W. J. H. STRONG.

AIR MACHINE AND PROPELLER.

APPLICATION FILED FEB. 25, 1915.

1,344,661. **Patented June 29, 1920.**

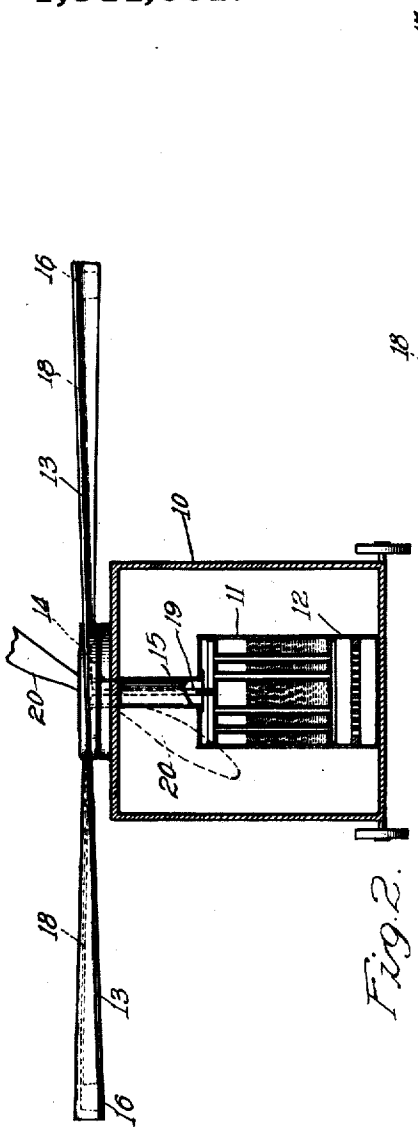


Fig. 1.

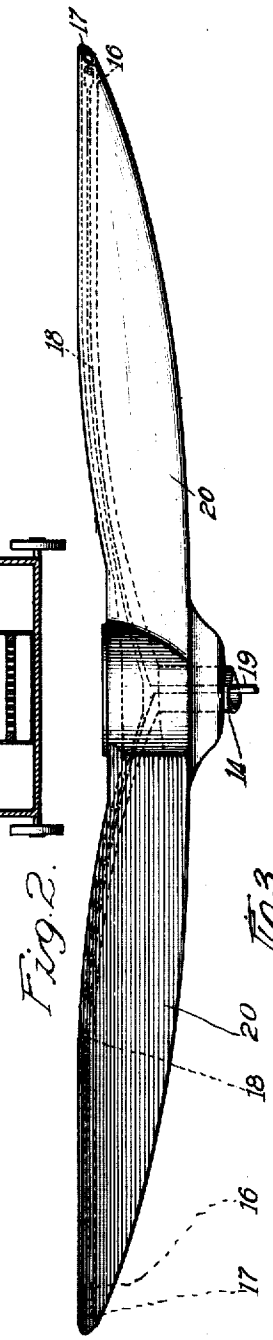


Fig. 2.

