

June 2, 1942.

C. B. KIDNEY

2,285,338

CENTRIFUGAL BLOWER

Filed Oct. 28, 1939

2 Sheets-Sheet 1

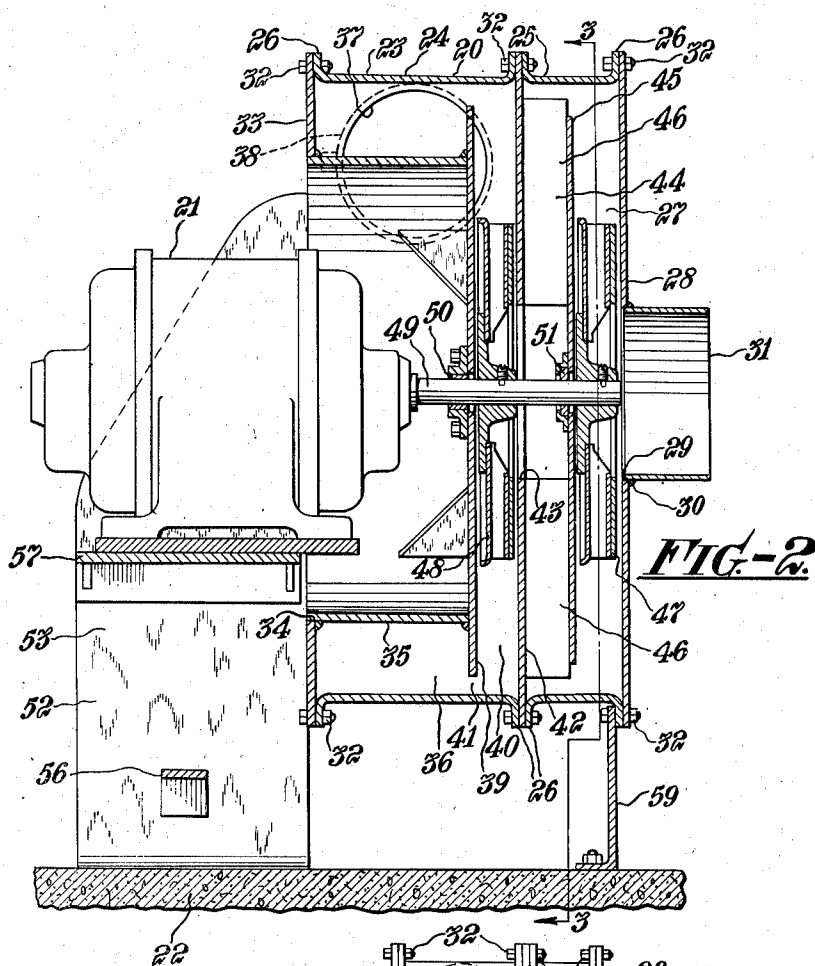


FIG-2

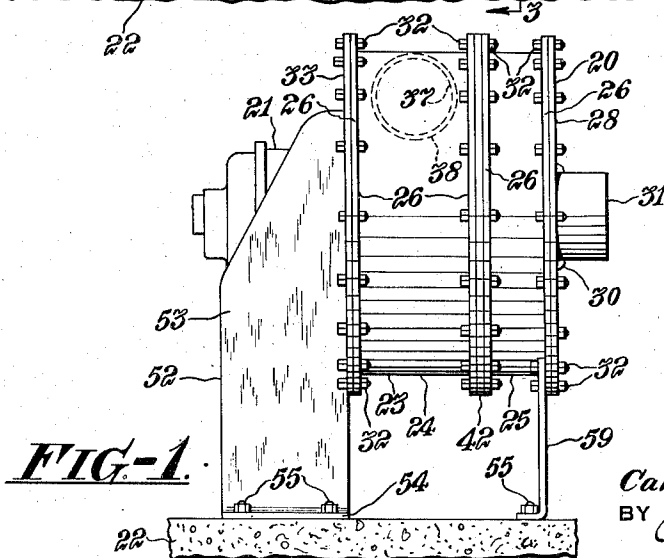


FIG-1

INVENTOR
Carleton B. Kidney
BY *C. B. Kidney*
HIS ATTORNEY

June 2, 1942.

