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O. D. H. BENTLEY
BLOWER DRIVE AND SUPPORT

2,108,703

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3 Sheets-Sheet 1

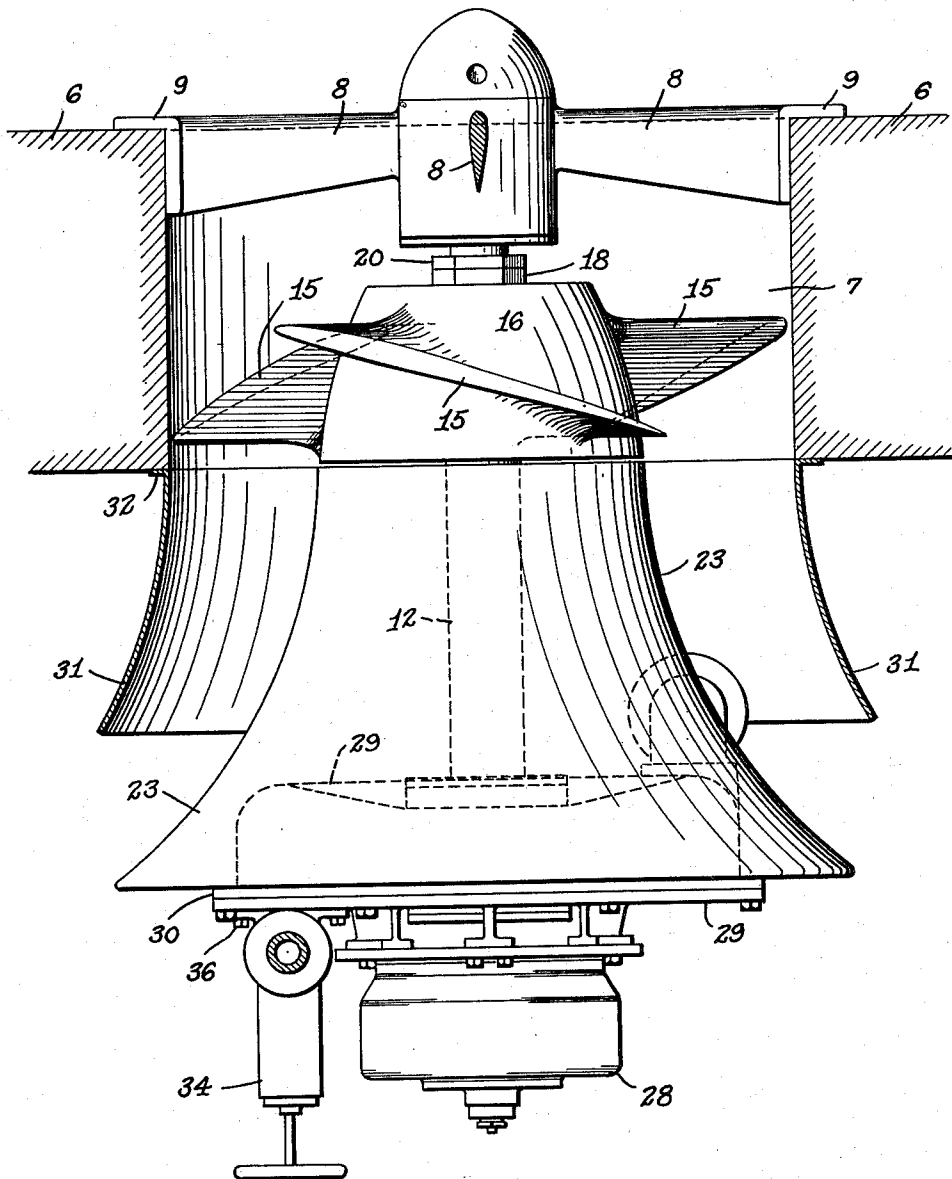


Fig. 1.

