Nov. 9, 1948. I. JEROME 2,453,514

FLYING FUSELAGE

Filed Feb. 10, 1942 7 Sheets-Sheet 2

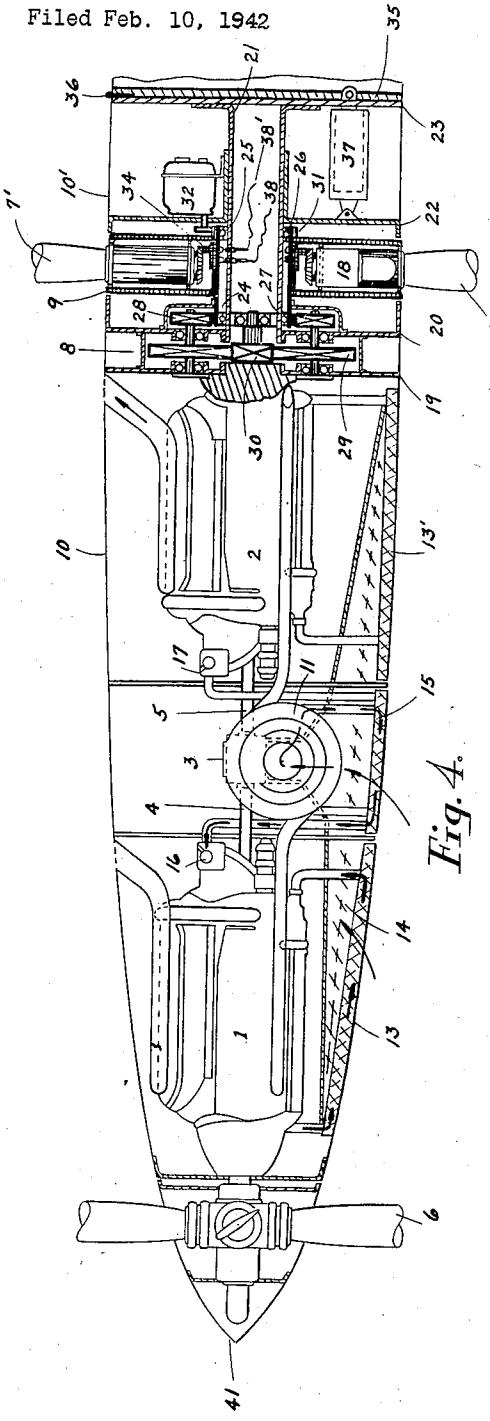


Fig. 4.

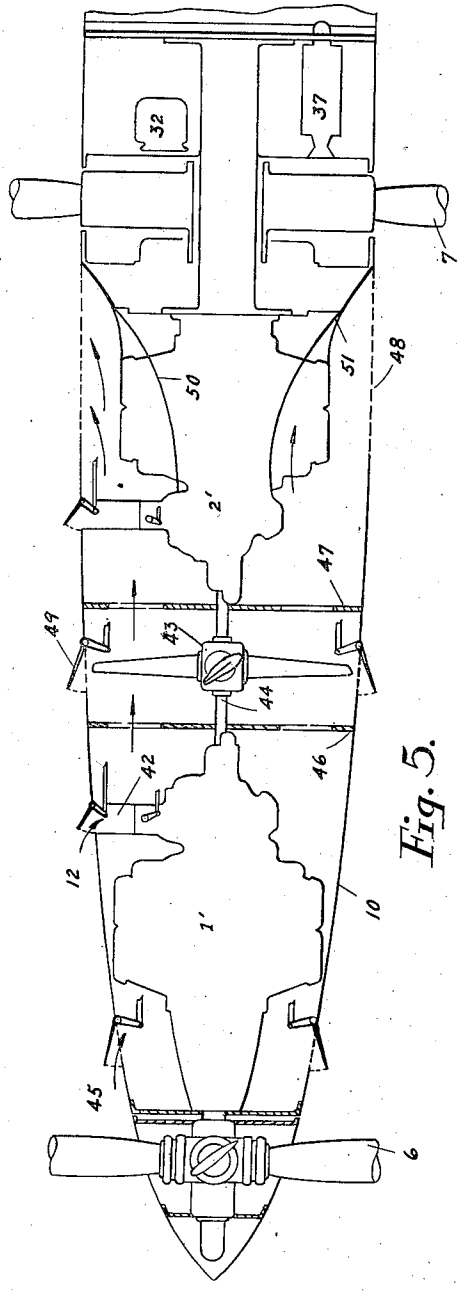


Fig. 5.

INVENTOR.

Irvin Jerome

Nov. 9, 1948. I. JEROME 2,453,514

FLYING FUSELAGE

Filed Feb. 10, 1942 7 Sheets-Sheet 3

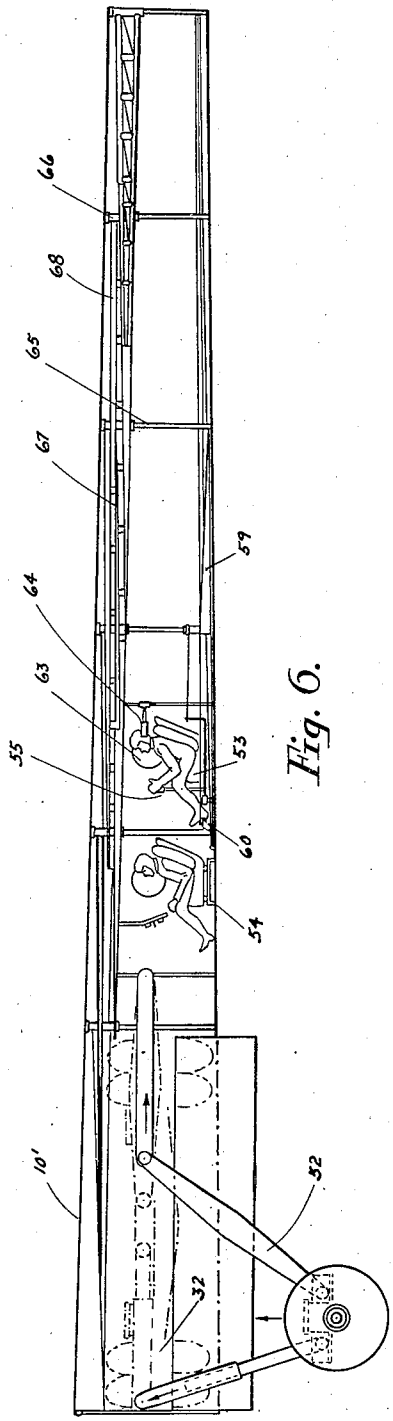


Fig. 6.

