

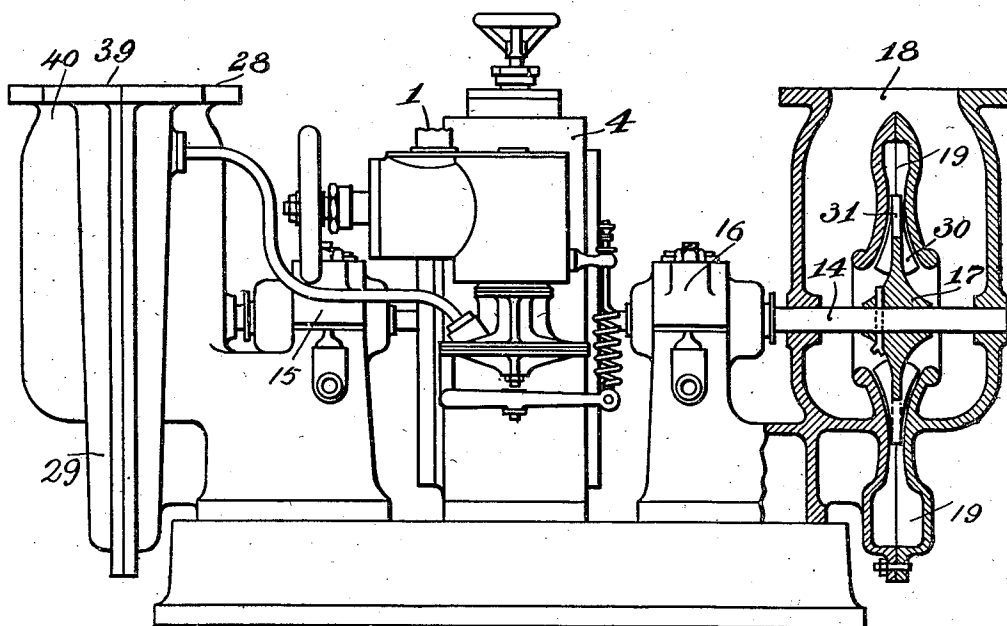
No. 855,809.

PATENTED JUNE 4, 1907.

A. C. E. RATEAU.
TURBINE DRIVEN BLOWER.
APPLICATION FILED JUNE 10, 1904.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

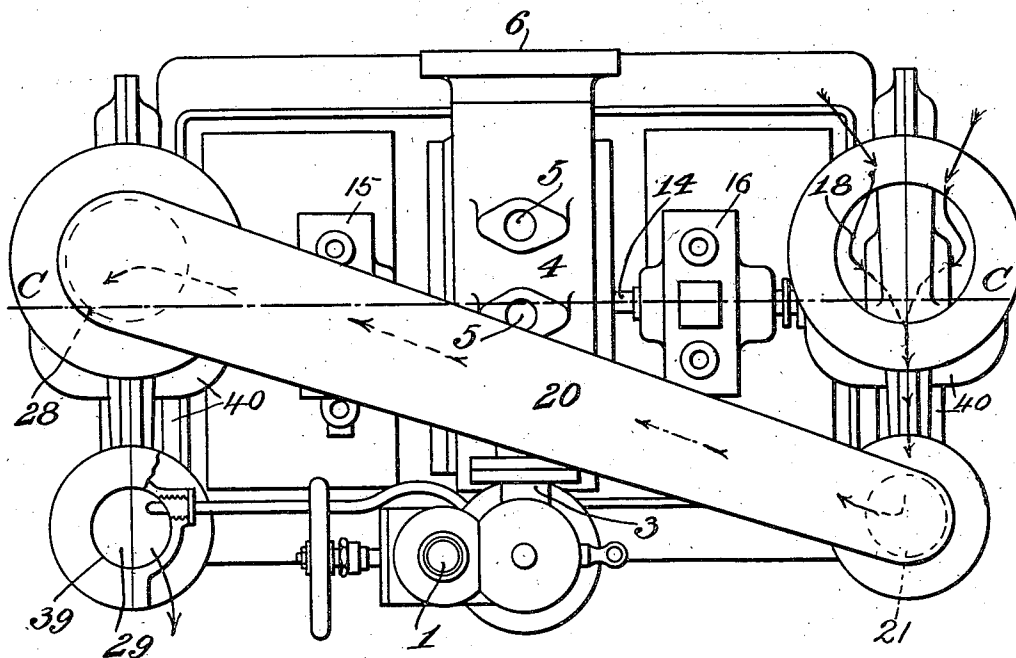
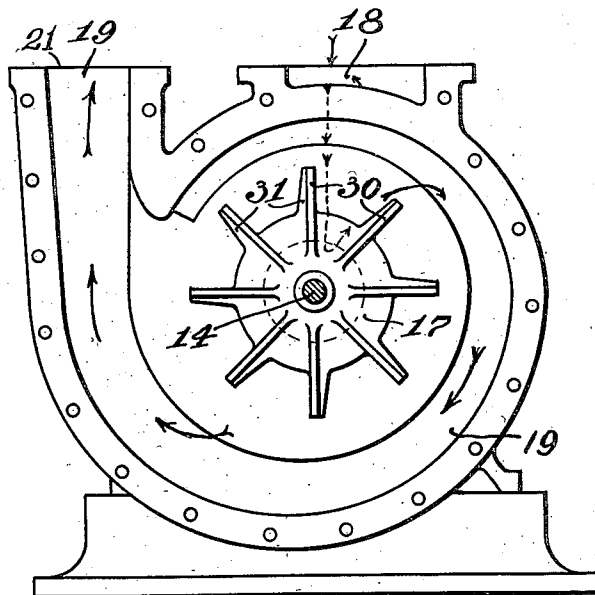


