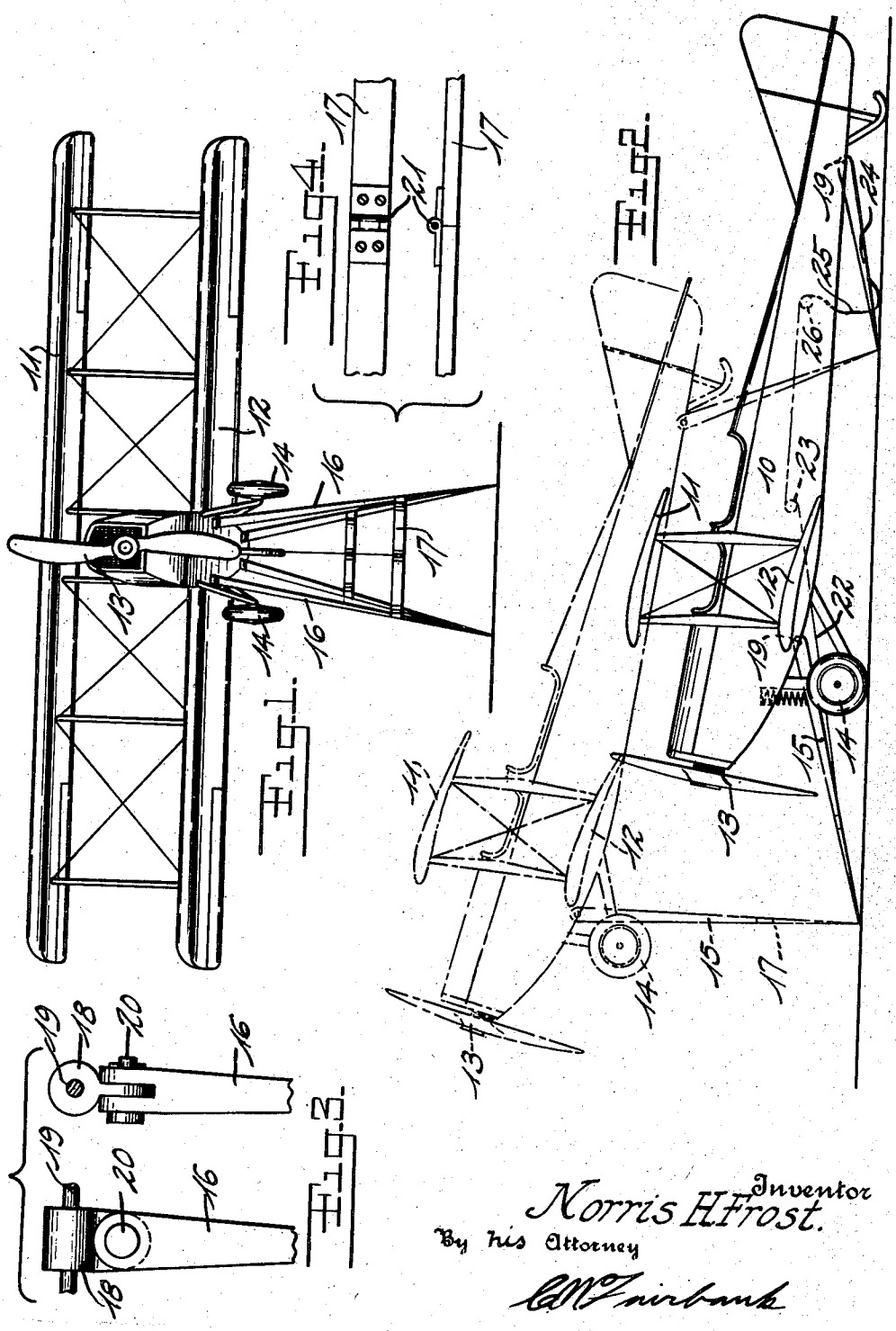
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SELF LAUNCHING AEROPLANE.

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1,254,898.

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Application filed October 16, 1917. Serial No. 196,811.

To all whom it may concern:

Be it known that I, NORRIS H. FROST, a citizen of the United States, and a resident of West Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Self-Launching Aeroplanes, of which the following is a specification.