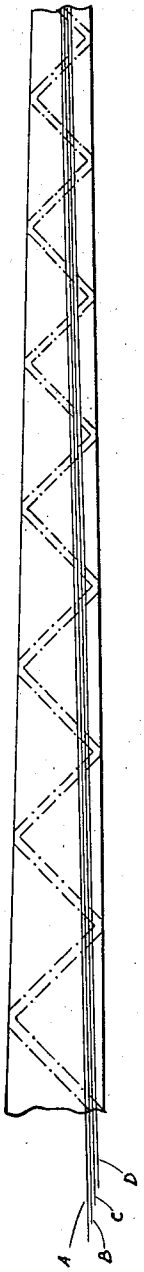


Fig. 7.

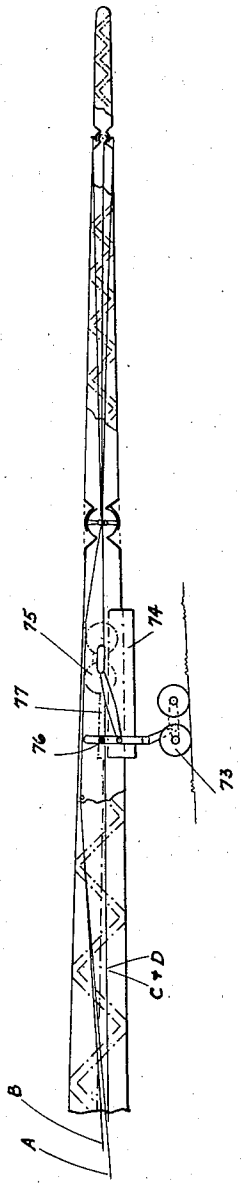


Fig. 8.

INVENTOR.

Irvan Jerome

Nov. 9, 1948. I. JEROME 2,453,514

FLYING FUSELAGE

Filed Feb. 10, 1942 7 Sheets-Sheet 4

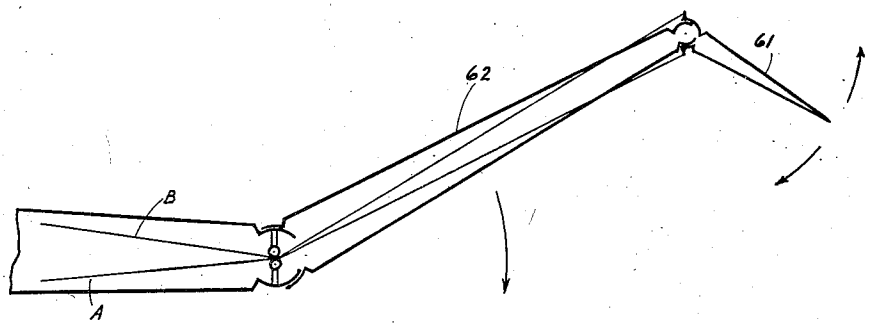


Fig. 9.

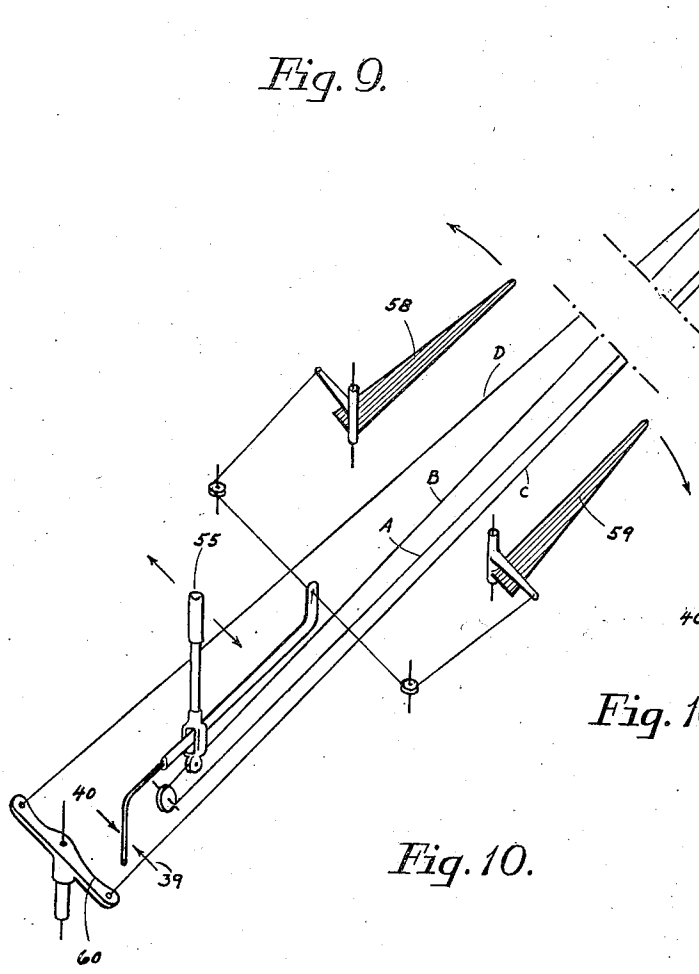


Fig. 10.

