T. C. STARR.

AEROPLANE.

APPLICATION FILED FEB. 5, 1912.

1,045,209.

Patented Nov. 26, 1912.

2 SHEETS—SHEET 1.

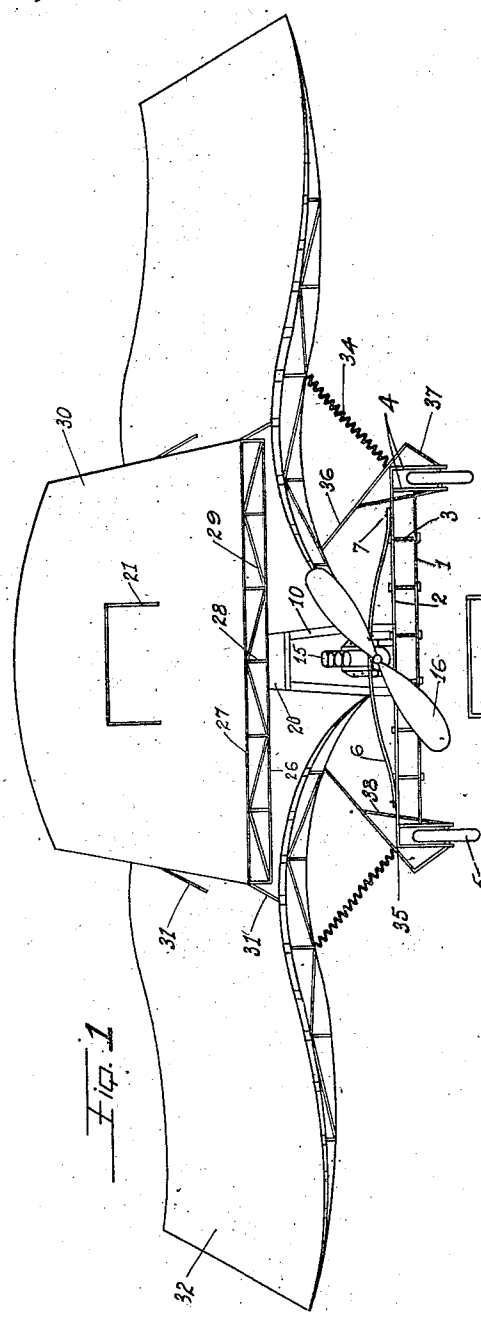

Fig. 1

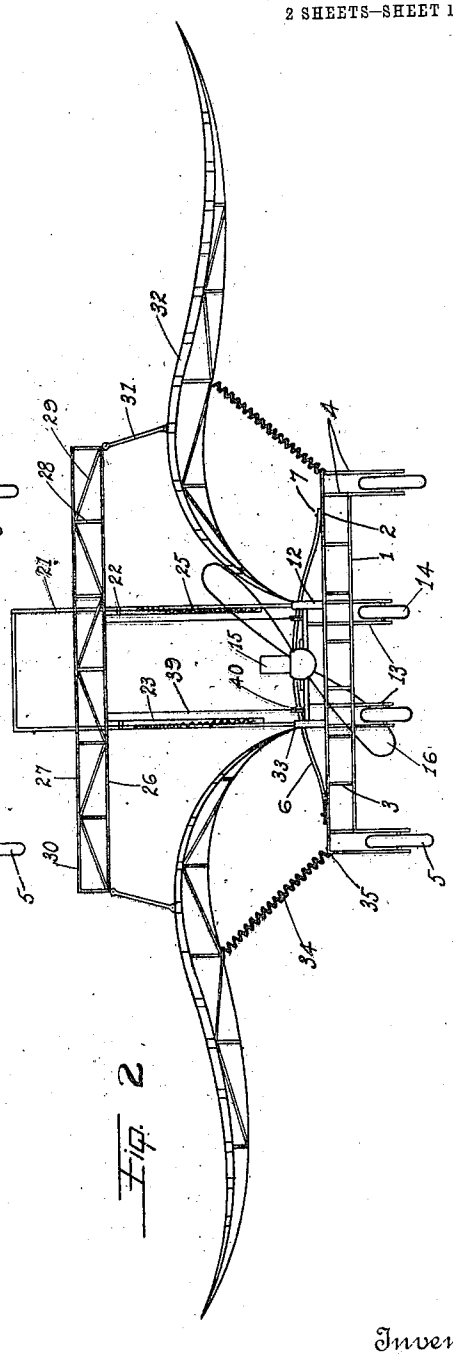

Fig. 2

Witnesses

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Fig 3

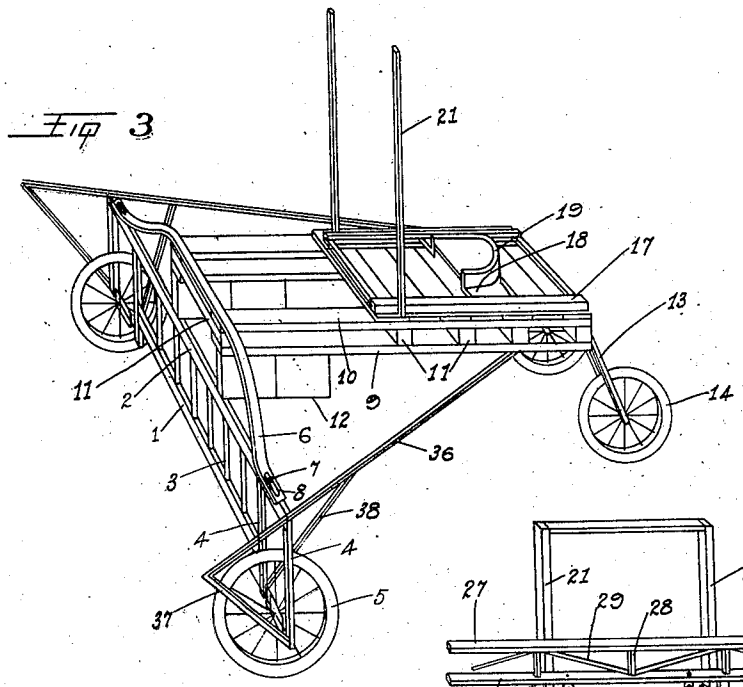


Fig 4

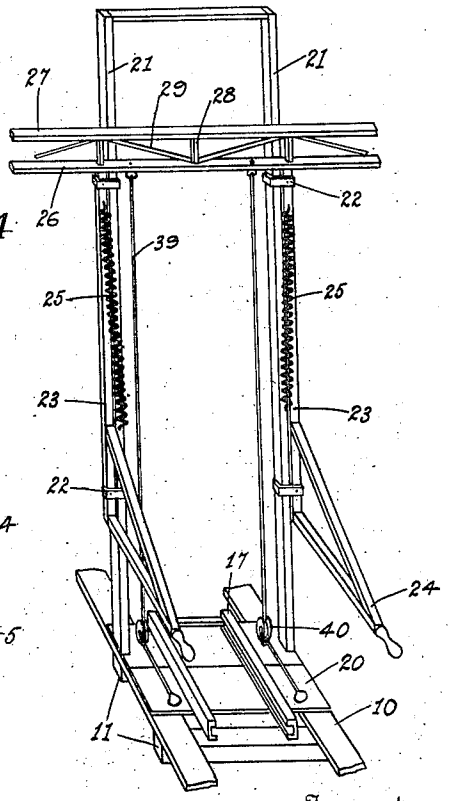
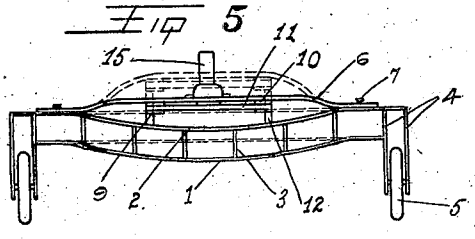


Fig 5



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UNITED STATES PATENT OFFICE.

THOMAS C. STARR, OF STOCKTON, CALIFORNIA.

AEROPLANE.

1,045,209. Specification of Letters Patent. Patented Nov. 26, 1912.

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To all whom it may concern:

Be it known that I, THOMAS C. STARR, a citizen of the United States, residing at Stockton, in the county of San Joaquin, State of California, have invented certain new and useful Improvements in Aeroplanes; and I do declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this application.

This invention relates to improvements in aeroplanes of all kinds, the object of the invention being to produce such an aeroplane as is designed to be stable in itself without the necessity of the use of auxiliary appliances and also one in which the equilibrium can be controlled by the motion of the aviator's body as is done in skating or the like which control can be maintained without the necessity of using outrigging elevating planes, ailerons, rudders or surface warping of any kind or character.

A further object of the invention is to produce an aeroplane capable of being propelled by hand after the motor is stopped and which can also be permitted to alight perpendicularly without injury to the operator, which alighting means consists of wings capable of being operated in a manner similar to the operation of the wings of a bird. This same wing mechanism is also designed to permit of the aeroplane being thrown out of balance in any direction and still be brought back to horizontal position by the operation of said wings by which operation the center of weight and resistance may be changed to conform to the varying changes of atmospheric pressure and other conditions.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purposes for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of the parts as will fully appear by a perusal of the following specification and claim.

In the drawings similar characters of reference indicate corresponding parts in the several views.

Figure 1 is a perspective view of the complete mechanism. Fig. 2 is a front elevation of the same. Fig. 3 is a perspective view of a running gear of the machine. Fig. 4 is a detached view of a lifting mechanism. Fig. 5 is a front elevation of a running gear.