C. B. KIDNEY

2,285,338

CENTRIFUGAL BLOWER

Filed Oct. 28, 1939

2 Sheets-Sheet 2

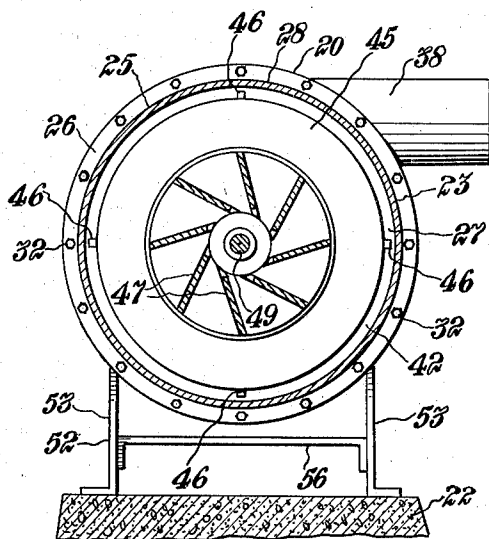


FIG.-3.

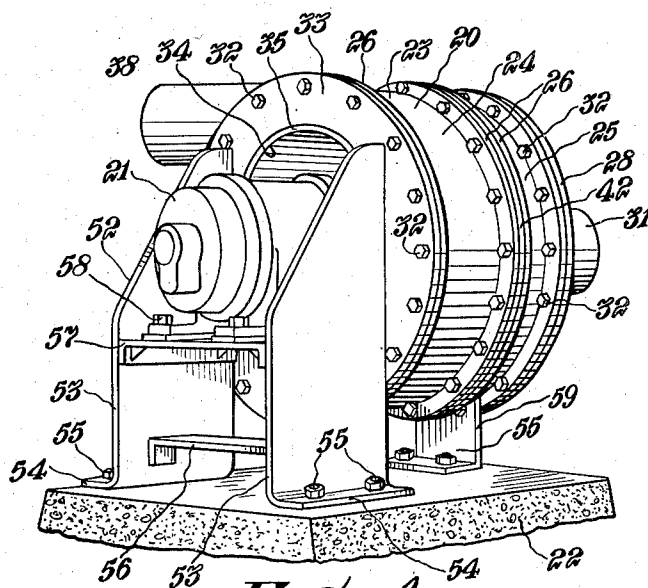


FIG.-4.

INVENTOR
Carleton B. Kidney
BY *[Signature]*
HIS ATTORNEY

UNITED STATES PATENT OFFICE

2,285,338

CENTRIFUGAL BLOWER

Carleton B. Kidney, Phillipsburg, N. J., assignor
to Ingersoll-Rand Company, New York, N. Y.,
a corporation of New Jersey

Application October 28, 1939, Serial No. 301,696

2 Claims. (Cl. 230—117)

This invention relates to blowers, and more particularly to centrifugal blowers of the multi-stage type.

One object of the invention is to simplify the construction and minimize the cost of production of blowers of this type.

Another object is to enable the blower to be disassembled and reassembled for purposes of inspection or repairs without disturbing the relative axial relationship of the constituent elements of the blower to its driving motor.

Other objects will be in part obvious and in part pointed out hereinafter.

In the drawings accompanying this specification and in which similar reference numerals refer to similar parts,

Figure 1 is a side elevation of a centrifugal blower constructed in accordance with the practice of the invention,

Figure 2 is a longitudinal elevation, partly in section, of the blower,

Figure 3 is a transverse view taken through Figure 2 on the line 3—3, and

Figure 4 is a perspective view of the blower.

Referring more particularly to the drawings, 20 designates, in general, the blower, 21 the motor whereby the blower is driven and 22 the foundation upon which the assembly rests.

The blower 20, constructed in accordance with the practice of the invention, is shown as being of the multistage type and comprises a casing 23 consisting of a pair of tubular sections 24 and 25 of sheet-material of which the marginal portions are bent outwardly to form lateral flanges 26 at the ends of the sections.

The tubular sections 24 and 25 are of different lengths, the section 25 being shorter than the section 24, and its interior constitutes the primary stage impeller chamber 27 which is closed at its outer end by a flat plate or cover 28 of sheet-material having a central opening 29 to which is connected, as by welding 30, an inlet conduit 31 for the admission of fluid medium into the blower. The cover 28 seats against the outer end of the tubular section 25 and is secured thereto by bolts 32 extending through the outer portion of the cover 28 and through the adjacent flange 26.

