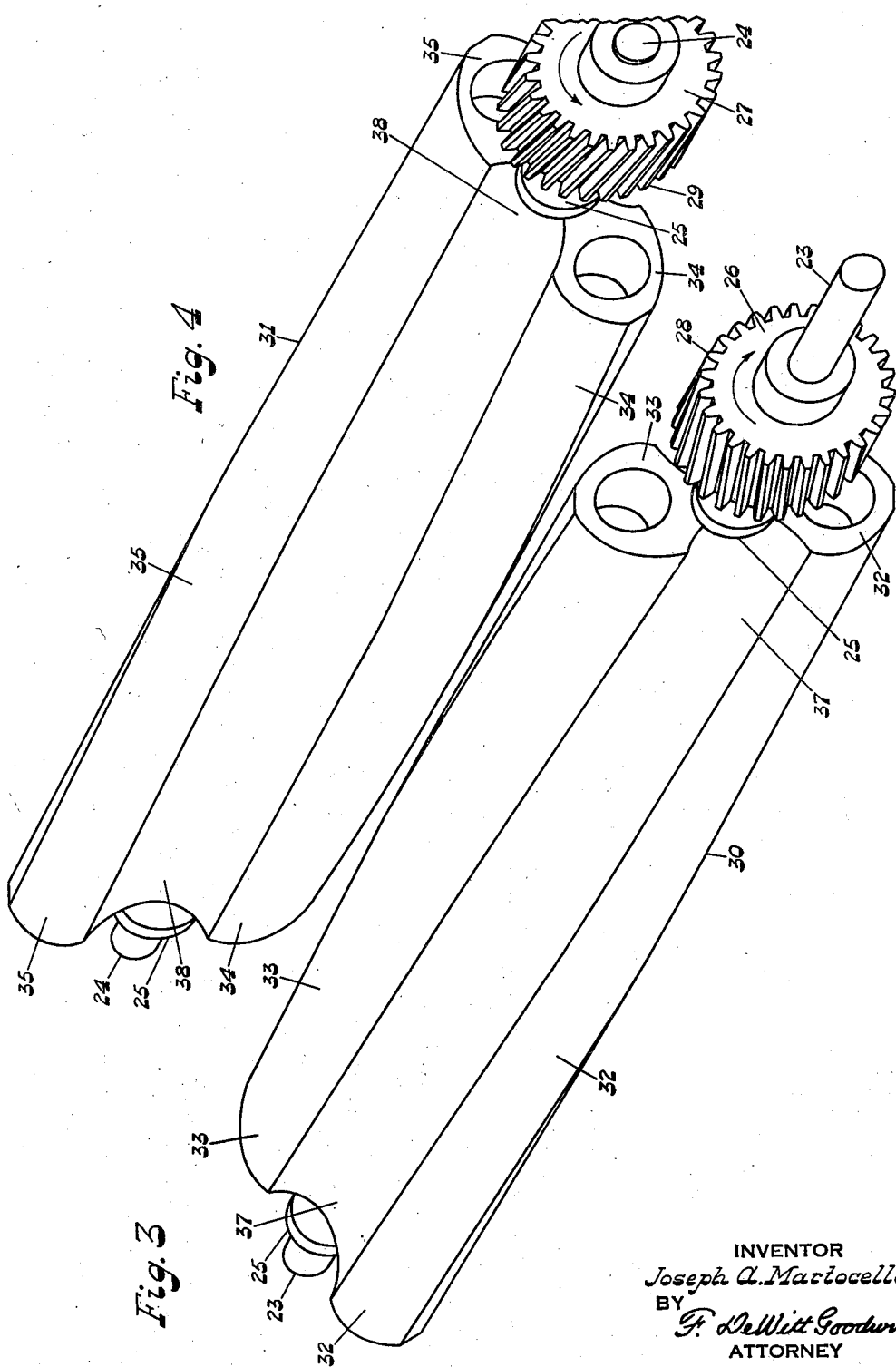
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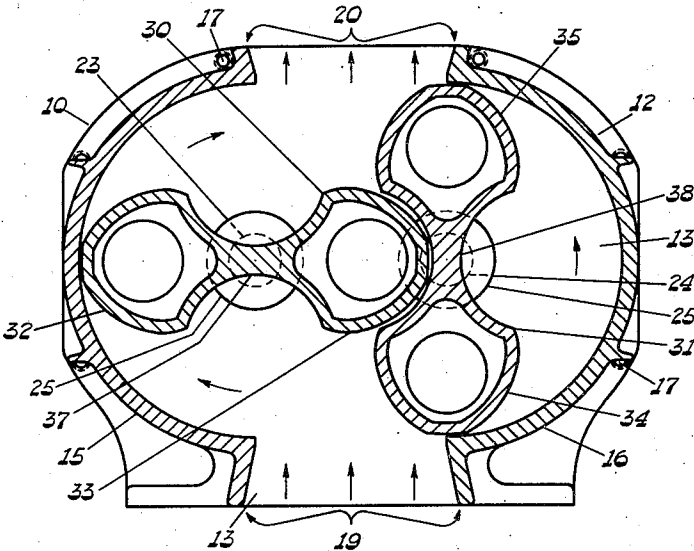


