

W. E. PEARSON.
FLYING MACHINE.
APPLICATION FILED NOV. 22, 1909.

1,042,594.

Patented Oct. 29, 1912.

3 SHEETS—SHEET 1.

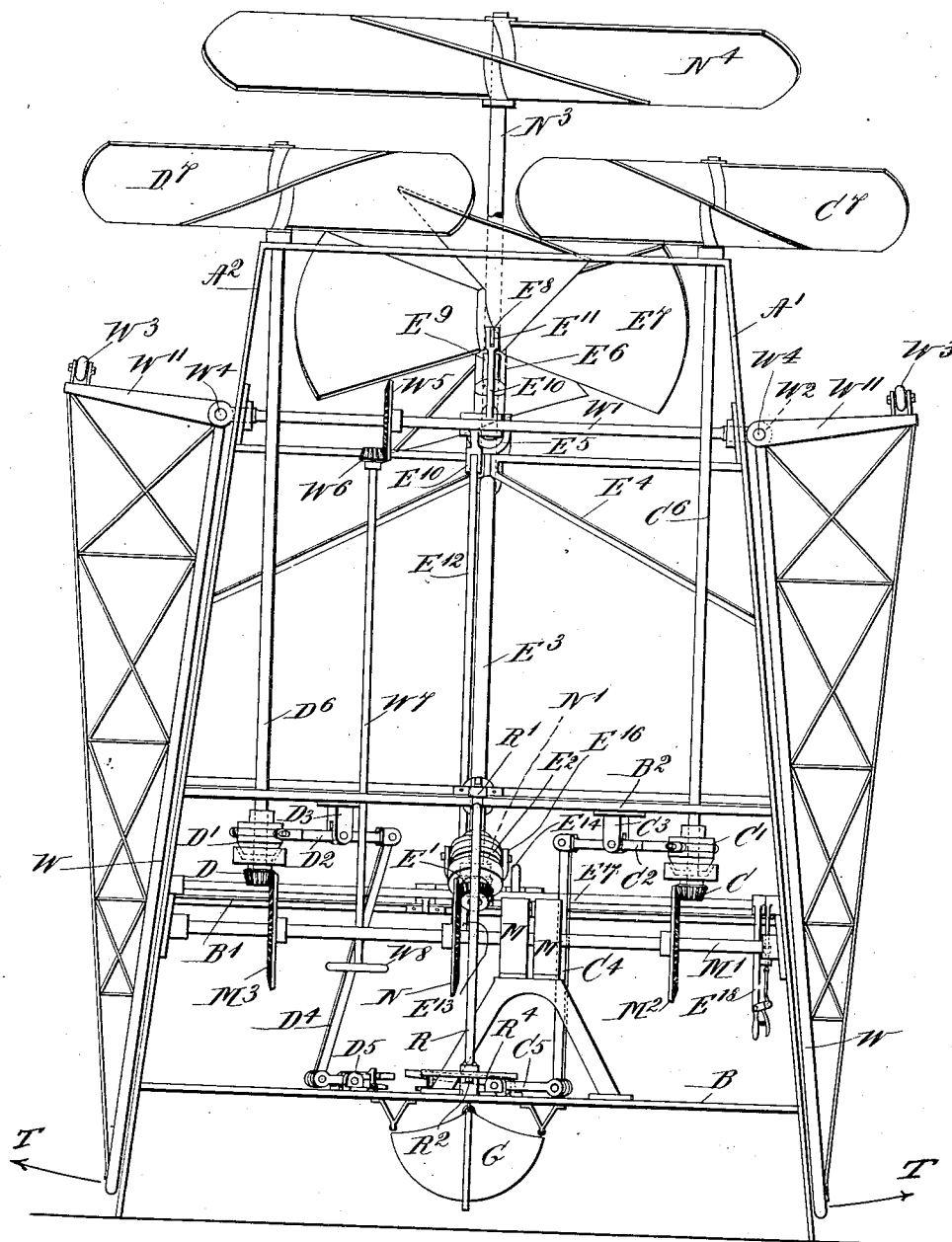


FIG. 1.

WITNESSES
Frank G. Parker
Harry C. Luce

INVENTOR
William E. Pearson.