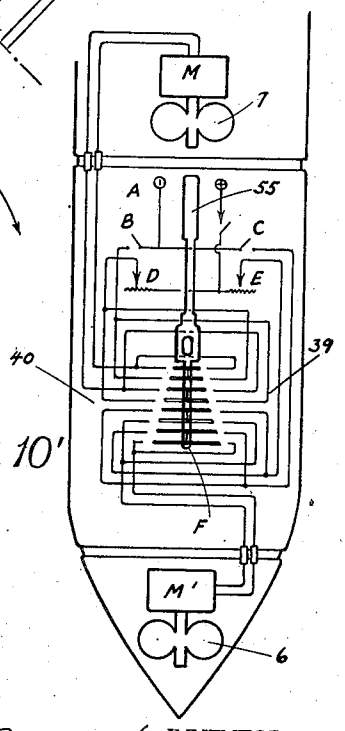


Fig. 10'

INVENTOR.

Ivan Jerome

Nov. 9, 1948. I. JEROME 2,453,514

FLYING FUSELAGE

Filed Feb. 10, 1942 7 Sheets-Sheet 5

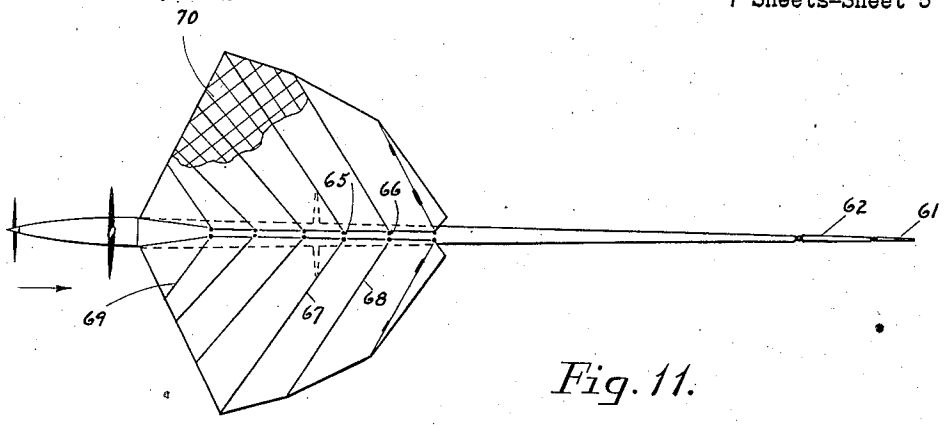


Fig. 11.

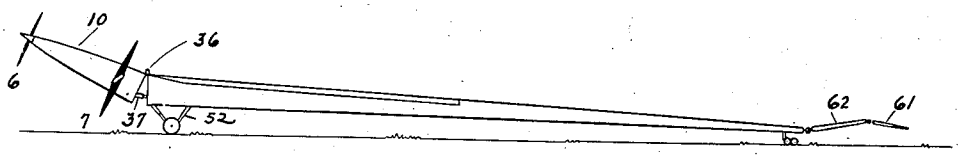


Fig. 12.

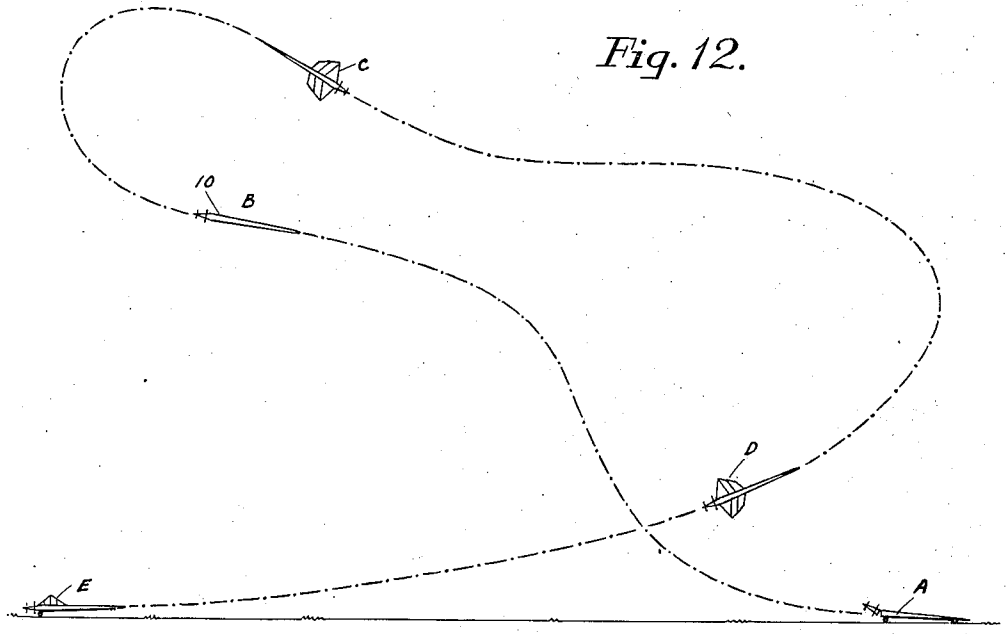


Fig. 13.

INVENTOR.

Ivan Jerome

Nov. 9, 1948. I. JEROME 2,453,514

FLYING FUSELAGE

Filed Feb. 10, 1942 7 Sheets-Sheet 6

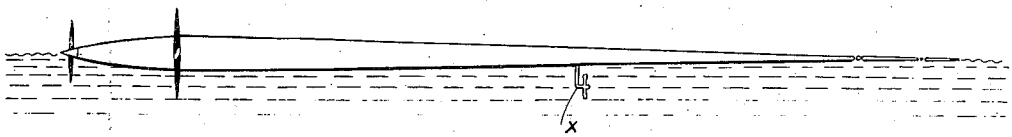


Fig. 16.