Fig. 5

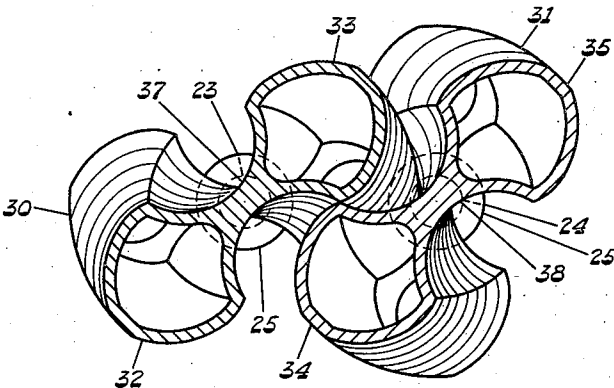


Fig. 6

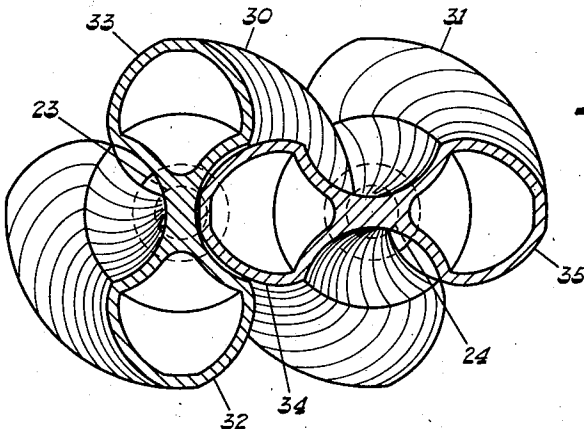


Fig. 7

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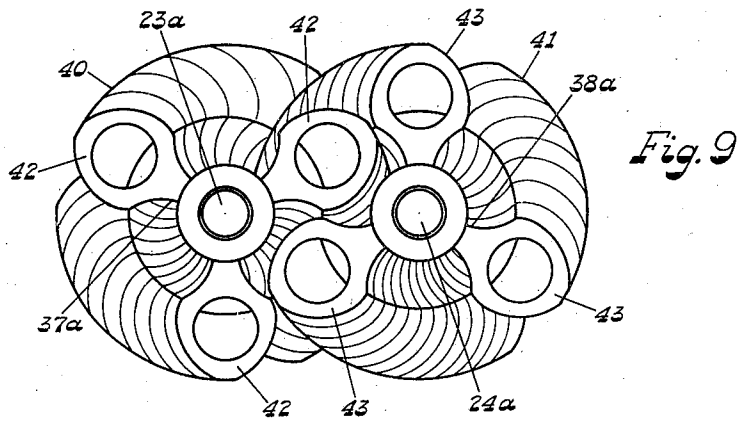
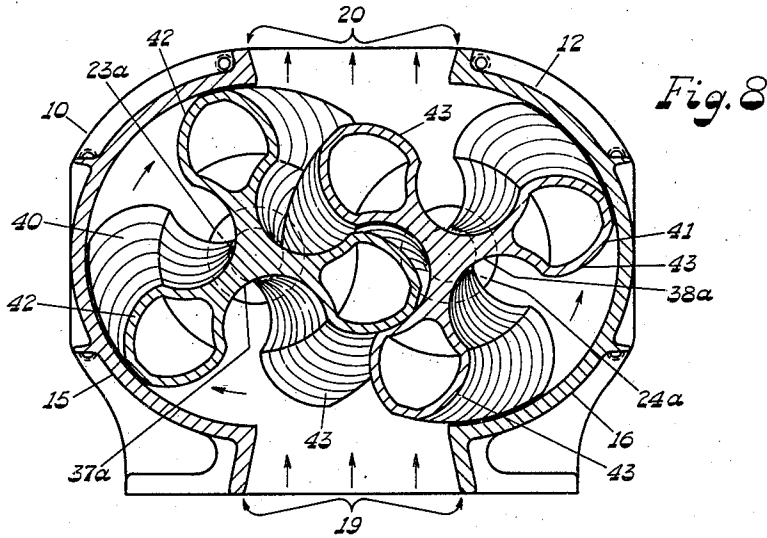
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UNITED STATES PATENT OFFICE

2,078,334

BLOWER

Joseph A. Martocello, Philadelphia, Pa.