This invention is a self-launching aeroplane and involves an attachment to and forming a part of the aeroplane to facilitate the launching of the latter, the launching force being primarily the tractive power or the propelling force of the engine driven propeller of the aeroplane.

In the present method of launching aeroplanes, it is ordinarily necessary to have a considerable area of evenly prepared surface over which the wheels of the chassis may run until the required momentum has been reached to enable the operator to raise the machine from the earth. It has also been proposed to have special launching devices which will project the aeroplane by energy stored in or applied through such launching device. These methods of launching operate successfully at the home station or base, but it is often necessary for the aviator to land in a locality where the desired characteristics of the ground are lacking, as for instance in rough or hilly ground and at a long distance from any separate special launching device. In such localities it is extremely difficult for the aviator to again leave the ground.

In carrying out my invention, I provide the aeroplane itself with an attachment so constructed that the aeroplane may be raised into the air and launched without the necessity of traveling along the ground for any appreciable distance. Furthermore, the energy required for lifting the aeroplane I derive entirely from the motor of the aeroplane and insure high speed of the motor with the resulting high tractive or propelling force of the propeller before the aeroplane has traveled a distance equal to its own length, whereby the aeroplane may very rapidly acquire high speed.

With my improved construction the aviator can launch the aeroplane from localities where the conditions are such that launching in the ordinary manner is difficult if not impossible.

In the accompanying drawings to which reference is to be had, I have illustrated one embodiment of my invention but I desire that this embodiment be considered in an illustrative rather than in a limiting sense as various changes may be made within the scope of my invention as described in the appended claims. In said drawings,

Figure 1 is a front elevation of the aeroplane at the instant of taking flight;

Fig. 2 is a side elevation showing the parts in solid lines in position preparatory to launching and showing in dotted lines the parts at the instant of launching; and

Figs. 3 and 4 are views of minor details of construction.

I have shown my invention as applied to a biplane of the tractor type, the aeroplane having a fuselage 10, a pair of superposed planes 11 and 12, a propeller 13 and wheels 14 facilitating the movement of the aeroplane along the ground. This aeroplane, so far as the main features thereof are concerned, forms no portion of my invention and is only diagrammatically illustrated.

My invention is equally applicable to machines having the propeller or propellers at the rear rather than at the front and provided with a single or more than two supporting planes.

To facilitate the launching, I provide a frame 15 pivoted to the body or other rigid part of the machine adjacent to the front end thereof and adapted to lie in a downwardly and forwardly inclined position with the front end resting upon the ground when the aviator is ready to launch the machine. This frame may vary in character, in point of attachment to the aeroplane and in details of construction, in accordance with the type of aeroplane to which it is attached.

Merely as an illustration, I have shown the frame in the form of two arms 16 pivoted to the under forward part of the fuselage and connected together by a transverse brace 17. The lower ends of the arms are spread apart to such a distance as will form an adequate support and prevent the aeroplane from tilting sidewise during the launching operation.

When the aviator desires to launch the machine, this frame is brought to the position illustrated in solid lines in Fig. 2 and the front lower end of the frame which rests on the ground is so braced or anchored that it cannot push forwardly along the ground.

As the aeroplane engine is started, the frame will at first prevent any forward movement of the aeroplane and will offer such a resistance that the engine may speed up until the propeller gives such a propelling or tractive force that the aeroplane will be driven upwardly and forwardly, the frame swinging about its lower end as a pivot. Due to the fact that the upper or pivotal connections between the frame and the body swing in an arc and the components of the arc continually approach the horizontal until the frame is in a vertical position, the engine and propeller may continue to increase in speed and the speed of the aeroplane itself will increase to such an extent that when the parts reach the position shown in dotted lines in Fig. 2, the aeroplane and its engine and propeller will have such speed that the aeroplane may continue its forward movement without any material lowering of the body as the frame swings rearwardly.

After the aeroplane is thus launched, the frame may be disposed of by the aviator in various different ways, depending upon the method of attachment of the frame and the details of construction of the frame. For instance, it may be pulled back to the forwardly extending position preparatory to its use at the next launching or may be formed of telescoping or folding sections which may be unlocked upon the pulling of levers or cords and the frame brought to a folded position. As illustrated, the two arms are mounted to swing not only forwardly and rearwardly, but also may swing laterally to bring the lower ends of the arms closely together or along the sides of the fuselage during flight. In Fig. 3, I have shown one of these arms 16 with a collar 18 turning on a transversely extending pivot 19 carried by the fuselage and closely adjacent to this collar is a pivotal connection 20 about which the arm may swing transversely of the machine.

