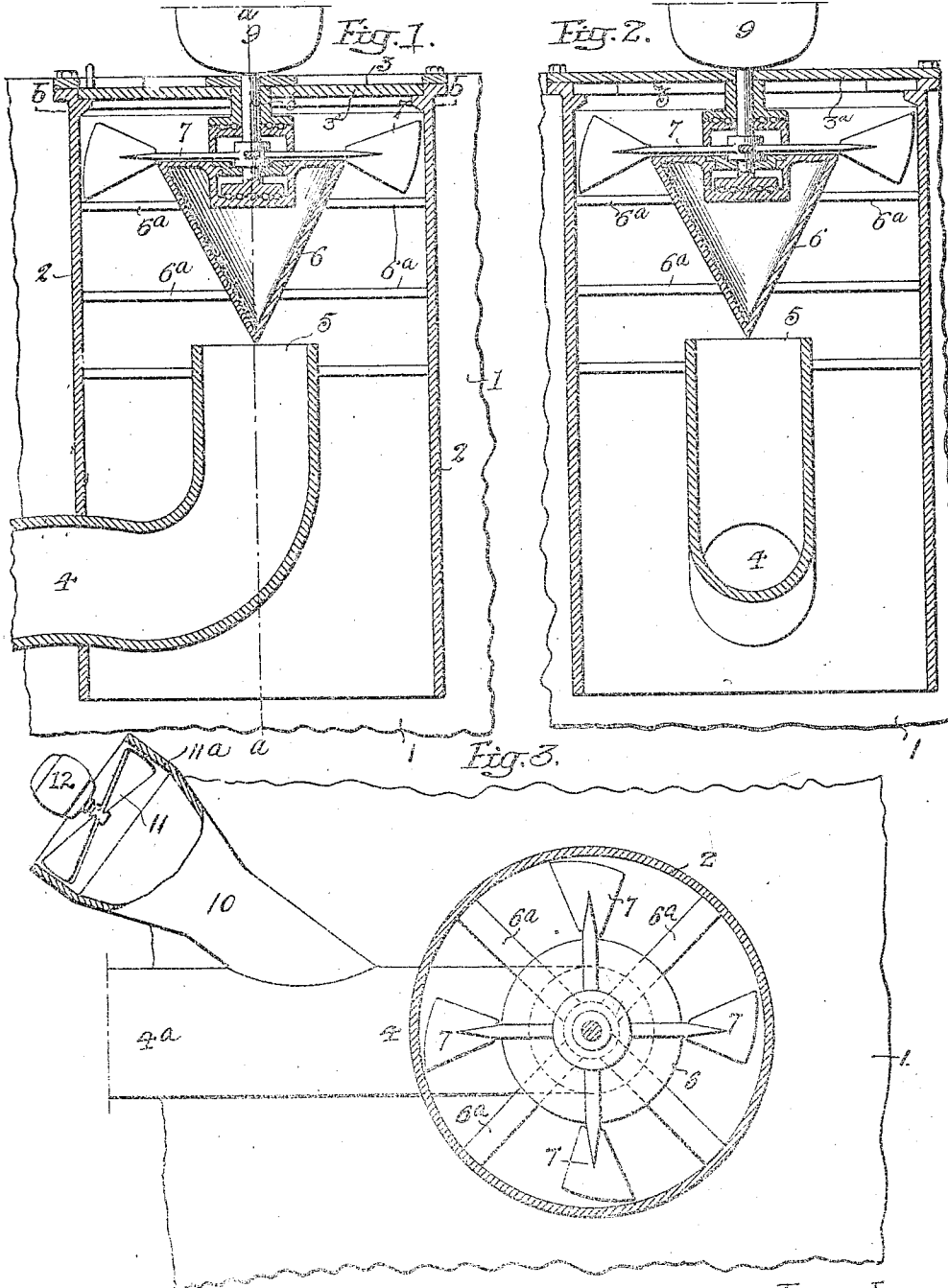


E. B. LATCH.
LIFTING ATTACHMENT FOR AIRSHIPS.
APPLICATION FILED JULY 19, 1910.

988,115.

Patented Mar. 28, 1911.



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UNITED STATES PATENT OFFICE.

EDWARD BIDDLE LATCH, OF MERION, PENNSYLVANIA

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Specification of Letters Patent.

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Application filed July 19, 1910. Serial No. 572,710.

To all whom it may concern:

Be it known that I, EDWARD BIDDLE LATCH, a citizen of the United States, residing in Merion, Pennsylvania, have invented certain improvements in Lifting Attachments for Airships, of which the following is a specification.

One object of my invention is to provide means whereby a lifting force may be applied to an air ship, regardless of whether such means constitutes the sole lifting device therefor or whether it is merely auxiliary to other agencies for accomplishing the same end.

I further desire to provide a lifting device particularly applicable to dirigible balloons for the purpose of utilizing a head wind or the current of air due to the forward movement of the vessel, for the purpose of assisting in raising it or of maintaining it in an elevated position; the invention contemplating a simple, substantial, and relatively light apparatus for accomplishing the desired ends.