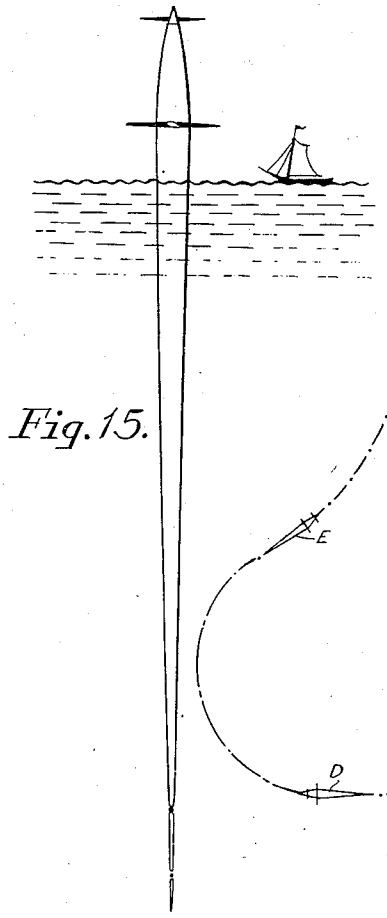


Fig. 15.

Fig. 14.

INVENTOR.

Ivan Jerome

Nov. 9, 1948. I. JEROME 2,453,514

FLYING FUSELAGE

Filed Feb. 10, 1942 7 Sheets-Sheet 7

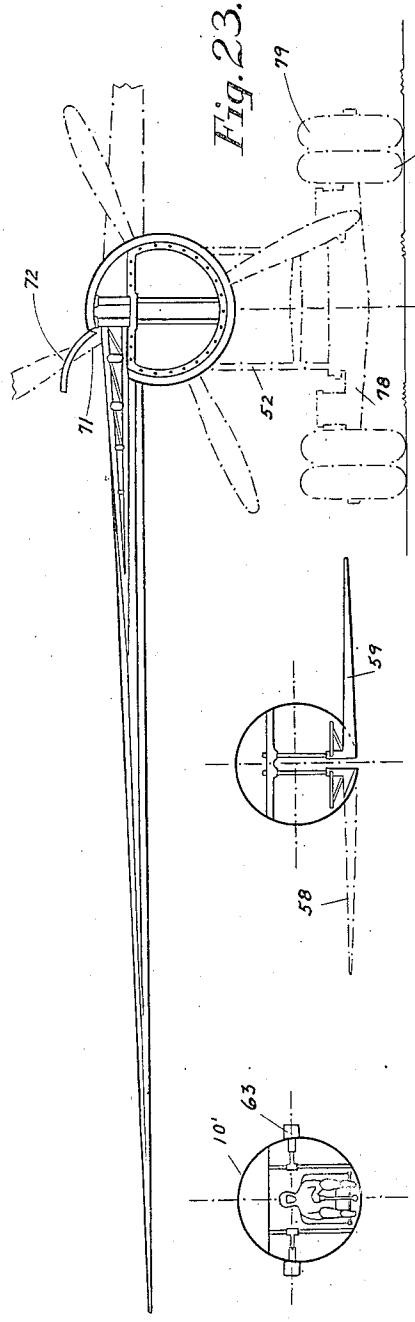


Fig. 23.

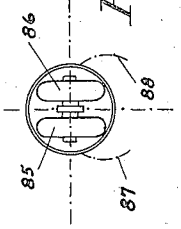


Fig. 19.

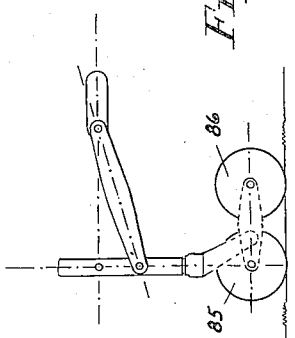


Fig. 20.

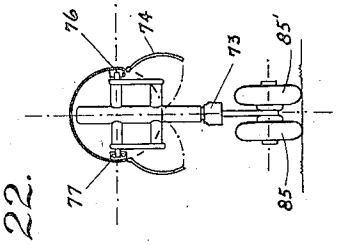


Fig. 18.

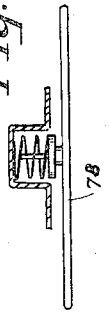


Fig. 17".

Fig. 22.

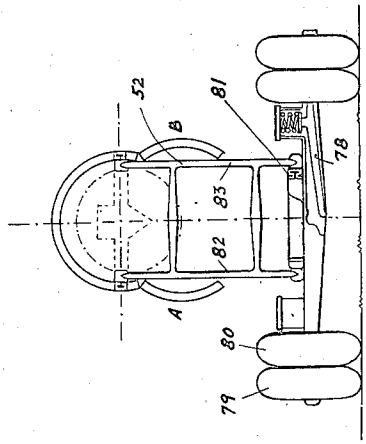


Fig. 17.

Fig. 21.

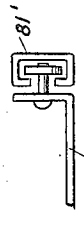


Fig. 17'.

INVENTOR.

Ira Jerome

Patented Nov. 9, 1948

2,453,514

UNITED STATES PATENT OFFICE

2,453,514

FLYING FUSELAGE

Ivan Jerome, Mineola, N. Y.

Application February 10, 1942, Serial No. 430,255

5 Claims. (Cl. 244—7)

1

My invention relates to a new method of flying, more particularly by a device I prefer to call an "airdart," the propulsion of which is accomplished by high-powered aviation engine units and in the embodiment disclosed herein as an example, by air screws.

One of the objects of my invention is to devise an "airdart," which is utilized for the housing of motor-unit, occupants, and aviation equipment, and at the same time, said airdart serving itself for lifting purposes while it is flying through the air.

Another object of my invention is to devise control method for the prevention of the spinning of my "airdart," resulting from unbalanced torques of propellers.

Another object of my invention is to provide my "airdart" with a control stick to control a novel tail group, and torque action, and to serve in a similar manner to the ailerons of an airplane.

Another object of my invention is to provide my device with take-off and landing means, which are folding sails of simplified design, of minimum weight and space requirement, and which can be opened in successive steps without the introduction of full resistance during their opening.

Another object of my invention is to provide two propellers, each with predetermined number of blades for absorbence of the engine's power, and balancing of the torques of propellers by pilot control stick, also controlling the tail group.