The transverse brace 17 between the arms is shown in Fig. 4 as having a hinge 21 intermediate of its ends so that it may either hold the arms spread apart to the desired distance or the hinge may bend in bringing the arms together. The ends of the brace 17 will of course be hinged to the arms. A cord or wire 22 is shown as being connected to this brace 17 and extending over a pulley 23 so that after the aeroplane is launched, the aviator may pull on the cord and thus both bend the brace 17, bringing the arms together, and lift the arms to a position along and beneath the fuselage as shown in dotted lines in Fig. 2.

By the use of only a single frame, the front end of the aeroplane will be raised while the lower end advances along the ground until the aeroplane takes flight. This will give the machine a decided tilt which will facilitate the upward movement of the aeroplane and the speedy launching.

I may, if desired, and in some constructions do, preferably employ a second and somewhat similar frame at the rear end of the machine so that the body will swing upwardly in parallelism or by making the rear frame shorter than the front one, the entire machine will rise but with the front end to a greater extent than the rear end. I have illustrated a frame 24 pivotally connected to the rear end of the fuselage and similar in all respects to the frame above described except that it is shorter and does not raise the rear end of the machine to as great an extent as the front end during the launching operation. This frame is shown as provided with a cord or wire 25 extending over a pulley 26 so that the aviator may pull the frame up to a forwardly extending position beneath or along the body instead of a rearwardly extending position as is the case of the front frame illustrated.

After the aviator lands, he may lower the rear frame to the position shown in solid lines in Fig. 2 and may move the front frame to its forwardly extending position in various different ways, depending upon the details of construction of the latter. For instance, he may remove the pivot pins which connect the front arms 16 to the body, thereby entirely detaching the frame from the body and then move it around to the desired downwardly and forwardly extending position and replace the pivot pins.

It will of course be evident that the fou. front ends of the arms which are illustrated as being comparatively sharp, due to the small scale upon which they are illustrated, may be made in any suitable manner to prevent them from penetrating into the ground to any material extent even though the ground be comparatively soft.

In case the tractive or propelling force is insufficient to alone raise the machine as above described, particularly where the machine is a very heavy or heavily loaded one, additional force may be brought to bear to effect the desired relative movement of the frame or frames and the body of the aeroplane. For instance, a very heavy spring may be put under tension by any suitable mechanism on the aeroplane and this spring may be released when the engine is started and may act on the frame or frames and the body to tend to produce the relative swinging movement of the frame from the position shown in solid lines in Fig. 2 to the vertical position shown in dotted lines. The details of such a spring are relatively unimportant and I have not illustrated such details. I have merely shown rather diagrammatically a pair of heavy coil springs 27 carried by the body and acting upon the arms 16 at a short distance in front of the pivotal

connections between the latter and the body. These springs may have any suitable means at their upper ends and within the body for placing them under high compression. After the machine is launched, they may be drawn back up into the body and again compressed ready for the next launching.

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

1. An aeroplane having a pair of frames pivotally secured thereto, one adjacent to the front end and the other adjacent to the rear end, each of said frames having their front lower ends adapted to rest upon the ground and swing about said lower front ends to raise the aeroplane when the tractive or propelling effect of the aeroplane propeller acquires sufficient force to raise the aeroplane, the front frame being of greater length than the rear frame, whereby the front end of the aeroplane is raised to a greater extent than the rear end during the launching.

2. In combination, an aeroplane, a pair of frames of different lengths, the longer frame having pivotal connections with the aeroplane adjacent the front end of the latter and the shorter frame having pivotal connections with the aeroplane adjacent to the rear end of the latter, said frames occupying downwardly and forwardly extending positions and having their lower front ends held against forward movement during the launching to insure the upward and forward movement of the aeroplane as said frames swing about their lower ends as pivots with the front end of the aeroplane rising to a greater distance than the rear end.

Signed at West Hoboken, in the county of Hudson and State of New Jersey this 10th day of October, A. D. 1917.

NORRIS H. FROST.