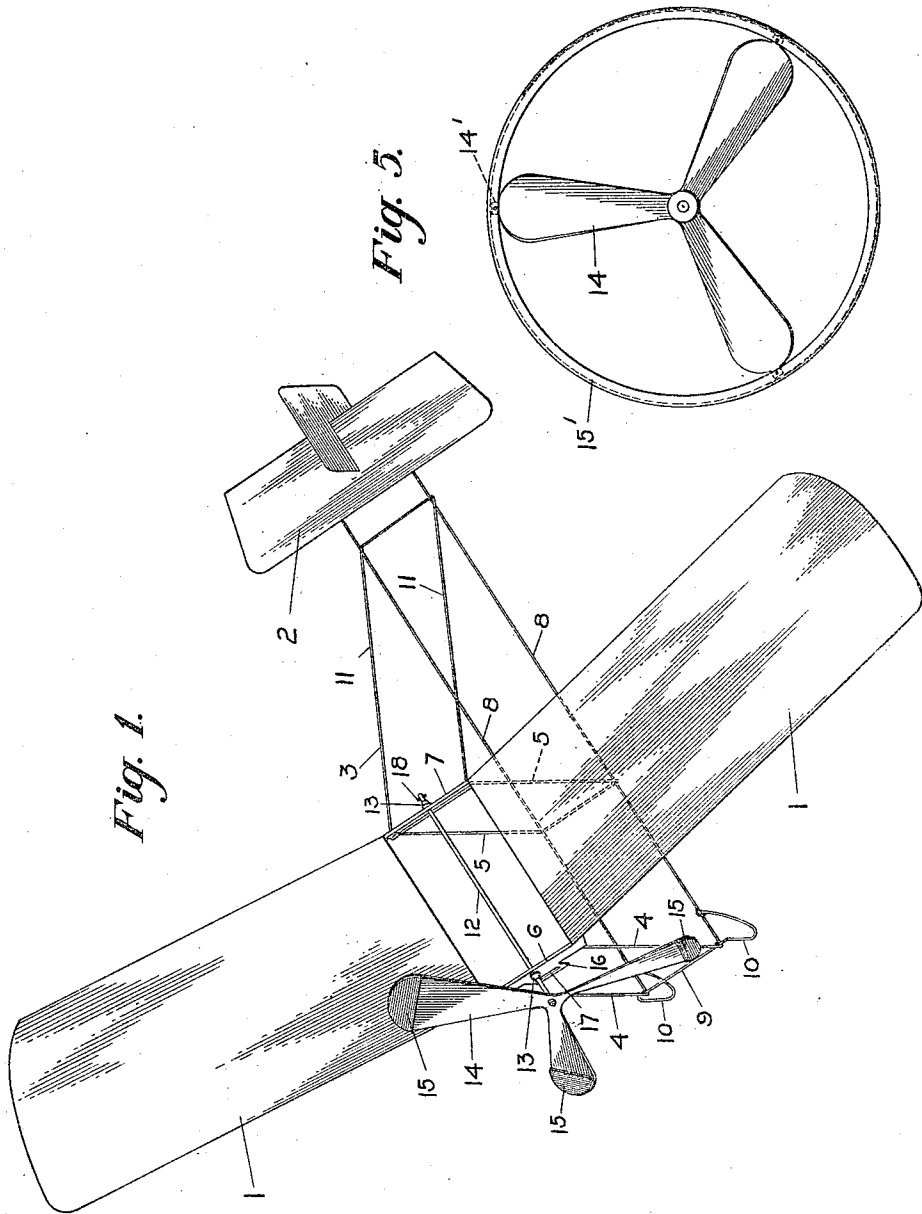


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AEROPLANE AND STARTING DEVICE.
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1,295,537.

Patented Feb. 25, 1919.
2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

Fig. 2.