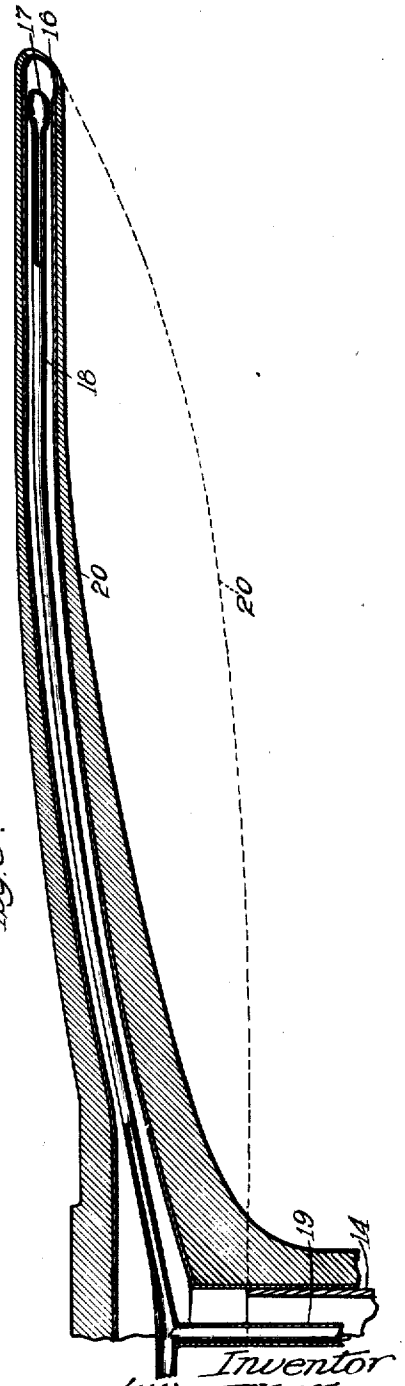


Fig. 3.

Witnesses:
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UNITED STATES PATENT OFFICE.

WILLIAM J. H. STRONG, OF BELOIT, WISCONSIN.

AIR MACHINE AND PROPELLER.

1,344,661. Specification of Letters Patent. Patented June 29, 1920.

Application filed February 25, 1915. Serial No. 10,396.

To all whom it may concern:

Be it known that I, WILLIAM J. H. STRONG, a citizen of the United States, residing at Beloit, in the county of Rock and State of Wisconsin, have invented new and useful Improvements in Air Machines and Propellers, of which the following is a specification.

My invention relates to air-crafts and propellers.

One of the objects of my invention is to provide a new and useful air-craft.

Another object is to provide a new and useful propeller adapted for use on air-crafts or the like.

The above and other features of novelty, advantage and capabilities will become apparent from a detail description of the accompanying drawings, in which I have illustrated a practical embodiment of the invention, but the construction there shown is to be understood as illustrative only, and not as defining the limits of invention.

From two-thirds to three-fourths of the lifting power of an aeroplane is caused by the vacuum on the back of the wing. Therefore by increasing this vacuum the lifting power is increased. The vacuum depends largely on the velocity with which the wing of the machine is moved through the air.

The velocity with which aeroplanes are now driven through the air is from 40 to 150 miles per hour, and the average is from 60 to 70. The greater the velocity the more like a solid the air becomes, and with explosives the reaction of the air may be as great as the reaction of a mass of iron. An illustration of this is the fact that a charge of dynamite on an anvil strikes down and disrupts the anvil. The explanation is that the resistance of the anvil is less than the resistance of the air because of the high velocity of the explosive. It is because of this characteristic that the reaction of the air increases with the square of the velocity. In the machine illustrated herein, I provide an air-craft with a normally horizontal revolving wing which travels many times faster than any of the wings heretofore known, and therefore greatly increases the lifting power of the machine, and too, with my invention, a wing of great length or size may be utilized for the driving power may be applied near the ends thereof.

With the aeroplanes now in use it is necessary to make a running start to get the machine in the air, and one of the disadvantages of these machines is that they cannot ascend with the maximum load which they could carry when once up, while my machine, as illustrated, will, by reason of the normally horizontal wing, lift many tons of excess free weight directly up into the air from a position of rest and transport it at great speed.

If the present machines were such that the speed of the propellers could be indefinitely increased, the velocity with which they propel the air would also be increased and the reaction or thrust on the air would increase with the square of the velocity, but, unfortunately, a law of mechanical motion as applied to our present motors intervenes, so that beyond a certain speed of revolution, called the critical speed, which is the point at which the propeller produces the greatest work with the least expenditure of power, the power required increases with the square of the speed, therefore I provide an air-craft with means for driving the propeller or wings by steam, but, as will be readily perceived, my invention is also equally adapted to other forms of power, such as that produced by the internal combustion motor and compressed air.

The expanding velocity of steam is from 700 feet per second at very low pressure to 3,000 feet per second, or the enormous velocities of about 475 miles an hour to more than 2,000 miles an hour. Therefore the air struck by steam moving at any of these velocities will produce a heavy reaction.

The propeller shown in the accompanying drawings, which is peculiarly adapted for air-crafts, but, of course, may be used on other machines, as may also the wing, is provided with means for carrying away and utilizing the exhaust or gases of combustion from the exhaust or combustion chamber, which means not only creates a draft, and produces motion, but also heats the propeller.