Application March 28, 1935, Serial No. 13,464

2 Claims. (Cl. 230-143)

My invention relates to improvements in air blowers of the type known as rotary blowers, and used either as exhausters or blowers.

This invention particularly relates to my improved blower disclosed in application Serial No. 750,878, filed by me October 31, 1934, for air conditioning apparatus.

The object of my invention is to increase the efficiency of blowers and to reduce the vibration and noise associated with such devices.

A further object is to provide a blower having helicoid impellers, operatively associated within a casing.

A further object is to construct a blower with a plurality of impellers each having helical lobes which intermesh. Said lobes are arranged so that they will gradually roll together throughout the length of the impellers as the latter revolve, thereby imparting rapid motion to the air as it is forced from between the continuously converging surfaces of the adjacent lobes as they roll together.

A further object is to provide an impeller having lobes arranged spirally throughout the length of the impeller and occupying successively different radial positions throughout the length of the impeller, for distributing the weight symmetrically relatively to the axis of the impeller, and thereby eliminating pulsations and vibration at high speed of rotation.

A further object is to provide means for reducing the end thrust of the impellers.

A further object is to provide a blower having a casing enclosing elongated impellers and construct the casing with elongated inlet and outlet passageways.

These together with various other novel features of construction and arrangement of the parts, which will be more fully hereinafter described and claimed, constitute my invention.

Referring to the accompanying drawings:

Fig. 1 is a horizontal sectional view of a blower showing the impellers in plan, and embodying my invention. Fig. 2 is a vertical, longitudinal, section on line 2-2, Fig. 1. Figs. 3 and 4 are perspective views of the impellers, detached. Fig. 5 is a transverse vertical sectional view as on line 5-5, Fig. 1. Figs. 6 and 7 are transverse vertical sectional views on lines 6-6 and 7-7, respectively, Fig. 1, the casing being omitted. Fig. 8 is a vertical, central, transverse sectional view of a blower, showing another form of my invention in which the helical impellers are each provided with three lobes. Fig. 9 is an end view of the impellers shown in Fig. 8.

In the accompanying drawings, in which like reference characters refer to like parts, 10 represents my improved blower, or exhauster, comprising a casing 12 formed of end members 13 and 14 and longitudinal side spacing members 15 and 16, secured to the end members by fastening devices 17. The side members 15 and 16 are of segmental formation, having inner cylindrical surfaces. Said side members are arranged in spaced relation to each other and form air inlet and outlet passageways 19 and 20, through the casing. Said passageways extend the length of the casing between the end members. The walls of the side members 15 and 16, defining said passageways 19 and 20 are inclined toward the center of the casing 12, as shown in Fig. 8, and insure the unobstructed passage of air into and from the casing.

The end members 13 and 14 have bearings 22 formed thereon. Shafts 23 and 24, in the form of stud shafts, are formed integrally with the impellers 30 and 31. Said shafts are rotatably mounted in the bearings 22, located at opposite ends of the casing. Said shafts and the impellers thereon are positioned in parallel relation to each other and extend lengthwise in relation to the length of the casing. Enlarged circular portions 25 are integrally formed with the shafts and with the impellers and form end thrust collars.

The shaft 23 is extended beyond the casing and forms means for the attachment of suitable driving means for rotating the shaft. Gear wheels 26 and 27, having helically positioned teeth 28 and 29, are secured upon the shafts 23 and 24. Said gear wheels intermesh for rotating the shaft 24 in unison with the shaft 23.

The impellers 30 and 31 are rigidly formed upon the stud shafts 23 and 24, and occupy the space within the casing 12 between the end members 13 and 14. Each impeller is constructed with two or more lobes. Figs. 1 to 7 show the impeller 30 formed with lobes 32 and 33, and the impeller 31 with lobes 34 and 35. The lobes of each impeller are integrally formed with central body portions 37 and 38, respectively, which portions are concaved and form recesses which are occupied successively by the lobes of the opposite impeller, as the impellers are rotated by their respective driving gears.