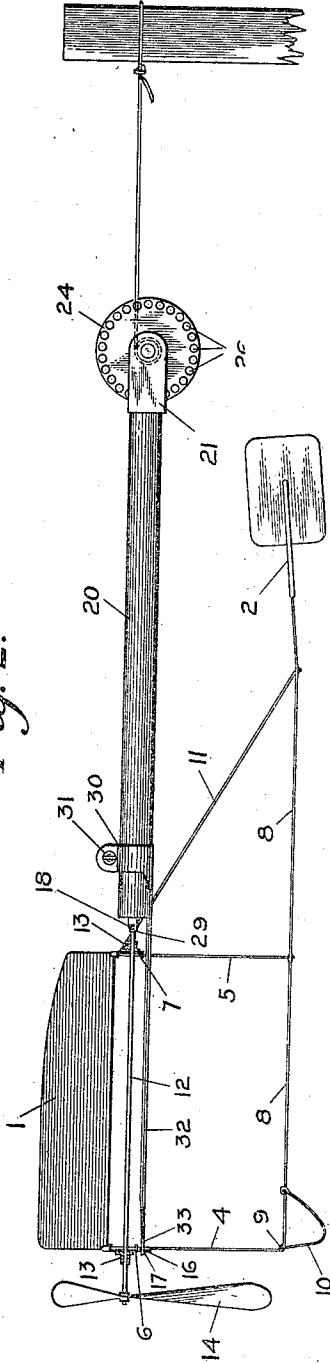


Fig. 3.

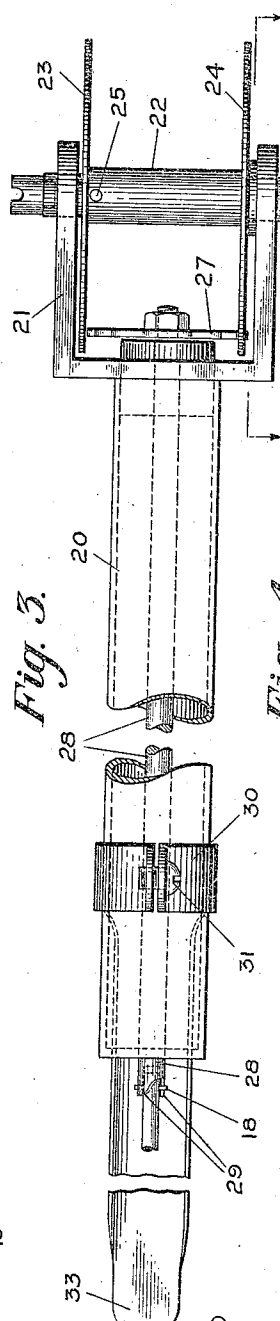
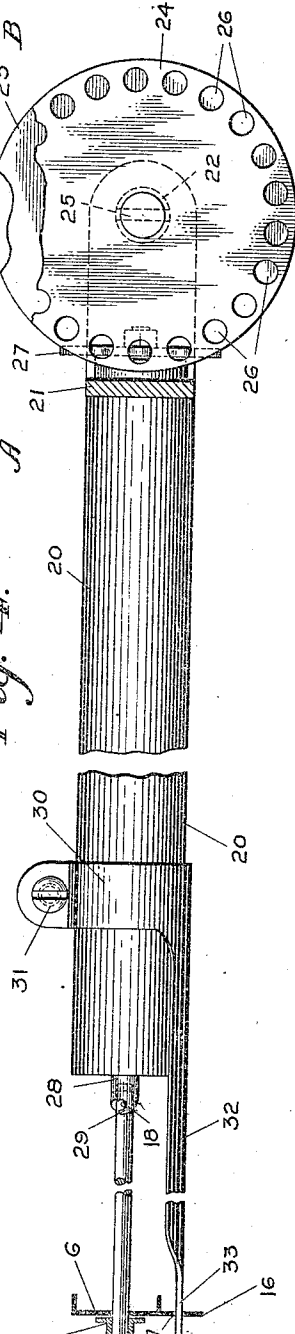


Fig. 4.



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AEROPLANE AND STARTING DEVICE.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HANS K. LORENTZEN, a subject of the King of Denmark, residing in the city of New York, county and State of New York, have invented certain new and useful Improvements in Aeroplanes and Starting Devices, of which the following is a specification.