Referring to the drawings in detail:

Figure 1 is a sectional view of an air-craft embodying one form of my invention.

Fig. 2 is an elevation of a propeller embodying one form of another part of my invention.

Fig. 3 is a sectional view of the same.

The frame or body 10, which may be of any suitable form, has mounted therein a combustion and a steam chamber, 11 and 12

respectively. Rotatably mounted on the upper side of the frame 10 is a suitable wing 13 so designed that by rotating it in the proper direction by the means presently to be described, the machine is raised directly up into the air and there sustained at any desired height.

The hollow shaft 14 on which the revolving wing 13 is mounted extends downwardly and is connected with the combustion chamber 11 by means of a pipe 15.

Embedded in the wing 13 and communicating with the hollow shaft 14 is a flue 16, which may be formed in the wing or by a separate pipe, as shown, or in any suitable manner, the open ends of which preferably terminate at the tips of the wing, but, of course, it will be understood that the flue may terminate there or elsewhere along the wings. As a result of this a continuous flue is formed from the combustion chamber to the tips of the wing, for carrying out the gases of combustion, and heating the incased pipe 18 in the wing or propeller, and for other purposes hereinafter described.

Within the flue 16 is located a pipe 18, having connected thereto a pipe 19 which pipe extends downwardly through the shaft and pipe 15 and to the fluid chamber 11, where its lower end is pivotally connected with the fluid chamber. The inner end of the pipe 19 extends through an opening in the upper partition of the chamber 11 and is adapted to rotate therein, as shown in Fig. 1. The ends of the pipes 18 preferably terminate more or less near the ends of the funnel 16 and may be provided at their outer ends, or along their course, with suitable jets. From this it will be seen that the fluid is forced up through the pipe and out through the jets, as a result of which the escaping fluid exerts a moving force on the wing by re-action upon the air. The jets may be so placed in relation to the funnel as to create or force a draft therein.

The contents of the pipe 18 may be expanded by the heat contained in the flue 16, or super-heated as it passes through said pipe.

For driving the machine forwardly there is rotatably mounted on the rear of the frame 10 a propeller 20, the details of which are best shown in Fig. 2, which propeller is rotated in the same way as the revolving wing, by the same means, and through similar connections. Therefore, I have applied the same reference characters to the corresponding parts on the propeller which will suffice for a detail description thereof.

By incasing the pipes within the flue or funnel the fluid passing through the pipes is expanded by heat, kept hot, or superheated by the escaping hot gases of combustion in the flue. The wing or propeller also derives more or less heat from the funnel and the wing action on the air or other fluid is facilitated thereby.

When an internal combustion motor is used for motive power, the flue 16 may be connected with the exhaust chamber where the exhaust gases, now wasted, would be utilized to assist in revolving the wing or propeller as the exhaust from the ends of the funnels would produce a reaction on the air as well as heating the wing and thus aid in its buoyancy, and lessen the viscosity or friction of the air.

It is, of course, understood that my propeller may be used with machines other than air-crafts, and any fluid, such as compressed air for instance, may be used other than steam.

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

1. In a wing, a flue therein adapted to connect with a combustion chamber and a pipe within the flue adapted to connect with a fluid chamber.

2. In a propeller, a flue adapted to be connected near the axis of said propeller with a combustion chamber and a pipe within said flue adapted to connect with a chamber containing a fugitive element for the purpose set forth.

3. In a wing, a flue adapted to carry away gases, means within the flue adapted to connect with a chamber containing a fugitive element, for moving the wing.

4. In a wing, a flue adapted to carry away gases embedded therein, means within said flue adapted to connect with a chamber containing a fugitive element, said means being provided with jets for the purpose of moving the wing by the reaction of the fugitive element on the air.

5. In an air-craft, the combination of a frame, a wing mounted thereon, a combustion chamber, a fluid chamber, a flue embedded in the wing, and connecting near the axis of said wing with the combustion chamber, and a pipe incased in the flue and connecting with said fluid chamber.

Chicago, Illinois, February 20, 1915.

In witness whereof I hereunto subscribe my name to this specification in the presence of two witnesses.

WILLIAM J. H. STRONG.

Witnesses:
I. V. CURRAN,
CLARENCE J. LOFTUS.