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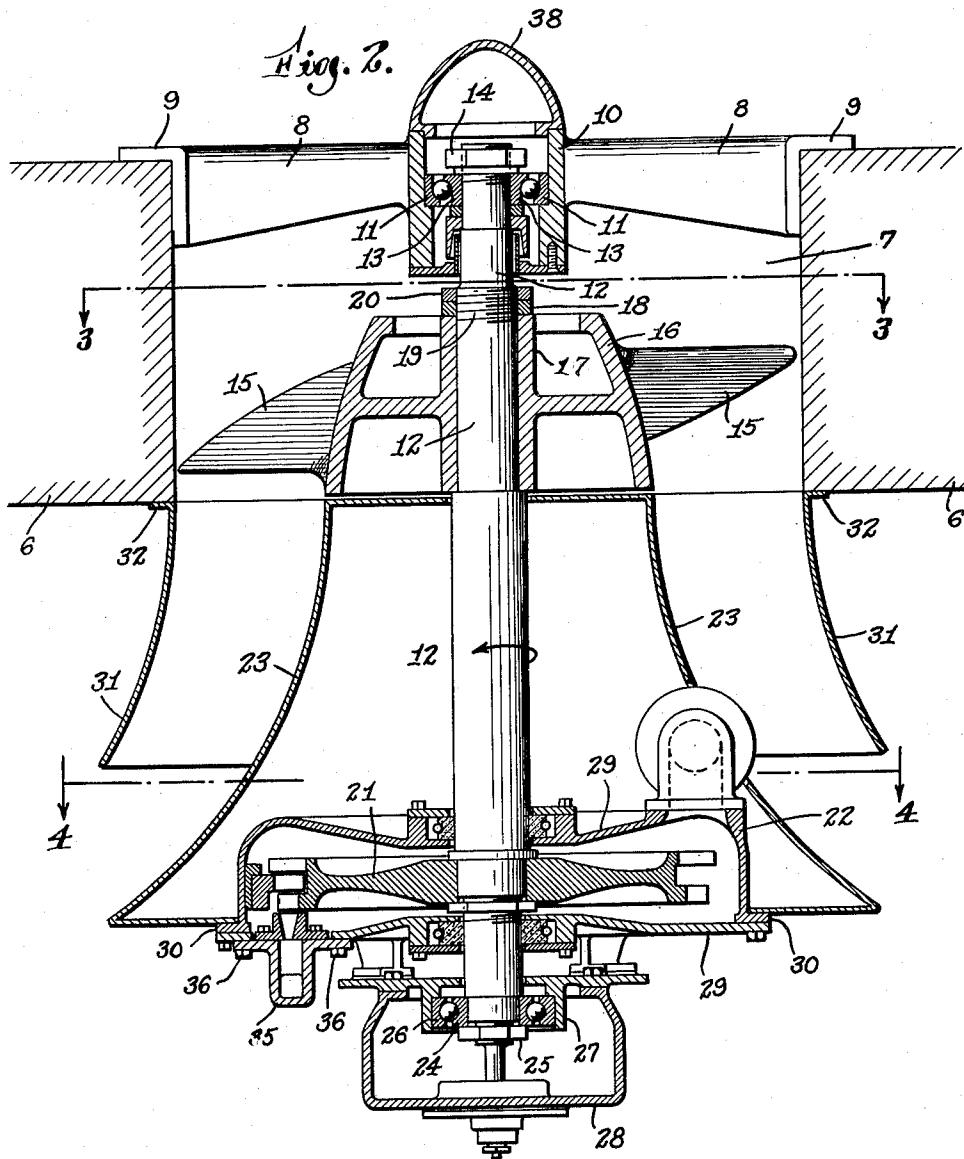
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Fig. 3.

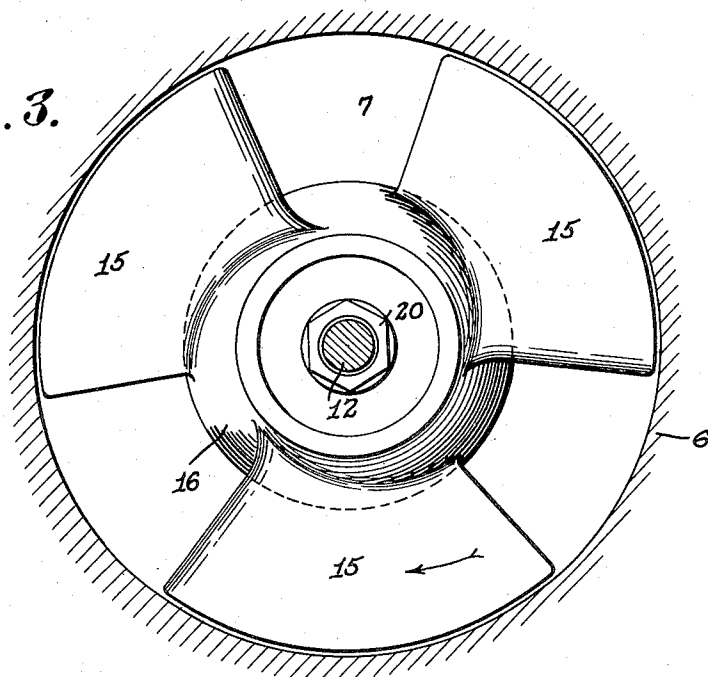
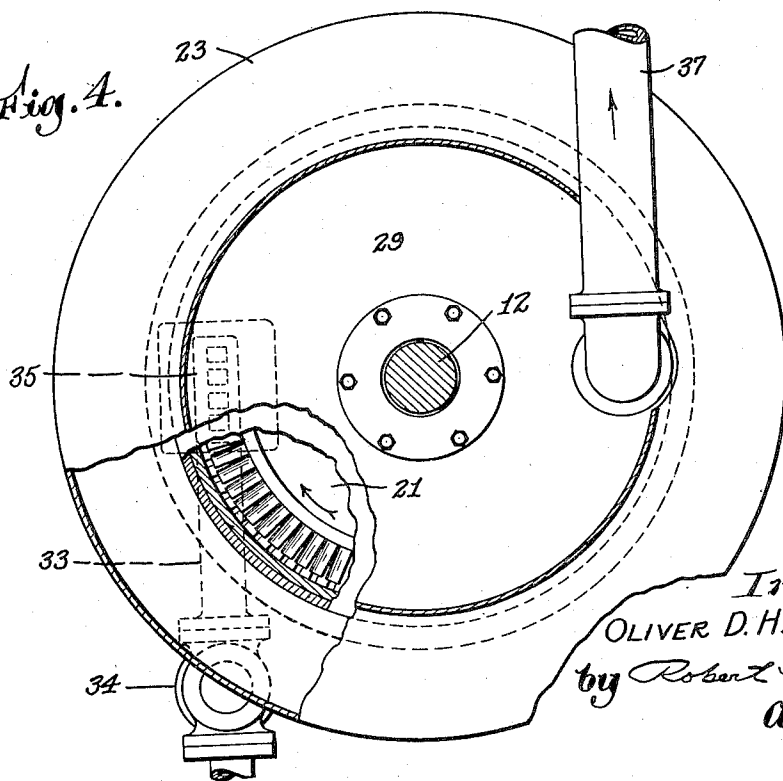