Another object of my invention is to provide my airdart with simplified light folding sails, for converting the same into an airplane or glider.

Another object of my invention is to devise a method of tail control with minimum resistance during its operation and practically none when it is not operated.

Another object of my invention is to devise a method of construction of the fuselage of my "airdart," which is formed in two portions, one being the front or engine group, the other one its tail, and the space between two said portions being utilized for air-screw propeller, revolving in opposite direction in relation to the air-screw propeller on the nose of said "airdart," as it is usual.

Another object of my invention is to provide a system of electrical switches, operated by the pilot stick, for the purpose of controlling the pitches of the propellers.

Another object of my invention is to devise a control method, operated either electrically or manually, to counteract the twisting moment,

2

when my machine flies either as an "airdart," an airplane or a glider.

Another feature of my invention is that the housing of foldable sails therein is made to conform to the smooth lines of the fuselage, so that there is practically no air resistance by said housing.

Another object of my invention is to provide a system which permits the utilization of a powerful ram action to help the superchargers for the motors of my device and in which an adjustment of the scoop controls the amount of air in order to retain the same air pressure.

Another object of my invention is to provide a novel chassis or running gear which normally may be housed in a fuselage of a small diameter, and which still may have large wheels for landing with large distance between them.

Another object of my invention is to provide normally collapsed wings for landing my aircraft, and also for cruising or taking off.

Another object of my invention is to provide folded wings which do not need complicated mechanisms for its opening, which open manually and by the help of the slipstream, and in which the slipstream provides a gradual opening, thus reducing stress on the wings due to sudden shock or pull.

Another object of my invention is to mount wings on a simplified structure which also permits them to be suitably folded into a compartment flush with the fuselage.

Another object of my invention is to devise an aircraft for naval purposes so that landing can be accomplished without wings or with wings folded.

Another object of my invention is to provide aileron control by fins when my aircraft is flying without wings, said fins being controlled from the pilot's stick, when desired.

Another object of my invention is to provide an aircraft with a novel tail, and therethrough controllable in various directions.

Another object of my invention is to provide an arrangement which permits the turning of the nose of my aircraft at a predetermined angle for the purpose of efficient take-off when space for a take-off is limited.

Another object of my invention is to provide an aircraft which will make a landing without wings in deep water, in the manner of a buoy.

A further object of my invention is to provide my aircraft with controls and means for floating the same flat on the water, for towing or cruising positions, and to provide it with an auxiliary

motor and a propeller similar to those used in a motor boat.

Still further objects of my invention will be partly apparent, partly pointed out as the specification of the same proceeds.

My aircraft consists of a cigar shaped streamlined fuselage of predetermined dimensions with folding wings, opened or closed at predetermined times and without conventional tail group, which usually is an essential part of heavier-than-air craft.

Contrasted with the conventional aircraft, the streamlined body not only houses the engines but also does the lifting. Such a lift is only possible at very high speeds. Drag, incident to wings empennage, sliding hatches, and external protuberances is entirely eliminated.

To any discerning person in aviation circles today, it is obvious that we are nearing the limits of usefulness of the airfoil, as far as any large increase in attainable speeds is concerned.

For several years, aeronautical engineers have been aware of the fact that as the speed of flight approaches the velocity of sound, compressibility shock and wave drag break down the lifting capability of an airfoil and magnify immensely the airfoil drag.

In the drawings:

Figures 1, 2 and 3 illustrate aircraft performance charts.

Figure 4 is a view of the forward portion of the aircraft of the present invention and various propulsion features thereof.

Figure 5 is a modification of Figure 4.

Figure 6 is a side elevation of the central portion of the fuselage of the aircraft showing foldable wings and the forward portion of the retractable landing gear.

Figure 7 is a diagrammatic view of a section of the fuselage with various control cables.

Figure 8 is a view of the rear section of the fuselage, rear portion of the landing gear and articulated tail for control purposes.

Figure 9 illustrates the general construction of the articulated tail.

Figure 10 illustrates control means for actuating the tail elements of the aircraft.

Figure 10′ illustrates control means for motors M and M′ employed for control purposes.

Figure 11 is a plan view of the aircraft illustrating the foldable wings in extended position.

Figure 12 is a side elevational view of the aircraft.

Figure 13 illustrates one manner of flying the aircraft.

Figures 14, 15 and 16 illustrate proposed flying methods and various attitudes of the aircraft when at rest.

Figure 17 illustrates the forward portion of the retractable landing gear.

Figure 17′ illustrates a portion of the mounting of the forward portion of the retractable landing gear.

Figure 17″ shows a spring mounting for the landing gear.

Figures 18, 19 and 20 illustrate the retractable rear portion of the landing gear.

Figure 21 illustrates the manner in which the pilot is accommodated in the fuselage.

Figure 22 illustrates additional fins for control purposes.

Figure 23 illustrates one of the foldable wings of the aircraft.

In the Figure 1, the ratio of the velocity of an airfoil to the local velocity of sound, called the

speed ratio, is plotted against lift and drag coefficients. The lift coefficient decreases and the drag coefficient increases with a rapidity entirely out of proportion to the present flight range.

To overcome this great increase in drag, an impracticable amount of engine power would have to be expended for a proportionately small increase in speeds. It is therefore obvious that to attain greater speeds, the problem of airfoil drag must be eliminated. However, the effect of compressibility shock and wave drag cannot be disregarded, to the best of my present day knowledge, but its greatest drawbacks are immediately left behind with the elimination of the airfoil.

A second limitation placed on an aircraft designer is maximum allowable landing speed. This factor greatly reduces an aircraft's high-speed possibilities, as a low wing loading is necessary for limiting landing speeds.

Refer to Figure 2 which indicates the variation of optimum wing loading with altitude and flying speeds.

The dashed line indicates the estimated limit in flying speed as determined by compressibility shock. It is to be noted that the limit, which is of the order of 540 M. P. H. at sea level, decreases to about 470 M. P. H. at 35,000 feet and is constant for higher altitudes. Flying speeds above 470 M. P. H. with conventional aircraft are therefore possible only at low altitudes unless the adverse effects of the compressibility shocks can be eliminated.