Fig. 3.



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UNITED STATES PATENT OFFICE.

AUGUSTE CAMILLE EDMOND RATEAU, OF PARIS, FRANCE, ASSIGNOR TO
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TURBINE-DRIVEN BLOWER.

No. 855,809.

Specification of Letters Patent.

Patented June 4, 1907.

Original application filed December 24, 1902, Serial No. 136,455. Divided and this application filed June 10, 1904.
Serial No. 211,940.

To all whom it may concern:

Be it known that I, AUGUSTE CAMILLE EDMOND RATEAU, a citizen of the Republic of France, residing at Paris, France, have invented a certain new and useful Improvement in Turbine-Driven Blowers, of which the following is a specification.

The present application is a division of my prior application, Serial No. 136,455, filed December 24, 1902, and relates to centrifugal fans or blowers.

The object of the invention is to provide an improved organization of blowing apparatus and driving mechanism therefor which as a whole will be simple, compact, strong, and capable of operating efficiently at very high speed, to produce a current of air of high velocity and pressure.

Generally speaking, the invention contemplates the employment of a turbine engine upon the shaft of which the impeller wheels of two or more centrifugal blowers are directly mounted, preferably one on each side of said turbine, with housings for said impeller wheels forming central inlets and peripheral delivery chambers of gradually increasing cross section, and a pipe of gradually increasing diameter connecting the discharge outlet of one blower with the inlet passage of the other blower.

I will describe my invention by reference to the accompanying drawings, wherein,

Figure 1 is a side elevation, partially in section, of my improved turbine-driven blower; Fig. 2 is a plan view thereof; Fig. 3 is a vertical sectional view of one of the blowers showing the impeller wheel in full elevation.

The same figures of reference designate the same parts wherever shown.

The turbine engine 4, having the steam inlet 1 and the steam discharge pipe 6, has its shaft 14 mounted in bearings 15 and 16 on either side of said turbine; and on the ends of said shaft are mounted the impeller wheels 17 of the blowers. Said bearings are located approximately midway between the turbine and the respective impeller wheels. Both blowers are constructed alike, their internal arrangement being indicated in Figs. 1 and 3. The impeller wheel 17 is surrounded by a housing 40 which is formed to provide an air

inlet 18 opening centrally around the impeller wheel, and a peripheral delivery-chamber 19, having a gradually-increased cross-sectional area in the direction of rotation of the wheel, terminating in an outlet 21. Said outlet is of smaller diameter than the inlet, the velocity of the air being greater at the discharge opening. Similarly the blower at the opposite end of the shaft is provided with a housing which forms an inlet 28 and a peripheral delivery chamber 29 having an outlet orifice 39 smaller than said inlet 28.