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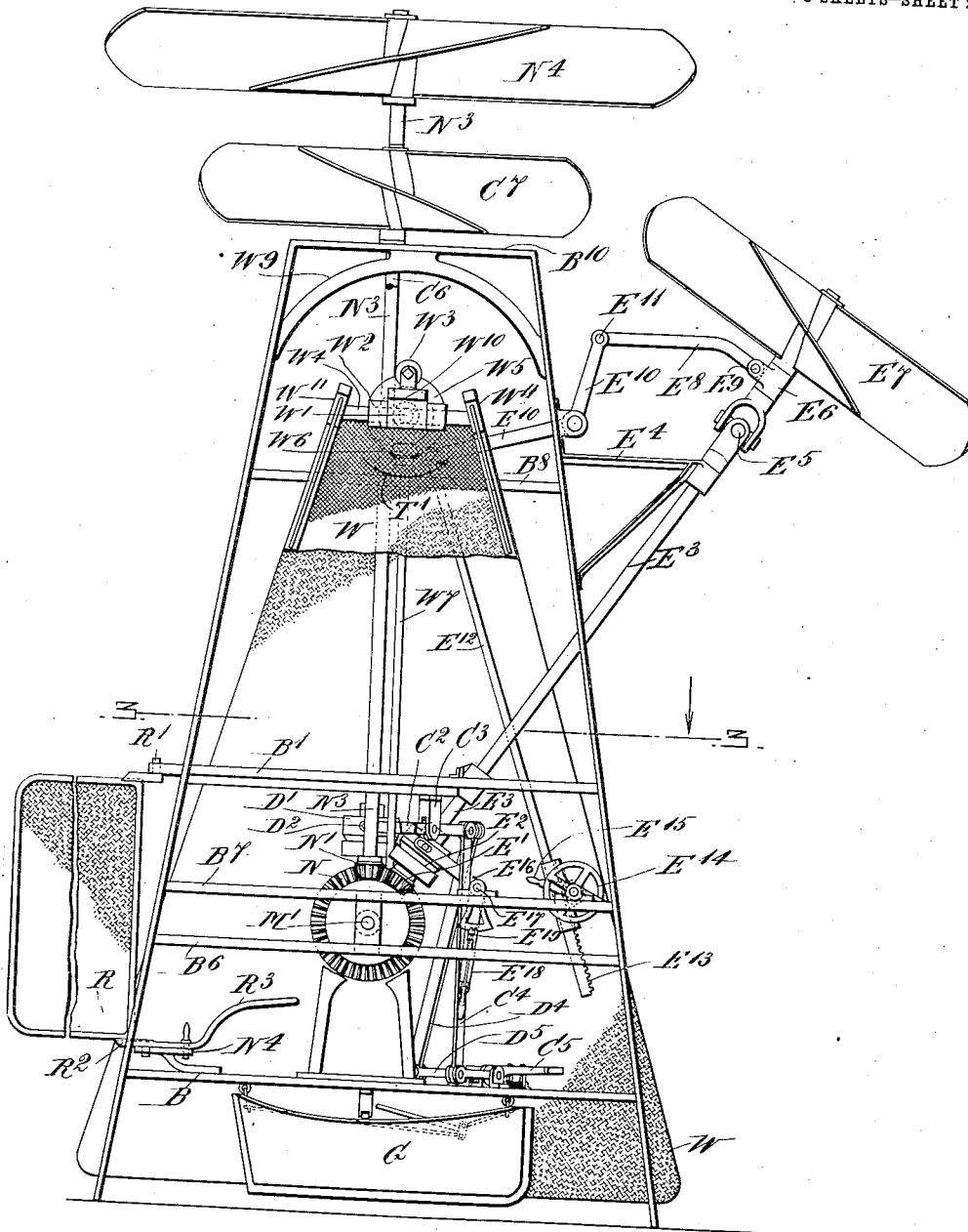


FIG. 2.