This chart also indicates that optimum wing loading increases with flying speed.

Figure 3 is a performance graph with optimum wing loading curves plotted for a typical transport and a racing plane at their cruising and maximum speeds respectively. These curves illustrate several important fundamentals. The lower the power loading at a constant parasitic factor, the higher the velocity. The lower the ratio of wind area to power at a constant parasitic factor, the higher the velocity.

Hence, with a view to a new approach to the problem of high-speed, sustained flight, this invention offers as a premise the idea of a self-propelled projectile, which I call an "Airdart."

The design of my invention endeavors to minimize the important limitations of the airplane and, insofar as possible, to incorporate standard parts and materials, of necessity, the highest power engines are required to make possible the desirable low power loading. The design of the body decreases the tendency toward boundary layer separation and minimizes the trailing turbulence burbles.

Low landing speeds are made possible through the use of retractable wings whose resistance is eliminated for high-speed flight. Parasitic resistance has been made as low as possible and the design naturally tends toward high dynamic loading.

In Figure 4, the power plant consists of engines 1 and 2, (approximately 3000 horsepower each), mounted in tandem and synchronously connected by a gear box 3 and shafts 4 and 5.

The engines are arranged in this manner, for reasons, that in case of single engine failure, the remaining engine will drive both propellers 6 and 7 at its maximum horsepower rating. The actual power delivered to the propellers will be reduced to half but this arrangement still makes possible driving of both propellers with counterbalanced torque, and with decreased pitch angles.

The forward engine 1, drives a multi-bladed,

variable pitch, tractor propeller 6. The rear engine 2, by means of a gear train 8, drives a second variable pitch, multi-bladed propeller 7, having a special hub 9, of same diameter as the body 10, at that section, said propeller rotating in the opposite direction to propeller 6, so that counteracting torque is produced. The distance between the two propellers is considerably more than the propellers' diameters; consequently, the arrangement is very efficient.

If more power plants are required, this arrangement can be extended along the streamlined body 10, and also for distribution of weight when concentrated weight is not desirable.

My aircraft calls for one and more exhaust turbo-superchargers such as 11. These superchargers may be operated individually, either on their respective engines or together as a separate unit utilizing exhaust gases from both engines. However, in my device the superchargers may be eliminated because of the exceptionally high air stream pressure or air ram made possible at the contemplated velocities, as shown by 12, in Figure 5.

As my "Airdart" is equipped with two liquid cooled engines 1 and 2, cooling radiators 13 and 13', are required. Each engine has its own radiator built up in strip form and fitted smoothly into the under side of the power section, as shown in Figure 4.

Cooling is regulated by pilot-controlled louvres 14, and external air is drawn by the exhaust turbo-superchargers, through the anti-freeze liquid radiators 13 and 13', and serves the dual purpose of cooling the engine radiators, and supplying air for the supercharger 11.

The center air radiator 15, shown in Figure 4, is the inter-cooler common to both superchargers, and cools air from superchargers 11 for carburetors 16 and 17.

These radiator arrangements make possible short and compact piping which in turn decreases the weight of the anti-freeze liquid required.

The forward propeller of the "Airdart" is multi-bladed, variable pitch, standard make, operated electrically.

It is mounted on engine 1 in the conventional manner and provided with a spinner of standard design.

The rear propeller is of novel design embodying two large discs of the same diameter as the body of the "Airdart" at this section.

Two electric motors such as indicated at 18, are utilized to control the feathering mechanism of the rear propeller 7, and they are set 180 degrees apart in the plane of the propeller as required for counterbalancing.

The entire assembly of the rear propeller and its feathering mechanism is driven through a system of gearing so as to permit the use of a stationary center tube 21.

Engine 2, is mounted on the double bulkhead 19 and 20. Pipe 21, of sufficient strength to hold two sections of the body 10 and 10' together is securely fastened to bulkheads 19 and 20, while the remaining section of body 10' and bulkheads 22 and 23 are securely fastened to pipe 21. Anti-friction bearings 24 and 25, support propeller hub assembly 9, which is mounted on tube 26, and is driven by external ring gears 27, and pinion 28, and by gears 29 and 30 assembled in a gear box between tube bulkheads 19 and 20. External gear 31 of propeller hub 9, drives the pinion of cabin supercharger 32, mounted on bulkhead 22 and tube 21. Electric motor 18, of conventional

design, drives propeller blades 7 and 7' with the aid of bevel gear 34, which is an idle gear on tube 26, and made to transmit revolutions of motor 18, to its respective propeller blades. Bulkheads 23 and 35 are pivoted on hinge 36, and moved by hydraulic cylinder 37, for take-off purposes as shown in Figure 12. The electric source of power is connected to leads 38 and transmitted through conventional collector rings 38' to motor 18, by the action of the pilot stick, shown in Figure 10, and its respective two-way switch 40.

The amount of electric energy used for turning the propeller blades is governed by the time for which the pilot allows the switch to be closed, therefore, angular movements of the propeller blades are proportional to the time in which electrical energy is allowed to pass through switch 40, on the pilot stick as indicated in Figure 10 by 39 and 40.

Switches 39 and 40 are of reversible polarity type which is fully described in my application Serial No. 322,736, filed March 7, 1940 now abandoned.

Propeller 6 is of the conventional electric type, mounted on shaft of engine 1, and is provided with spinner 41, and with ports if necessary to admit a stream of air for ventilation and cooling purposes.

Figure 5 shows a modification of Figure 4. Liquid cooled engines 1 and 2, are substituted by air-cooled engines 1' and 2'. Carburetor ducts 42, are supplied with air ram or pressure air intake through the pilot-controlled opening 12. Variable pitch blades controllable by pilot are mounted on the hub of an impeller 42 on the shaft 44, thus providing a circulation of air from opening 45, throughout the space in the body 10, which will receive the air through the openings 46 and 47 in the bulkheads. The air is expelled through the port holes of the body 10, as at 48.