Fig. 4.



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BLOWER DRIVE AND SUPPORT

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7 Claims. (Cl. 230—116)

This invention relates to direct driven blowers and relates more particularly to turbine driven blowers.

In some locations, such for example as on naval vessels where space is limited, it is desired that the blowers used, be direct driven and that a single simple and rugged structure support both the blower and its driving turbine, usually from a deck or wall plate. It has been proposed in the past, to suspend the blower and driving mechanism from the deck from an encircling support to which both the blower and its driving mechanism are fastened.

According to this invention, a single upper thrust bearing, although of course more than one bearing may be used, supports both the rotating and stationary structure of a turbine driven blower and the entire mechanism is supported by the housing of the thrust bearing from the deck, wall or other support to which it is desired to attach the assembly.

According to a feature of the invention, the rotating and stationary mechanism are supported from an upper thrust bearing and the stationary structure is supported upon a lower bearing which, however, is itself supported with the other mechanism from the upper bearing.

According to another feature of the invention, the stationary structure supported on the lower bearing is prevented from rotation by the piping conveying the steam to and from the turbine.

An object of the invention is to support the rotating and stationary mechanism of a direct driven blower from an overhead thrust bearing. Another object of the invention is to support a blower and a steam turbine for driving same from an overhead thrust bearing, attached to an overhead support.

Other objects of the invention will be apparent from the following description taken together with the drawings.

The invention will now be described with reference to the drawings, of which:

Fig. 1 is a side elevation, with a portion in section of a turbine driven blower assembled and supported according to this invention;

Fig. 2 is a transverse sectional view of the assembly of Fig. 1;

Fig. 3 is a sectional view along the lines 3—3 of Fig. 2; and

Fig. 4 is a sectional view along the lines 4—4 of Fig. 2.

Referring now to Figs. 1 and 2, the numeral 6 identifies a deck or wall, within the opening 7 of which it is desired to mount a direct driven

blower to be supported entirely from the deck or wall 6.

The stream-lined cross-members 8 which serve both as inlet vanes and as supporting members, are joined at one end to the angle plates 9 which are suitably attached by bolting or otherwise to the members 8. The cross-members 8 are joined at the other end to the frame 10 within which the outer race 11 of a thrust ball bearing is seated as illustrated by Fig. 2. The shaft 12 is supported from the inner race 13 of the bearing by the nut 14 which is screwed upon the threaded upper end of the shaft, and which rests upon the inner race 13.

The blower comprises the blades 15, attached to the hub 16, the inner member 17 of which fits closely around the shaft 12. The hub member 17 is seated at its lower end upon an enlargement of the shaft 12. The nut 18 which in turn is screwed on to the threaded portion 19 of the shaft 12 maintains the hub member in position. The nut 20 serves as a lock nut for the nut 18.

The rotor 21 of the turbine 22 is secured to the shaft 12 so as to be able to rotate same. The stationary structure of the turbine and the inner air guiding casing 23 are supported from the shaft 12 by means of a lower ball bearing, the inner race 24 of which is seated upon the nut 25 screwed upon the threaded lower end of the shaft 12. The stationary apparatus is all supported upon the outer race 26 of the lower bearing, through the intermediary of the flange 27 to which is bolted the lower cover 28 and from which is supported the casing 29 of the turbine. It is not intended however, that the entire weight of this stationary apparatus be supported by the lower bearing alone. The steam inlet and outlet pipes, 33 and 37 respectively, (Figs. 3 and 4) are arranged to support a portion of the weight of the stationary apparatus and other supports may be provided.