WITNESSES

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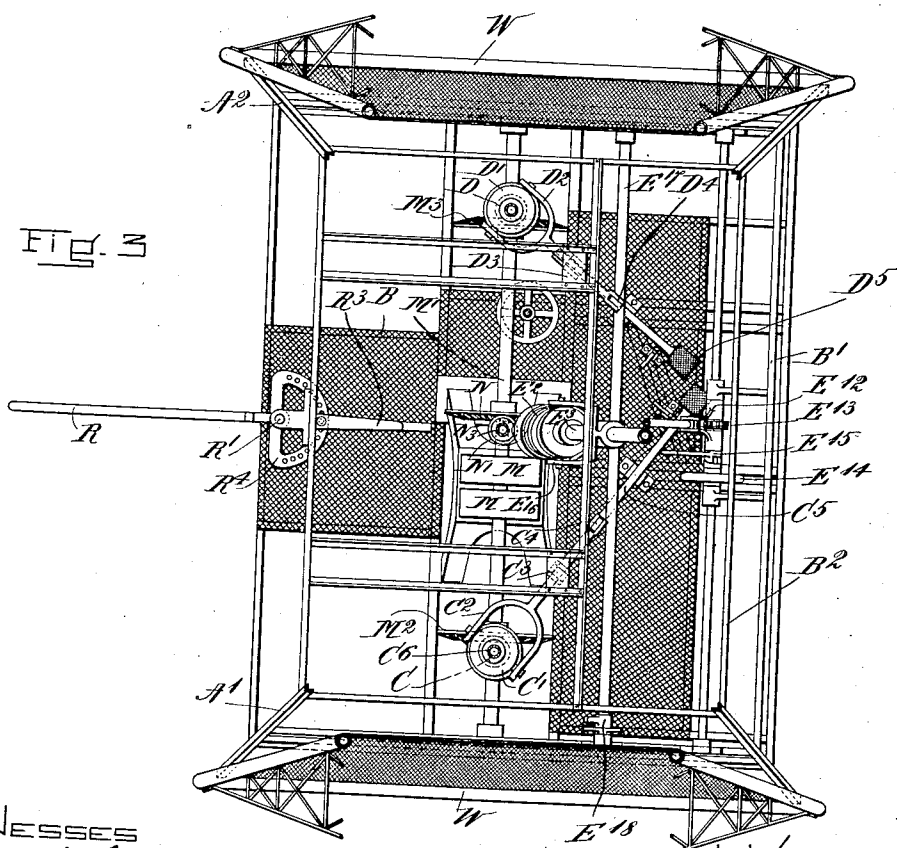
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UNITED STATES PATENT OFFICE.

WILLIAM E. PEARSON, OF BOSTON, MASSACHUSETTS.

FLYING-MACHINE.

1,042,594.

Specification of Letters Patent.

Patented Oct. 29, 1912.

Application filed November 22, 1909. Serial No. 529,480.

To all whom it may concern:

Be it known that I, WILLIAM E. PEARSON, citizen of the United States, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Flying-Machines, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to that class of flying machines that ascend by the direct action of propellers, are guided by the combined action of a rudder and an inclined propeller, and depend largely for their progress from place to place upon soaring induced by gravity.

It consists in the use of vertically operating propellers for ascending, a rudder and an inclined propeller for guidance; and upon adjustable soaring wings—folded when not in use;—for local movement the energy required in the act of soaring being supplied by the action of gravity, due to the weight of the machine, in descending, the object being to dispense with the use of large plane surfaces so dangerous, and even fatal to practical aerial navigation. This object I attain by the use of the mechanisms shown in the accompanying drawings, in which,—

Figure 1 is a front elevation of my machine. Fig. 2 is a side elevation of the same, a part of one of the soaring wings being represented as cut away for the purpose of showing other parts. Fig. 3 is a plan view taken below the line 3—3 of Fig. 2.

In the drawings the upright parts of the frame of the machine are represented by $A^1 A^2$ and the cross-pieces of the frame by $B^1 B^2$. A boat G is attached to the lower part of the frame and is to be used in case the machine should land in the water. Driving motors M are connected by any suitable clutch devices to the main shaft, M^1 , a bevel gear wheel N on said main shaft M^1 engages with a pinion gear, N^1 , Fig. 2, which is connected by a coupling N^2 to the upright shaft N^3 which gives rotation to the main propeller N^4 . The bevel gear M^3 , Fig. 3, engages with the pinion D , which is connected by a coupling D^1 to the shaft, D^3 , which gives motion to the small propeller, D^7 . The bevel gear M^2 engages with a pinion, C , which is connected by a coupling, C^1 , to the upright shaft C^3 that gives motion to the propeller, C^7 . The three propellers N^4 , D^7 and C^7 are all lifting propellers. The pitch of the blades in the small lower pro-

pellers $D^7 C^7$ is double that of the pitch of the blades in the large upper propeller N^4 . This difference of the pitch of blades of the propellers is made so that the flow of air from the upper propeller N^4 may not become "dead" air for the lower propellers, thus the pitch of the blades of the lower propellers $D^7 C^7$ being twice that of the upper ones; the lower propeller will still find resistance in the current that is caused by the upper propeller and be equally efficient in lifting the machine through the air. The propeller D^7 runs in the opposite direction to that of propeller C^7 , so that any tendency to cause the machine to rotate will be balanced.

