(No Model.) 2 Sheets—Sheet 1.

R. LESLIE.

AIR CIRCULATING AND COOLING DEVICE.

No. 493,036. Patented Mar. 7, 1893.

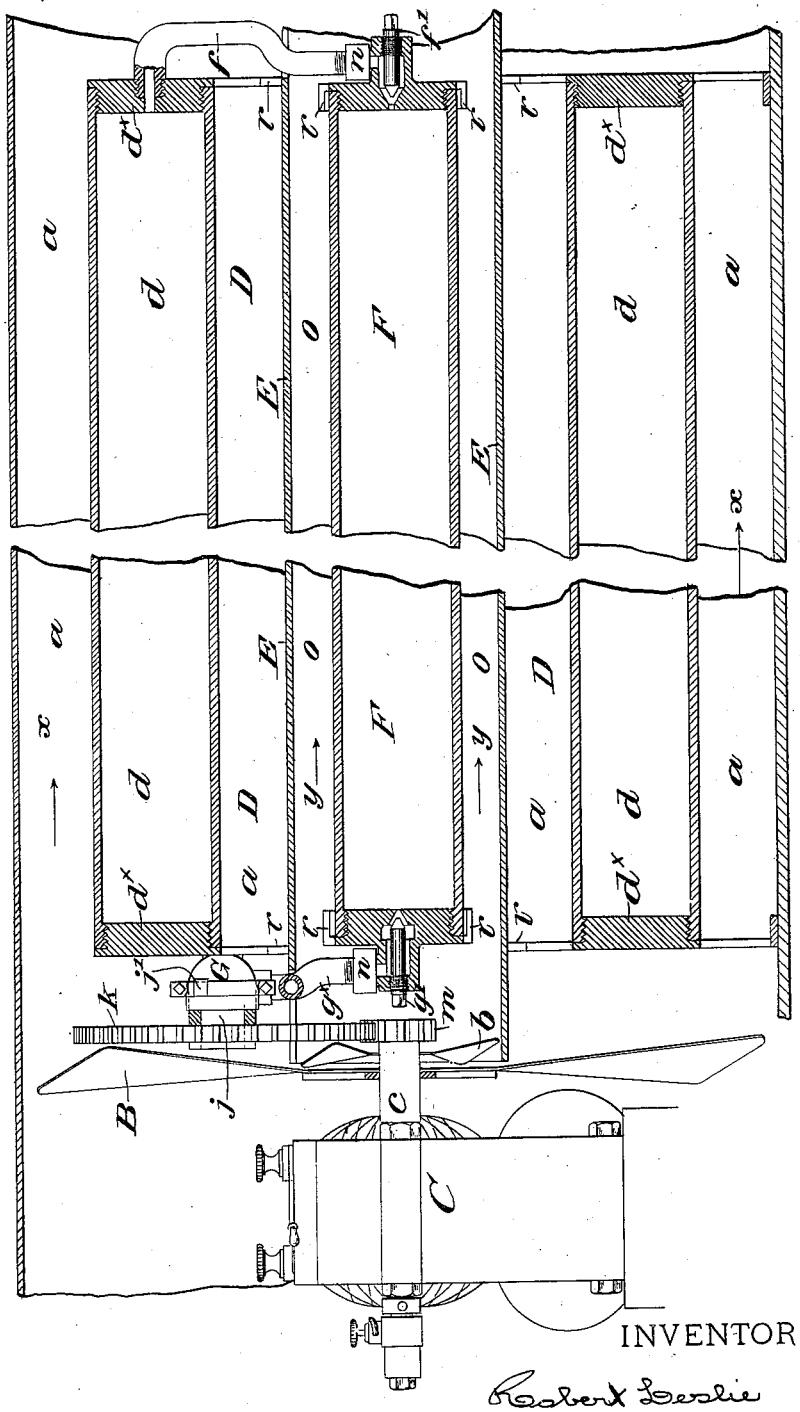

FIG. 1

INVENTOR:

Robert Leslie

WITNESSES:

J. B. Darlington

Peter A. Ross

By Henry Connett

Attorney.