My invention relates to aeroplanes in general and more particularly to that class of aeroplanes designed for short flights and has for its object the production of an aeroplane which will be simple, light and strong in construction, easily manipulated and which will have a maximum duration of flight for the power imparted to the propeller. These and other objects will appear hereinafter.

One embodiment of the invention is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of the aeroplane without the starting device.

Fig. 2 is a sectional view of the aeroplane with starting device in position.

Fig. 3 is a top view of the starting device showing the method of engaging the propeller shaft.

Fig. 4 an elevation of the starting device, in part section on line A, B of Fig. 3, and showing the forward propeller shaft support in section and its engagement with the starting device, and

Fig. 5 is a modified form of propeller.

In the illustrations given, the application of my invention is shown in connection with a monoplane, while it will be apparent that the construction and starting device may be used with equal facility and advantage in any other type of aeroplane, and that the form and construction may be modified and varied without departing from the spirit of the invention, and in particular while the form of embodiment specifically shown and described is in the nature of a toy, my invention is in no way limited to miniature forms, but as stated may apply to aeroplanes and starting apparatus large and small.

In the drawings, 1, 1 are the main supporting wings or planes, 2 the guiding plane, 3 the supporting frame work which is composed of wire and sheet metal, as hereinafter described. The main body of the frame is composed of four vertical wires 4, 4, and 5, 5 secured by soldering or stamped-up loops, or in any suitable manner to the longitudinal sheet metal members 6 and 7.

At the bottom of the rectangular frame structure, the forward vertical members 4, 4 are bent at right angles and extend backwardly, forming base members 8, 8 to which the guiding plane 2, at the rear of the machine is attached; the rearward members 5, 5 are composed of one piece and form a loop at the bottom passing beneath the base members 8, 8 and forming a support for same, the cross-member 9 is secured in the angles formed by the members 4, 8 and 4, 8 and extends laterally beyond said members and is bent downwardly; then upwardly and back and secured by loops to the base members 8, 8, by this construction forward landing braces are formed by the loops 10, 10 and a cross brace by the portion 9. Diagonal tie members 11, 11 composed of one piece of wire are secured at their upper ends to the cross-member 7 and extend back and downwardly toward the guiding plane 2, passing beneath the two base members, 8, 8.

Wire loop frames (not shown) bent to conform to the shape of plane desired, are secured to the ends of the upper cross-members 6 and 7. These frames may be covered with any light fabric and serve as the supporting planes; the guiding plane 2, is constructed in a similar manner and secured to the base members 8, 8. The joints between the various members may be made with solder or wound with a finer wire, or by a combination of the two.

The upper cross-members 6 and 7 are composed of sheet metal and may be flanged at their upper and lower edges to add strength and rigidity. Preferably the joints between the wire members and the sheet metal members 6 and 7 may be formed by stamping up loops or U portions in the sheet members, underneath which the wire members may be passed, and the two members then securely soldered.

The members 6 and 7 are perforated at their centers to form front and rear bearings for the propeller shaft 12, longitudinal movement of said shaft being prevented by the flanged collars 13, 13 fixed to the shaft, which also serve as thrust bearings.

In the embodied form a three-bladed propeller is shown, forward of the cross-member 6 and fixed to the end of shaft 12, to the outer ends of the blades of said propeller are secured the flat weights 15, 15, which conform to the outline of said blades, and serve to store up momentum in the propeller

when set in motion by the starting device, as hereinafter described. The rearward end of the propeller shaft 12 extends through cross-member 7 and is provided with the clutch engaging pin 18 extending slightly beyond the shaft on either side.

From the center of cross-member 6, there extends downwardly a portion 16 provided with a slot 17. The starting device for imparting rotary motion to the propeller and starting the aeroplane in flight, comprises a main tube 20, to which is secured at one end a forked member 21 in the extended arms of which are formed bearings to support the drum 22. Rigidly attached to drum 22 and lying between the arms of said forked-member 21 are the disks 23 and 24. Drum 22 is provided with a through hole 25 and extends beyond its bearing adjacent to disk 23, and is slotted and counterbored to receive a winding key.