Referring now more particularly to the characters of reference of the drawings, I first provide a front supporting frame consisting of a bottom cross bar 1 and an upper cross bar 2, there being vertical brace members 3 interposed between said members 1 and 2. Said members 1 and 2 also have end supporting rods 4 between which are mounted runner wheels 5. An arched bar 6 is bolted to the member 2 by means of bolts 7 projecting through slots 8 in said bar 6. The members 1, 2 and 6 are made of spring material such as hickory or light metal material which will permit of the same springing lightly up or down as shown in Fig. 5, as the aviator alights on the ground which will save both the operator and the motor mechanism from receiving the full force of the heavy jolt or jar as the aeroplane drops on the ground. The arched bar 6 and its sliding connection 7—8 with the member 2 acts as a check to prevent this resilient structure from having too great a movement one way or the other. The engine frame which consists of lower members 9 and upper members 10 provided with cross bars 11 is connected with the member 6 and provided at its forward end with blocks 12 and its rear end is connected with a frame 13 being mounted on runner wheels 14. Secured to the said engine frame is an engine or motor 15 which drives the propeller 16 by means of the usual connection. Mounted on said engine frame is a pair of slotted rails 17 in which are slidable flanges 18 of an aviator's seat 19. Formed across the rear end of the engine platform is an aviator's platform and projecting upwardly from this are two guide beams 21 slidably over each of which are two spaced collars 22 connected by bars 23, such bars having outwardly projecting levers or handles 24.

The numeral 25 designates rubber springs secured to the members 23 as shown in Fig. 4. Secured on the upper end of the members 23 is a plane comprising bottom members 26 and top members 27 and intermediate brace members 28 and 29, the said top members being covered with suitable mate-

rial 30. This plane member just described is connected by hinged rods 31 with members 32 shaped in any suitable manner like the wings of a bird which members 32 are hinged at 33 to the engine frame and also provided with rubber springs 34 connected between said members 32 and the member 2 as at 35.

The numeral 36 designates brace rods projecting backwardly and connected to the aviator's platform and provided with auxiliary brace rods 37 and 38 which project inwardly to the members 4 to keep them rigid under all conditions.

The numeral 39 designates cables connected with the plane which is connected with the rods 23 and project thence under pulleys 40 to a point within reach of the seat 19.

In practice the springs 25 and 34 may be made of rubber as described or steel or compressed air structure may be used but in any event the tension of such springs is sufficient so that when the machine is in the air the entire weight of the machine and of the aviator would be sufficient to counteract such tension to any extent necessary to just keep said wings in open position. Thus when the machine is on the ground these springs would pull the wings toward closed position and then after the motor is started the air rushing under the wings would lift against the springs with increasing power until the aeroplane left the ground at which point as will be readily seen the spring pressure and the air pressure would be about equalized and hence it would take little power to raise or lower the wings. This raising and lowering would be accomplished by means of the operation of the handles 24 or by the cables 39 which raise or lower the plane which is connected to the wings by a rod 31. Owing to the evenly balanced condition of the wings 32 when the aeroplane is in the air but a slight movement of the hand on the members 24 or 39 will result in moving the wings up or down as will be described. The rear tips of the wings 32 and member 30 are flexible like a fish's fin and hence the up or down motion of the said wings tends to drive said machine forward. Since the spring power is merely sufficient to bring the wings down when the machine is in the air and since said springs are extended under the same condition with respect to leverage as that required to bring the wings down or lift the entire machine, this causes the entire weight of the machine to rest on the air rushing under it and hence the balance of the power to be supplied by the aviator to move the wings downward and lift the entire machine and cause it to move through the air would be exerted as described, by a leverage represented by the stroke of the center of the wings and the stroke of the aviator's hand which of course would vary according to the different builds of the machine. The ratio between the necessary pressure against the wings 32 when the machine is in the air and the leverage to be furnished by the aviator to force the wings downwardly would be a ratio of 2 to 3 respectively and hence if it required twenty pounds pressure to force the wings downward the aviator would have to exert through the leverage mechanism described thirty pounds of pressure to bring the wings down to lift the entire machine. This same relation would be maintained throughout regardless of what the entire machine together with its cargo might weigh. Thus it will be seen the weight of the aeroplane when in the air is what causes the wings which are the balancing means to be extended and in this structure lies the whole point of my invention, to-wit, the using of the weight of the aeroplane and all it contains to furnish the necessary power which aids it in lifting itself. It must not be inferred from this statement however that a motor is rendered unnecessary as it is a necessary feature to drive the propeller to drive the air under the wings 32 to raise the aeroplane in the air, but when in the air the structure provided for the aviator to raise and lower the wings would then be sufficient to drive the same upward and forward by the operation of such wings.

The sliding seat 19 enables the operator to gain a long stroke on the cables 39 in a manner similar as is done in racing shell boat. Also such sliding seat enables the operator to change the center of gravity in case of a backward or forward tip of the aeroplane.

In order to turn the aeroplane to the right or left the aviator throws the weight of his body to the right or left which increases the drag on that side and decreases the supporting surface in the opposite side. By elevating the wings 32, this effect can be more pronounced and the turn made shorter. Similarly a change in the center of gravity makes it impossible to upset the machine.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfils the object of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention.

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

A device of the character described comprising a running frame, another frame carried by said running frame, wings hinged to said last named frame, resilient means fixed to said wings and to said first named

frame, vertical guides on said second named frame, a plane movable vertically on said guides, means flexibly connecting said plane with said wings and means for raising and lowering said plane and a resilient means fixed to said plane and to said vertical guides, as described.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS C. STARR.

Witnesses:
STEPHEN N. BLEWETT,
CLARENCE SMITH.