A number of additional vents, like 49, is provided around the body 10, being opened when needed. Use of internal impeller 43, affords good cooling, for it is generally known that a stream of external air does not flow inside the moving body, unless it has been sucked in by an internal impeller such as 43.

Fire walls 50 and 51, are provided for guiding the stream of air from the impeller 43 to the openings 48, for the purpose of efficient movement of air intended for cooling and ventilation purposes.

The arrangement for driving the rear propeller is the same as described hereinbefore, parts being indicated by corresponding numbers.

Figure 6 is a diagram of the second section of the "airdart," provided for the chassis, pilot compartments and wing housing. The complete chassis assembly 52 is indicated, both in retracted and in extended positions. Details of the construction of chassis 52 will be found in Figures 17, 17', 17'', and 23.

My aircraft is provided with a novel retractable chassis 52, as indicated in Figures 6, 12, 17, and 23, and in it, four wheels 79 and 80 are mounted on an axle 78, in pairs.

The axle is fixed to a turntable 81, Figures 17 and 17', which includes two rings, one rotary and the other stationary. The fixed ring 81' is connected to the body structure by four struts, such as 82 and 83 in Figure 17, which are operated by pneumatic or hydraulic cylinders. The hydraulically actuated cylinders may retract the entire chassis into the body of the aircraft, as shown by 32 in Figure 6.

The chassis consists of standard parts except for the rings. The rings, operated by an electric motor, or manually, make possible a 90 degree turning of the main axle **78** (Figures 17 and 23). This movement permits the landing gear to fit into the aircraft along its longitudinal axis and allows the use of large diameter wheels **79** and **80**.

The chassis compartment (Figure 17) has doors A and B which are opened and closed by a hydraulic mechanism of standard design and may be hand-operated from the cockpit, if necessary.

The tail chassis, Figures 18 and 20 consists of a hydraulically actuated fork which supports a pair of tandem tail wheels **85** and **86**. The provision for retraction is conventional. Retracted position of these wheels clearly shown in Figure 19.

Tail wheel compartment doors, **87** and **88**, Figure 19, are opened and closed in a manner similar to the main chassis doors.

Pilot compartment **53** (Fig. 6) is similar to those found on conventional planes. Seat **54** is made to move forward and backward in channels on suitable rollers, with shock absorbers for taking care of the effect of acceleration.

Stick **55**, shown in the diagrams of Figures 10 and 10', is made of conventional design except reversible switches **39** and **40**, which are used for sending current to the both propellers **6** and **7** simultaneously for the purpose of balancing or unbalancing torques. In addition to switches **39** and **40**, the same stick operates fins **58** and **59** (Figures 6, 10, and 22) for additional control of torques. Forward and backward motions of stick **55** controls lift and descent of my aircraft in a similar manner as accomplished by conventional airplanes. Foot pedals **60** control the tail in right and left directions.

The diagrams in Figures 9 and 10 illustrate either the straight operation of the tail by stick **55** for up and down movements or left and right by four cables, A, B, C, D. An additional body **62** is added to the tail for the production of a large resistance force. Tail **61** is made of cone shape and follows the lines in the body of my "airduct."

The hinge construction shown for the tail sections such as ball joints, also are made for illustration only and can be substituted by any suitable hinge or joint.

Figure 10' diagrammatically illustrates a direct current reversible switch of conventional design. A is the source of electrical energy fed to the switches B and C and the resisters D and E in order to control the speed of the motors M and M'. F is the lower end of stick **55** and is made of non-conductive material with prongs which are conductors and are connected in pairs in order to act as jumper for their respective circuits.

Figure 10' is made for illustrations only and can be designed on any conventional manner for an electrical operation of electric motors M and M' which can be of direct or alternating or synchronous types.

In Figure 6 the pilot is shown as enclosed in the fuselage of smooth lines and with port-holes as **63**.

An optical system **64** (Figure 6) consisting of lens and mirrors for observation from interior of "airdart" is made in such a manner that when in use it is extended outside of the body and permits the pilot to observe in the same manner as an automobile driver looks into an outside mirror except that here the image is reflected from the front, while auto mirrors reflect the image from the back (Fig. 21).

When the optical system is not in use it is retracted by the action of the pilot so as to offer no air resistance. The pilot usually flies by instruments or by observation through the port holes **63**.

The pressure tight compartment for the pilot and passengers is supplied with air from cabin superchargers, as shown in Figure 4 at **32**.

Tubular posts such as **65** and **66** support swinging beams **67** and **68** (Figures 6 and 11) and a desired plurality of similar swinging beams may be arranged to the front and the rear of them. All said beams, normally close in the manner of an umbrella and open by the action of the slip stream, and unfold gradually. Said beams such as **67**, **68** and **69** have cable netting between them, over which suitable fabric is secured, stretched, which serves to support the weight and loads of my "airdart" when flying as an airplane or glider. This results in a great saving of weight as wings made of conventional airplane practise will be bulky, difficult to fold and of considerable weight. Wings made by my method resemble the bat wings, and while due to bulging they are not efficient for regular flying, they provide excellent air brakes for landings, and function similarly to the flaps of the airplane. When the pilot wishes to open the wings of the "airdart," he releases a latch of any obvious design, holding beam **67** (not shown). The slip stream unfolds the wings without use of any device or power apparatus, such as pneumatic or hydraulic mechanisms for opening the wings.

Obviously, the speed of my aircraft will be reduced before permitting these wings to open. An example of this is indicated in Fig. 13 wherein the speed of my aircraft will be reduced by upward climbing as in position B and the wings open only after such reduction, as in position C.

After the landing, the wings are folded, by hand or mechanically, into the space **71** (Figure 23), to be closed by the door **72**, without any protrusions. Door **72** is manually or mechanically operated, while the beams open automatically when released and exposed to a slipstream.

In Figure 7 I show a section of the body of my aircraft, through which pass the control cables A, B, C, D, and which may be used for various purposes, such as tanks, payload compartments, etc.