The disk 24 is drilled with a series of holes 26, 26, and forms a gear meshing with the metal pinion 27 secured to shaft 28, running at right angles to drum 22, and supported centrally in bearings formed in the ends of tube 20, the forward end of shaft 28 extends beyond the forward end of said tube, is counterbored to receive the rearward end of propeller shaft 12 and provided with a two-jaw clutch 29 to engage pin 18 of said propeller shaft.

Slidably mounted on tube 20 is the split sheet metal collar 30, provided with clamping screw 31, and having a forwardly extending portion or blade 32, which in its operative position reaches beyond the forward end of tube 20 and terminates in a flat tongue 33 with beveled edges for easy engagement with slot 17 of forward cross-member 6. The collar 30 with its blade 32, when once adjusted to any given aeroplane, may be securely clamped in position by screw 31, or when not in use the collar may be moved backwardly to bring the curved blade snugly under the tube 20.

The operation of the starting device in connection with the aeroplane, is as follows:

On the drum 22 is wound any suitable cable, such as heavy twine or flexible wire, the free end of said cable being securely attached to some stationary object; the tongue 33 is slipped into slot 17 and the rear end of shaft 12 into the counterbore of shaft 28, the pin 18 being engaged by clutch 29, of said shaft; it will thus be seen that the starting device provides a supporting means for the aeroplane.

To start the aeroplane in flight, the starting device is grasped by the tube 20 and, by a rapid forward movement, rotation is imparted by the unwinding of the drum, through gear 24, pinion 27, shaft 28 and clutch 29 to the propeller shaft 12. When the forward velocity of the aeroplane, im-

parted to it by the rapidly revolving propeller, exceeds the speed at which the operator is moving the starting device, the aeroplane will disengage itself from the tongue 32 and clutch 29 of said starting device and fly as long as forward motion is given it by the propeller.

Due to the weighted ends of the propeller blades, considerable fly-wheel effect is established in the propeller and flight will be maintained for a much longer period of time than with a light propeller of ordinary construction.

In Fig. 5 is shown a modified form, which may be the preferred form, of propeller construction, in which the weights 15 are replaced by a metal ring 15', said ring may be made solid, or formed of sheet metal bent back upon itself and secured to the propeller blades by ears or lugs 14' forming a part of said blades, and included between the folds of said ring.

In my preferred form, the aeroplane will not leave the starting device until the impulse due the propeller exceeds the speed of the person running with the device, thus insuring greater flight.

It will be obvious from the foregoing description, that under certain conditions the starting device may be operated by firmly clamping said device to some stationary object and by a rapid movement unwinding the cable from the drum.

While one embodiment of the invention is shown and described in the drawings and specification, many changes in designs and construction may be made within the scope of the invention, without departing from the spirit thereof.

Having described my invention, what I claim is:

1. In combination with an aeroplane, means for starting and storing energy for propulsion of the same, a handle adapted to be grasped for pushing said aeroplane to give it initial movement and connections whereby the movement automatically starts the development of said energy, and connections for automatically releasing the starting means.

2. In combination with an aeroplane, independent starting means detachably connected to the rear of said aeroplane and adapted to be moved to push said aeroplane to give it an initial impulse, a fixed connection, an attachment between the fixed connection and starting means whereby the initial movement starts and stores energy, and propelling means on said aeroplane to receive said energy and propel the aeroplane.

3. In combination with an aeroplane, a movable starting device comprising means for initially supporting said aeroplane, and clutch to engage the propeller shaft, both supporting means and clutch adapted for

instant disengagement when the impulse of the propeller exceeds the speed of movement of said starting device.

4. In combination with an aeroplane, a starting device comprising a shaft, having at one end a clutch adapted to engage the propeller shaft of said aeroplane, and at the opposite end a pinion engaging a driving gear of a winding drum and means for rapidly rotating said drum.

5. In combination with an aeroplane, independent starting apparatus with means adapted to connect with the aeroplane and

movable to give said aeroplane an initial impulse, connections whereby the operation of the propeller is assured during the initial impulse, and connections for automatically releasing the starting means from the aeroplane.

Signed at New York, in the county and State of New York, this 15 day of April 1918.

HANS K. LORENTZEN.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."