These objects and other advantageous ends I secure as hereinafter set forth, reference being had to the accompanying drawings, in which:—

Figure 1, is a vertical section illustrating my invention as applied to or mounted on a portion of the hull of a dirigible balloon or other form of air ship. Fig. 2, is a vertical section on the line *a—b*, Fig. 1, and Fig. 3, is a vertical section on the line *b—b*, Fig. 1.

In the above drawings, 1 represents a portion of the hull or framework of an air ship on which is rigidly mounted a cylindrical casing 2 placed with its longitudinal axis vertical and normally closed at its upper end by an adjustable head 3. Leading into the lower portion of one side of this casing is an intake conduit 4 having its end within said casing turned upwardly so as to discharge in the axial line thereof; the intake of said pipe having any desired construction and being so placed relatively to the body of the air ship in which my invention is mounted as to receive a current of air due to a head wind. Immediately above the open end 5 of this conduit 4 is mounted a deflector 6, in the present case in the shape of an inverted cone and supported by braces 6^a from the sides of the casing or in any other suitable manner.

Below the adjustable head 3 and in the

space between it and the deflector 6 I mount a fan 7 having any desired number of blades or vanes and provide a vertically placed shaft 8 to which power may be delivered from any source such as an electric or other motor. In the present instance I have shown an electric motor 9 as fixed to this shaft and as representing the source of power. Suitable bearings are provided for the shaft 8, and these, as shown, are of the anti-friction type, so that when power is applied to said shaft, the fan is turned in such a direction as to force any air in the casing 2 downwardly; the re-action from such operation tending to raise the fan and whatever structures are attached thereto.

When the air ship is moved forward and is exposed to a head wind, a current of air of a greater or less velocity is delivered to the conduit 4 and is discharged thereby against the deflector 6; there thus being in the casing 2 a constantly renewed upwardly delivered body of air which has a pressure depending upon such velocity. As a consequence, the fan 7 acts against this compressed air so that its lifting power is considerably greater than if the air on which it acted was at normal pressure and at zero velocity.

In some instances it may be desirable to artificially set up a current of air in the conduit 5 and for this purpose I provide it with a branch 10 connected to an auxiliary blower 11 driven from a motor 12; the main branch 4^a of the conduit being as before noted, led to a point on the air ship at which the entrance of a current of air due to a head wind is facilitated.

It is obvious that the fan 7 may be any desired construction and that under certain conditions the deflector 6 may be omitted, without departing from my invention. Further, the device as a whole may be so proportioned and constructed as to constitute the sole lifting means of the structure to which it is attached, and for this purpose the auxiliary fan 11 is made of such size as to condense the air in the casing 2 sufficiently for the fan 7 to properly fulfil its functions.

Under certain conditions of operation the device may be operated with the head 3 partially or wholly open depending on the speed at which the fan is run and on the lifting force desired, and for the purpose of this adjustment provide it with a suitable valve or

regulating damper 3^d though it is obvious that other constructions may be employed to accomplish this object.

I claim:—

- 5 1. A lifting device consisting of a casing; a fan mounted in the upper portion of said casing; means for driving said fan to force air downwardly out of the casing; and a conduit of less area of cross section than the casing for delivering a current of air upwardly into said casing.
- 10 2. The combination of a casing open at its lower end and having an adjustable head capable of partially or wholly closing its upper end; a fan mounted in the upper portion of said casing; means for driving said fan to force air downwardly out of the casing; and means for delivering a current of air upwardly into the casing.
- 20 3. The combination in a lifting device of a casing; a fan mounted adjacent the top of the casing; a conduit less in area of cross section than the casing and placed to discharge a current of air toward the top thereof; with means for driving the fan to force air downwardly in the casing.
- 25 4. The combination in a lifting device of a casing; a fan mounted adjacent the top of the casing; a conduit entering the side of the casing and turned upwardly so as to discharge a current of air toward the top of the casing; with means for driving the fan to force air downwardly in the casing.
- 30 5. The combination of a casing open at the bottom; an air conduit discharging upwardly in the casing; a deflector immediately above the end of said conduit; a fan above the deflector; with means for driving said fan so as to force a current of air downwardly in the casing.
- 40 6. The combination of a casing open at one end; a fan mounted at the other end of the casing and having a downwardly open-

ing outlet; means for driving said fan to force a current of air out of the casing through said outlet; a conduit entering the casing and discharging toward the fan; with means other than the fan for causing a current of air to flow in the conduit toward said fan.

7. The combination with an air-ship structure of a casing thereon open at the bottom; a fan in the casing; means for driving the fan to force a current of air downwardly in the casing; with a conduit having a branch placed to receive a current of air from a head wind and formed to discharge the same directly toward the fan.

8. The combination with an air ship structure of a vertically placed casing thereon open at the bottom; a fan in the casing; means for driving the fan to force a current of air downwardly therein; a conduit having a branch placed to receive a current of air from a head wind; with a second branch to said conduit; and means for delivering a current of air from said second branch through the conduit to the fan.

9. A lifting device consisting of a casing having a valve adjustable to vary the opening of one end thereof to any desired extent; a fan mounted in the casing; a conduit entering the casing and directed toward the fan for delivering a current of air toward the same; and means for operating the fan to move a current of air in a direction opposite that of the air delivered from said conduit.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

EDWARD BIDDLE LATCH.

Witnesses:

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