Figure 8 shows the rear end of my "airdart" with the movable sections of the tail. Tail chassis **73**, is shown in extended position with doors **74** open. Retracted position of chassis inside of the body of "airdart" is shown at **75**. This chassis is shown in Figure 18 and consists of four wheels of small diameter so that the loading on each wheel will be reduced. It can be noticed that in the folding of this chassis, arrangement for sliding the part **76** into channels **77**, permits the folding of all tubular structure into a horizontal position in a similar manner, as shown for chassis **52** in Figures 6 and 17.

Due to the long fuselage, my "airdart" will usually rise on a small angle of inclination for its body, or it may take off from a hill. Figure 12 illustrates the take off position of "airdart" when the front or nose section was raised on hinge **36**.

Figure 13 illustrates the "airdart" in various positions. A shows the take off, B illustrates its body straightened up for horizontal flight. C shows my "airdart" with wings opened as illustrated in Figure 11. At positions C and D my

"airdart" flies as a plane or glider with or without power drive, and position E illustrates the conventional landing of it as usual for heavier than air craft.

Figure 14 illustrates a method for take off and landing of my "airdart" in a body of water of sufficient depth. Position A shows my "airdart" without wings, floating in the water in the upright position of a buoy. The take off from that position is accomplished in the manner of a helicopter. Position B shows my "airdart" after this vertical take off, being brought on the tail as indicated by the arrows into position C for diving. Position D and E indicates flight of my "airdart" ready for landing without wings. In position F my "airdart" is brought from climbing to descent as indicated by the arrows there. Position G indicates my "airdart" landing tail first in a body of water for the resting position shown at A.

Figure 15 shows my "airdart" on a larger scale in a body of water in vertical position as shown by A and G in Figure 14.

Figure 16 shows my "airdart" in horizontal position when certain sections of the "airdart" have been emptied of water in order to trim my "airdart" on flat, as will be understood. An auxiliary engine and portable water propeller (X in Figure 16) may also be provided for towing.

While I have shown preferred embodiments of my invention, it is to be understood that changes and variations may be resorted to in the elements, combinations and operation of my invention, and I reserve my rights to such changes and variations, as are within the spirit of this specification, and the scope of the claims hereunto appended.

One such change may consist in using other means of propulsion than the propellers shown, like a rocket or jet engine.

Having thus described my invention which I claim as new and desire to secure by United States Patent is:

1. In a flying machine, having a straight fuselage, a retractable running gear with wheels, a shaft for said wheels, said shaft in a retracted position being in parallelism with the longitudinal axis of said fuselage, and means to turn said shaft into a transverse position to said axis when the wheels are lowered for use, whereby wheels of large diameter may be employed and retracted into the fuselage.

2. In a flying machine, in combination, a very long and narrow fuselage of substantially smooth outer surface, having a relatively fixed long central section, a shorter front or nose portion pivoted to said central section, and intermediate longer tail portion pivoted to the rear end of said fixed central portion, and a shorter but elongated tapering tail portion proper pivoted at the rear end of said intermediate tail portion, means adapted to propel said flying machine at a speed of 500 M. P. H. or over, whereby the action of the air passing under, over and around said fuselage normally will support and stabilize it in the air, without the action of any other means, and means operable by a pilot in said fuselage to control the relative angles of said central, front, intermediate and tail sections.

3. In a flying machine as set forth in claim 2, propelling means in said front section whereby

a change of angle between said front and said fixed central section will have a lifting effect on the machine, and running gears at the two ends of said relatively fixed central section.

4. In a flying machine as set forth in claim 2, running gears at the ends of said central section, said running gears having pairs of wheels with a shaft, and being adapted to be turned transversely to said section and underneath thereof for the running operation, or turned in parallelism with the axis of said section, and being retractable into the same in such longitudinal position.

5. In a heavier than air flying machine, in combination, a long and narrow straight fuselage of streamlined shape and substantially smooth outer surface, means in said flying machine adapted to propel the same at speeds of over 500 M. P. H., whereby the action of the air passing under, over and around said fuselage normally will support and stabilize it in the air, without the action of any other means, and means, normally within said straight streamlined fuselage but projectable therefrom, to change the condition of the flight when desired, said last mentioned means being adapted to be controlled by a pilot within said fuselage, a retractable running gear with wheels, a shaft for said wheels, said shaft in a retracted position being in parallelism with the longitudinal axis of said fuselage, and means to bodily turn said shaft into a transverse position to said axis when the wheels are lowered for use, whereby wheels of large diameter may be employed and retracted into the fuselage.

IVAN JEROME.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,027,258	Kubish	May 21, 1912
1,094,898	Hirth	Apr. 28, 1914
1,109,891	Young	Sept. 8, 1914
1,307,318	Petersen	June 17, 1919
1,325,377	Richards	Dec. 16, 1919
1,427,257	Bowen et al.	Aug. 29, 1922
1,562,663	Strong	Nov. 24, 1925
1,692,397	Wagner	Nov. 20, 1928
1,721,598	Karrasch	July 23, 1929
1,737,035	Wagner	Nov. 26, 1929
1,762,874	McLind	June 10, 1930
1,808,908	Steinmann	June 9, 1931
1,878,732	Thompson	Sept. 20, 1932
1,998,148	Vieru	Apr. 16, 1935
2,011,254	Nightingale	Aug. 13, 1935
2,035,019	Osborn	Mar. 24, 1936
2,043,704	McPherren	June 9, 1936
2,065,414	Adams	Dec. 22, 1936
2,119,369	Twining	May 31, 1938
2,142,450	McDonnell	Jan. 3, 1939
2,185,235	Swanson	Jan. 2, 1940
2,272,522	Hojnowski	Feb. 10, 1942
2,300,268	Stuart	Oct. 27, 1942
2,312,624	Caldwell	Mar. 2, 1943
2,328,786	Crowder	Sept. 7, 1943
2,338,420	Freitag	Jan. 4, 1944
2,397,632	Stuart	Apr. 2, 1946