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FIG. 2

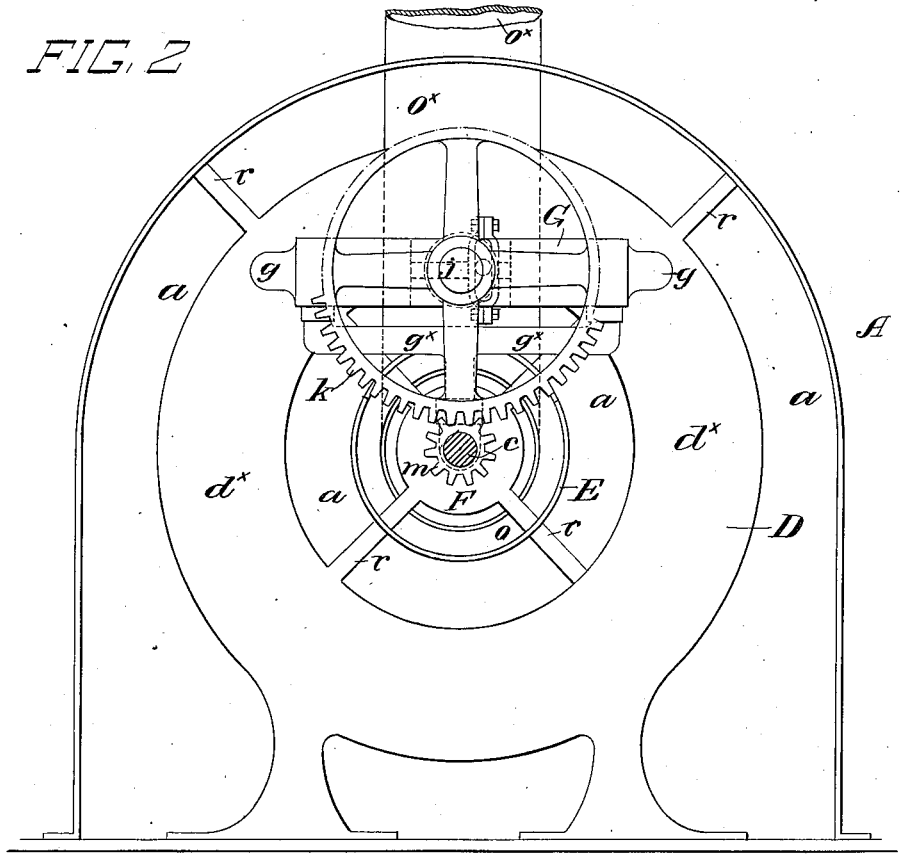
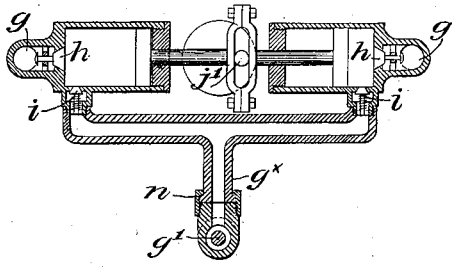


FIG. 3



INVENTOR:

Robert Leslie

WITNESSES:

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Peter A. Ross

By Henry Connett

Attorney.

UNITED STATES PATENT OFFICE.

ROBERT LESLIE, OF NEW YORK, N. Y.

AIR CIRCULATING AND COOLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 493,036, dated March 7, 1893.

Application filed April 23, 1892. Serial No. 430,315. (No model.)

To all whom it may concern:

Be it known that I, ROBERT LESLIE, a citizen of the United States, and a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Air Circulating and Cooling Devices, of which the following is a specification.

My invention relates to that class of devices adapted for supplying cooled air to a room or office, and the object is to provide a portable apparatus which will cause a current of air to flow into the room or place to be cooled and ventilated, and in its passage, flow through a cooling or refrigerating device which will take up more or less of its heat.

Another and further object of the invention is to adapt the apparatus to be run by an electric motor, which will operate the air-cooling as well as the air-circulating devices.

The invention will be particularly described hereinafter and its novel features carefully defined in the claims.

In the accompanying drawings—Figure 1 is a longitudinal, vertical section of a device or apparatus embodying my invention. Fig. 2 is a transverse section between the wheel *k* and fan B in Fig. 1, and Fig. 3 is a sectional view taken through the compressing pump, detached.

A represents an outer casing, which I make by preference, of cylindrical form. In this casing, at the end where the air is taken or drawn in, is situated an exhaust fan, B, on the armature shaft, *c*, of an electric motor, C. The fan B will be of such diameter as to rotate snugly within the casing and will be of such form as to cause a current of air to enter the casing at the left-hand end, as seen in Fig. 1, and flow in the direction of the arrow *x*, to and through the cooling device, which I will now describe.

Within the casing A is mounted a receptacle D, formed of two cylinders of different diameters arranged one within the other, and forming an annular chamber *d*, which I call the expansion chamber. This chamber is closed at its ends by ring-like plugs or stoppers, $d^{\times}$, which form a part of the receptacle, D.