For assistance in guiding the machine when in the air a fourth propeller E^7 , Fig. 2, is used. This propeller is driven by the bevel gear N acting through the pinion E^1 clutch, E^2 , shaft E^3 , universal joint E^5 and shaft in the collar E^6 . The plane of rotation of the propeller E^7 may be changed by the following described device. The collar E^6 has an arm E^8 pivoted to it at E^9 ; a bent lever E^{10} is connected to the arm E^8 at E^{11} and this bent lever E^{10} is operated by the rod E^{12} . The rod E^{12} has a ratchet E^{13} the teeth of which engage with a pinion connected with the hand wheel E^{14} so that any movement of the said hand wheel will cause the rod E^{12} to move longitudinally and acting through the bent lever E^{10} and arm E^8 will cause the propeller to tilt in any desired direction and thus assist in guiding the machine. The hand lever E^{15} serves to lock the rod E^{12} by means of a cam piece which bears against the hub of the wheel E^{14} . A bracket E^4 holds a collar through which the upper end of the shaft E^3 passes. The clutch E^2 that connects the driving gear E^1 to the shaft E^3 and propeller E^7 is operated by the lever E^{16} , Fig. 2, shaft E^{17} to which the hand lever E^{18} is attached. The hand lever E^{18} has a latch E^{19} which locks the hand lever E^{18} and through it the clutch lever E^{16} . The clutch, D^1 , Fig. 1, that connects the driving gear with shaft D^3 and propeller D^7 is operated by the lever D^2 , pivoted to the hanger, D^3 , which is connected to the link D^4 ; the said link, D^4 , is operated by the foot lever D^5 . The clutch, C^1 , that connects the driving gear with the shaft, C^3 , and propeller C^7 is operated by the lever, C^2 , hung in the hanger C^3 which is connected to the foot lever C^5 by the rod C^4 . The rudder, R , Figs. 2

and 3, is hung at R^1 and R^2 and operated by the tiller, R^3 , which may be locked in any desired position by the semi-circular plate R^4 , Fig. 3, which has holes at intervals as shown in which a stop on the tiller R^3 engages.

My machine has two wings, W , W , one upon each side as shown in Fig. 1. These wings are pivoted on the cross-shaft W^4 W^4 so that if the machine begins to fall the wings will open outwardly in the direction indicated by the arrows T , Fig. 1. The wings also may turn on the axis, see arrow T^1 , Fig. 2, by turning the wings in the line of the arrow T^1 (either way) will cause the machine to soar, that is, in descending. The device for tilting the wings for causing the machine to soar may be described as follows. The hand wheel W^8 , Fig. 1, operates a rod W^7 which rotates the pinion W^6 , which, acting through the gear wheel W^5 , causes the shaft W^1 to rotate, carrying the cross-quill or sleeve W^2 with it; this action will cause the cross-arms W^4 to tilt, carrying the wing braces, W^{11} , as per arrow T^1 and take the wings W with it.

To assist in controlling the position and movements of the wings W I have the following described device. The sleeves W^2 each have an arm W^{10} see Fig. 2 which has on its end a buffer wheel W^9 which, when the wing to which it is attached is open, will come in contact with the curved guideway W^9 and thus sustain the wing and hold it steady in its time of soaring.

From the above it may be understood that the wings W W in opening may be held in planes that are at right angles to the vertical plane that passes through the vertical line of the machine, that is the line of vertical ascension of the machine; in which case the machine will, in still air, descend vertically and not soar at all. But if the operator, working through the hand wheel W^8 and the shaft W^1 , cause the wings to be tilted so as to take a different angle than a right angle with the vertical plane, as aforesaid, then the wings will cause the machine to soar.

50 Claims.

1. In a flying machine of this class, an ascending mechanism comprising a pair of vertically acting propellers located above

the center of gravity of the machine and rotating in opposite directions, a third propeller mounted to rotate axially of the machine above said pair of propellers and having its wings set at a less angle than those of the latter, a lateral driving propeller adjustable as to its plane of action, descending wings swinging on a normally horizontal axis and opening automatically, and means for directing the machine, substantially as and for the purpose set forth.

2. In flying machines of this class, vertically acting propellers, a laterally acting propeller, means for guiding the machine, descending wings swinging on a normally horizontal axis, and means whereby the axis may be adjusted to any desired angle with the horizon whereby the said wings may be used for checking the descent of the machine or to cause it to soar, substantially as and for the purpose set forth.

3. In a flying machine of this class an ascending mechanism comprising vertically acting propellers, a laterally propelling mechanism, a guiding rudder; wings automatically opening to prevent the abrupt descent of the machine, means for adjusting said wings to cause them to assume any desired angle to the horizon, and guiding and staying buffers for said wings, substantially as and for the purpose set forth.

4. In a flying machine of this class, an ascending mechanism comprising vertically acting propellers, a lateral driving propeller adjustable as to its plane of action, a guiding rudder, descending wings swinging on a normally horizontal axis and opening automatically, means for adjusting the angularity of the axis whereby the wings may be used for checking the abrupt descent of the machine or to cause it to soar, buffers on said wings, and guiding means cooperating with said buffers, substantially as and for the purpose set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, on this twentieth day of November A. D. 1909.

WILLIAM E. PEARSON.

Witnesses:

FRANK G. PARKER,
WILLIAM EDSON.