The lobes of the opposite impellers 30 and 31 mesh alternately when the impellers are rotated, as shown in Fig. 5, and form a continuous closure to the passage of air between the impellers. The lobes upon each impeller rotate within the cylindrical portions of the two side sections 15 and

16 of the casing and form air passageways, for carrying the air through the casing adjacent to the sections 15 and 16, as indicated by the arrows, Fig. 5.

5 Impellers have heretofore been constructed with the lobes extending parallel with the axis of the impellers. My invention resides in the helical formation of the impellers. The lobes are extended spirally throughout the length of the
10 impellers and form helicoid impellers.

The lobes 32 and 33 upon the impeller 30 are pitched to form a right hand spiral and the lobes 34 and 35 upon the opposite impeller 31 are pitched to form a left hand spiral. When the
15 impellers are rotated as indicated by the arrows in Fig. 5, the spiral lobes will intermesh and continuously coil together throughout the length of the impellers. The convolute surfaces will form air pockets between the lobes of the
20 opposite impellers, which pockets rapidly reduce in size as the lobes roll together and impart a rapid movement to the air throughout the length of the impellers, and discharge the air through the outlet passageway 20 formed in the casing.

25 The impellers are rotated in the proper directions, as indicated by the arrows in Fig. 5, so that the air pockets formed between the convolute surfaces of the lobes will open as the lobes are rotated adjacent to the inlet passageway 19 of
30 the casing, and said pockets will close as the lobes are rotated adjacent to the outlet passageway 20 of the casing.

When the impellers are rotated rapidly the helicoid formation thereof will impart an end
35 thrust, due to the resistance of the air, which tends to move the impellers toward the end member 13 of the casing; to counteract this end thrust, the teeth of the gear wheels 26 and 27 are inclined in spiral directions opposite to the
40 pitch of the impellers, thereby imparting an end thrust to the gear wheels which is opposed to the end thrust imparted by the air to the impellers. The teeth 28 of the gear wheel 26 have
45 a left hand pitch and the lobes of the impeller 30 have a right hand pitch. The impeller 30 and the wheel 26 are rigidly mounted on the same shaft 23. The teeth 29 on the gear wheel 27, secured on the shaft 24, have a right hand pitch
50 and the impeller 31, also rigid with the shaft 24, has the lobes 34 and 35 formed with a left hand pitch. By this arrangement the end thrust of the rapidly rotating gear wheels will tend to reduce the end thrust imparted to the helical impellers.

55 Figs. 8 and 9 illustrate a form of helical impellers 40 and 41, each comprising three lobes, 42 and 43 respectively. The lobes are formed upon the triangular body portions 37a and 38a,

and extend spirally about the axis of the impellers and extend throughout the entire length of the impellers. Said lobes 42 and 43 are rigidly mounted upon the shafts 23a and 24a and intermesh in a manner similar to the impellers
5 having two lobes, as above described.

By constructing a blower, or exhauster, with helical impellers, a more symmetrical distribution of the weight of the lobes is obtained, and a more perfect balancing of the rotating parts is made
10 possible, thus eliminating pulsations and vibration to a greater extent than has heretofore been possible, and insuring silence during operation. By this construction a continuous flow of air from the blower is obtained and thereby pro-
15 ducing more efficient results.

The novel construction of the casing having elongated inlet and outlet passageways, which are coextensive with the length of the impellers, insures a full delivery of air equal to the capacity
20 of the impellers.

Various changes in the details of construction and the arrangement of the parts may be made without departing from my invention.

I claim:

1. A blower comprising elongated intermeshing
25 impellers, end casing members in which the impellers are rotatably mounted, side casing members secured between said end members and positioned in parallel relation relatively to the length
30 of the impellers, and said side members arranged in spaced relation to each other and having inclined walls forming inlet and outlet passageways, co-extensive in width with the distance
35 between the center lines of the impellers and co-extensive in length with the length of the impellers, said inlet and outlet passageways being substantially unrestricted and said outlet passageway discharging directly to the atmosphere.
2. A blower comprising elongated intermeshing
40 impellers, end casing members in which the impellers are rotatably mounted with their axes positioned in spaced parallel relation to each other, semicylindrical side casing members positioned concentric with each impeller, means se-
45 curing the opposite ends of the side members upon the opposite end members, and said side members having longitudinal edge walls inclined toward the central portion of the casing and defining inlet and outlet passageways coextensive
60 in width with the distance between the center lines of the impellers and co-extensive in length with the length of the impellers, said inlet and outlet passageways being substantially unrestricted and said outlet passageway discharging
65 directly to the atmosphere.

JOSEPH A. MARTOCELLO.