The opposite end of the casing is likewise sealed by a flat cover 33 of sheet-material which seats against the end flange 26 of the tubular section 24 and is secured thereto by bolts 32 extending through the cover 33 and the adjacent flange 26. The cover 33 has an enlarged central opening 34 to receive an end of a tubular

member 35 that extends into the casing section 24 and cooperates therewith to define an annular discharge chamber 36 into which the fluid medium pumped by the blower is finally discharged and from whence it passes through an outlet opening 37 and a conduit 38, a short section of the latter being attached to the section 24. The inner end of the tubular member 35 is covered by a flat plate 39 welded to the tubular member and forming a side wall for the secondary chamber 40 which communicates with the discharge chamber 36 through an annular space 41 between the periphery of the plate 39 and the inner surface of the casing.

The impeller chambers 27 and 40 are separated by a diaphragm 42, in the form of a flat plate, interposed between the inner ends of the tubular sections 24 and 25 and secured to the adjacent flanges 26 by bolts 32. The diaphragm 42 has a central opening 43 to afford communication between the impeller chamber 40 and an interstage passage 44 leading from the impeller chamber 27 and defined, in the present instance, by a flat plate 45 forming a side wall for the impeller chamber 27 and attached to the diaphragm 42 by guide vanes 46 arranged in the interstage passage 44.

Within the impeller chambers 27 and 40 are impellers 47 and 48, respectively, which are mounted upon and suitably secured to the shaft 49 of the motor 21. The shaft 49 is supported only by the bearings of the motor 21 and extends through packing members 50 and 51 attached to the plates 39 and 45, respectively, to prevent leakage of fluid along the shaft.

In order to minimize the overhanging portion of the shaft 49 the motor 21 extends part way into the tubular member 35 and a support is provided for the motor in the form of a pedestal 52 arranged at an end of the casing 23 to support the blower. The pedestal 52 comprises a pair of upright members 53 in the form of sheet-material plates having their lower portion bent outwardly to provide foot pieces 54 through which extend bolts 55 for securing the members 53 to the foundation 22.

The lower portions of the members 53 are held in suitably spaced relation by a brace 56 interposed between the members, and the upper portions of the members are secured with their innermost edges, as for example by welding, to the outer surface of the cover 33 on opposite sides of the opening 34. Between the members 53 and intermediate their ends is a shelf 57 which may be suitably welded to the inner surface of the

member 53 to form a seat for the motor 21 which is secured to the shelf by bolts 58.

Preferably a brace 59 is disposed beneath the tubular section 25, to support that end of the blower, and secured at its lower end to the foundation by bolts 55. The upper end of the brace 59 is perforated to receive a bolt or bolts 32 of the cover 28 and the adjacent flange 26 for securing the brace 59 thereto.

From the foregoing description it will be apparent to those skilled in the art that the blower is of simplified design and of inexpensive construction. By employing flat plates for the transverse elements of the casing the passages through which the fluid medium flows will be of uniform width throughout. An efficient action of the blower may, therefore, be obtained with a minimum expenditure of power. The blower may be readily and expeditiously disassembled for the purposes of inspection or repairs and, inasmuch as each tubular section of the casing forms an individual housing for an impeller, stages of compression may be conveniently added to the blower by merely substituting a motor shaft 49 of suitable length and interposing additional impellers and casing sections between the end tubular sections of the blower, namely, the sections 24 and 25 in the present instance.

I claim:

1. A centrifugal blower, comprising a casing consisting of tubular sections of sheet-material having lateral flanges at their ends, flat plate covers for the ends of the casing, a flat diaphragm between the tubular sections to divide the interior of the casing into impeller chambers and

extending between the flanges at the opposed ends of the tubular sections, bolts for securing the flanges to the diaphragm, impellers in the impeller chambers, a tubular member on one end closure extending into the casing and cooperating therewith to define a discharge chamber, a flat plate on the tubular member to form a closure for one end of the tubular member and to serve as a bounding surface for one of the impeller chambers, a motor extending into the tubular member to drive the impellers, and a pedestal secured to the end closure carrying the tubular member for supporting the casing and the motor.

2. A centrifugal blower, comprising a casing of tubular shape having a discharge port, a closure for one end of the casing, means for securing the closure to the casing, a cover for the other end of the casing and having an opening forming an inlet port for the casing, a plate supported by the closure and cooperating with the cover to define an impeller chamber and cooperating with the casing to define an outlet passage for the impeller chamber, a second casing of tubular shape seated against the cover, means for clamping the cover between the casings, a cover for the free end of the said second casing having an inlet opening, means in the second mentioned casing to divide the interior thereof into an impeller chamber and a passage for conveying fluid from the last mentioned impeller chamber to the inlet port of the first mentioned impeller chamber, an impeller in the second mentioned impeller chamber, and a drive shaft connected to the impellers.

CARLETON B. KIDNEY.