The impeller wheel is preferably constructed as shown in Figs. 1 and 3 of a single piece of metal formed with straight radial blades 30 and a central web or disk, each blade being preferably provided with a strengthening rib on its back, which rib is formed by a radial extension of the central web. These impellers are driven at very high speed by the turbine and must be strong and rigid.

One of the advantages of the present invention is that since two or more blowers are provided to absorb the power of the turbine, they can each be made comparatively small, so as to be adapted for the high speed at which a turbine necessarily runs.

The inlet and outlet orifices of the blowers preferably open upwardly, as shown, and in accordance with my invention the discharge outlet 21 of one blower is connected by a diagonal pipe 20 with the inlet 28 of the other blower; said pipe gradually increasing in diameter in the direction of passage of the air, that is, toward the said inlet 28.

The operation is as follows: Air enters the inlet 18 and is carried radially outward by the centrifugal action of the impeller 17, and delivered through the chamber 19 to the discharge outlet 21 of the first blower. From thence it passes through the pipe 20 of gradually increasing diameter to the inlet 28 of the second blower, being finally delivered through the outlet 39 at a very high velocity and pressure. The total air pressure at the inlet 28 of the second blower is considerably increased beyond the total pressure at the discharge outlet of the first blower, due to the increasing diameter of the connecting pipe 20, and in accordance with the well known laws of pressure in fluids. In the passages

19, 20 and 29, each of which gradually increases in cross section, the velocity of the air decreases, and the energy thereof is manifested in an increase of pressure. Thus the pressure created by the first impeller wheel increases gradually in the delivery chamber 19, and the pipe 20, and the air is compressed again by the second impeller wheel, thus securing a higher final pressure than would have been obtained if the impeller wheels were connected in series by a passage of uniform cross section.

It will be noted that in the construction above set forth, in which the impeller wheels are carried on each side of the turbine, with the bearings located approximately midway between the turbine wheel and each of said impeller wheels, the entire moving element is well balanced, permitting very high speeds without undue strain upon the shaft or its bearings. The whole structure is simple, strong, and compactly organized, so that very great power may be developed in a comparatively small machine.

Having thus described my invention, I claim as new and desire to secure by Letters Patent, the following:

1. The combination with a shaft and means for driving the same, of a fluid impeller having an impeller wheel mounted upon said shaft, a peripheral delivery chamber having an air inlet on each side of the impeller wheel, and a housing for said fluid impeller surrounding said air inlets, said housing having a single air inlet.

2. The combination with a shaft and means for driving the same, of centrifugal blowers having their impeller wheels mounted upon said shaft, a peripheral delivery

chamber of gradually increasing cross-section for each impeller wheel, said delivery chambers having air inlets on each side of the impeller wheels, a housing for each impeller wheel said housing having an air inlet, and a pipe connecting the discharge outlet of one blower with the inlet to the housing of a succeeding blower.

3. The combination with a centrifugal blower provided with an impeller wheel and a delivery chamber therefor having an air inlet on each side of said wheel, of a housing for said blower, said housing having an air inlet, a second centrifugal blower, and a pipe connecting the discharge outlet of said second blower with the inlet to the housing of the other.

4. The combination with a steam turbine and its shaft, of blowers having their impeller wheels mounted directly on said shaft, a peripheral delivery chamber of gradually increasing cross-section for each impeller wheel, said chambers having air inlets on each side of said wheels, a housing for each blower having a single air inlet communicating with the air inlets to the corresponding impeller wheel, the delivery outlet of each blower being smaller than the inlet to the housing, and a pipe of gradually-increasing cross-sectional area connecting the discharge outlet of one blower with the inlet of the housing next in the series.

In testimony whereof, I have hereunto set my signature in the presence of two subscribing witnesses.

AUGUSTE CAMILLE EDMOND RATEAU.

Witnesses:

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