Within the tubular receptacle D, and extending through its hollow, is an inner tubular casing, E, and between the outer casing A and the outer surface of the receptacle D, and between the inner casing E and the inner surface of said receptacle, are annular passages, *a*, *a*, through which the air flows on its way from the fan to the room to be cooled.

Within the casing E, (which may be cylindrical,) is arranged a tubular holder F, for the reception of a compressed gas or vapor, the expansion of which produces the refrigerating effect on the air. This holder is connected at one end with the expansion chamber *d*, by means of a suitable tube or pipe *f*, and a valve, *f'*, is provided to regulate the flow of gas from the holder F.

I propose to employ any of the well known gases or chemicals which may be compressed and will produce intense cold by their expansion; of these, carbonic acid, and ammonia will serve the purpose.

G is a gas-compressing pump, the induction pipes, *g*, *g*, of which connect with the expansion chamber *d*, and the eduction pipe, $g^{\times}$, with the holder F, at the end of the apparatus opposite to that where the pipe *f* is situated. Where the pipe $g^{\times}$ connects with the holder F, a valve *g'*, is provided similar to the valve *f'*.

The pump G may be of any known construction; but the form illustrated in Fig. 3 or one similar to it will serve. This pump has two cylinders and a common piston rod connecting the two pistons; *h*, *h*, are the induction valves, and *i*, *i*, the eduction valves. Reciprocating movement is imparted to the pistons from a shaft *j*, on which is a spur-wheel *k*, which gears with a pinion *m*, on the armature shaft *c*. A crank-pin *j'*, on the shaft *j* engages a slot in the piston-rod of the pump, in a well known manner. The casing A may extend indefinitely to the left as the apparatus is represented in Fig. 1, and will take air from outside of the room, by preference, in order that the supply may be fresh. The motor C will be connected in circuit with any form of generator. The fan B will cause a current of air to flow along and through the annular passages *a*, finally emerging at the other end of the casing A, which latter, as well as the receptacle D and the holder F, may be of any length. The pump G will take the expanded gas from the expansion chamber *d*, and force it into the holder F, thus maintaining the compression in the latter. This compression will heat the holder F, which

will radiate its heat to the air within the annular space *o* between the holder F and the inner casing E; and this warm air will be displaced by the following described means. On the shaft *c* of the motor C, is a small exhaust fan *b*, which rotates within the inner casing E, which extends out to, or nearly to the fan B, the spur wheel *k* extending through a slot in said casing to reach the pinion *m*. This fan *b*, causes the air to flow through the annular passage *o* in the direction of the arrow *y*, said air being carried away by a flue $o^{\times}$, which forms a continuation of the passage *o*, and which may lead the warm air out of the room, or to any point desired.

The holder F is removable, and when filled and ready, to be set in place, the valves f' and g', are closed. After being set in place, the pipes *f*, and $g^{\times}$, are coupled to it by unions *n*. The valves may then be opened.

The receptacle D may be secured in place in the casing A by means of radially projecting arms, *r*, on the annular plugs or stoppers $d^{\times}$; and the caps or stoppers in the ends of the holder F may be provided with similar supporting and centering devices.

I prefer to make the casing E in whole or in part of some non-heat conducting material in order that the heat from the passage *o* may not be transmitted to the passage *a*. I prefer to arrange the compression pump within the casing A, and the motor also, but this arrangement is not absolutely essential.

Having thus described my invention, I claim—

1. In an air-cooling apparatus, the combination with an outer tubular casing A, an inner tubular casing E, a tubular receptacle D, arranged in the annular space between said casings and containing an expansion chamber *d*, a tubular holder F, for compressed gases, arranged within the inner casing E, and connected at one end with the chamber *d*, a compression pump, G, connected on the induction side with chamber *d*, and on the eduction side with the holder F, a motor for operating said pump, and means substantially as described for causing a current of air to flow through said casing and about the receptacle D, as set forth.

2. In an air-cooling device, the combination with an exterior casing A, and an interior casing E, of a tubular receptacle arranged in the annular space for the passage of air between said casings and containing an annular expansion chamber *d*, a holder F, for compressed gases, arranged within the inner casing E, and connected with the chamber *d* at one end, a compression pump connected on the induction side with the chamber *d*, and on the eduction side with the holder F, and a motor for operating said pump.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ROBERT LESLIE.

Witnesses:
HERBERT BLOSSOM,
PETER A. ROSS.