The inner air guiding casing 23 is supported upon the flange 30 of the casing 29. The outer air guiding casing 31 may be supported from the wall 6 by means of bolts or screws placed through the angled portions 32.

The steam inlet and outlet pipes are utilized to prevent rotation of the casing of the turbine as will be explained with reference to Figs. 2 and 4. The inlet pipe 33 has the rectangular discharge portion 35 which is attached by the bolt 36, to the under side of the casing 29. The steam outlet pipe 37 is attached to the upper portion of the casing 29. By the tangential arrangement of the oppositely directed pipes 33

and 37, the tendency of the turbine casing 28 to rotate is counteracted both by the reaction afforded by the steam flow through the pipes 33 and 37 and by the physical action of the pipes.

5 The stream-lined cover 38 over the upper thrust bearing, the stream-lined cross-member 8, the stream-lined hub 16 and the deflector casings 23 and 31 are all so arranged and designed as to direct air through the assembly
10 with maximum efficiency.

Whereas one embodiment of the invention has been described for the purpose of illustration, it should be understood that the invention is not limited to the arrangement described as many
15 departures will suggest themselves to those skilled in the art, after having had access to this disclosure.

What is claimed is:

1. A blower assembly comprising in combination, a vertical shaft, blower blades mounted on
20 said shaft, a steam turbine having rotating and stationary structure, a bearing around the lower end of said shaft and supported thereby, means for supporting the stationary structure of said
25 turbine around and from said bearing, means for preventing the rotation of said stationary structure around said bearing, a thrust bearing at the upper end of said shaft, and means for supporting said blower assembly from said thrust bearing.
30

2. A blower assembly comprising in combination, a vertical shaft, blower blades mounted on
said shaft, a steam turbine having rotating and stationary structure, a bearing around the lower
35 end of said shaft and supported thereby, means for supporting the stationary structure of said turbine around and from said bearing, means for preventing the rotation of said stationary structure around said bearing, a thrust bearing
40 at the upper end of said shaft, means for supporting said shaft from said thrust bearing, and means for attaching said thrust bearing to a mounting for said assembly.

3. A blower assembly comprising in combination, a vertical shaft, blower blades mounted on
45 said shaft, a steam turbine having rotating and stationary structure, a bearing around the lower end of said shaft and supported thereby, means for supporting the stationary structure of said
50 turbine around and from said bearing, means for preventing the rotation of said stationary structure around said bearing, a thrust bearing at the upper end of said shaft, means for supporting said shaft from said thrust bearing, a
55 plurality of stream-lined transverse cross mem-

bers supporting said thrust bearing, and means for attaching said cross members to a mounting for said assembly.

4. A blower assembly comprising in combination, a vertical shaft, blower blades mounted on
5 said shaft, a steam turbine having rotating and stationary structure, a bearing around the lower end of said shaft and supported thereby, means for supporting the stationary structure of said
10 turbine around and from said bearing, a thrust bearing at the upper end of said shaft, means for supporting said shaft from said thrust bearing, means for conveying steam to and from said
turbine, and means for opposing rotation of said
15 stationary structure of said turbine around said first mentioned bearing by said last mentioned means.

5. A blower assembly comprising in combination, a vertical shaft, blower blades mounted on
said shaft, a steam turbine having rotating and
20 stationary structure, a bearing around the lower end of said shaft and supported thereby, an air guiding casing, means for supporting the stationary structure of said turbine and said casing from
25 said bearing, means for preventing the rotation of said stationary structure around said bearing, a thrust bearing at the upper end of said shaft, and means for supporting said blower assembly
from said thrust bearing.

6. A blower assembly comprising in combination, a vertical shaft, blower blades mounted on
30 said shaft, a steam turbine having rotary and stationary structure, means for mounting said rotary structure upon said shaft, a bearing around
35 the lower end of said shaft and supported thereby, means for supporting said stationary structure from said bearing, means for preventing the rotation of said stationary structure around said
bearing, a thrust bearing at the upper end of
40 said shaft, and means for supporting said shaft from said thrust bearing.

7. A blower assembly comprising in combination, a shaft, thrust bearings around and attached to the ends of said shaft, a blower rotor
45 on said shaft adjacent one of said bearings, a turbine rotor on said shaft adjacent the other of said bearings, a turbine casing, means for supporting said casing from said shaft by said other
of said bearings, means for preventing the rotation of said casing around said other of said
50 bearings, mounting means, and means for supporting said shaft from said mounting means by said one of said bearings.

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