

ABSTRACTS OF PATENT SPECIFICATIONS.

(Specially abstracted for the Journal by W. O. Manning, F.R.Ae.S.)

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AEROPLANES—CONSTRUCTION.

465,246. *Improvements relating to Metal Aeroplane Bodies.* Messerschmitt, W., Hannstetterstrasse 118a, Augsburg, Germany. Convention date, Germany, Dec. 9th, 1935.

The proposed body consists of a number of sections fitted into each other, each alternate section having each of its ends inwardly flanged, for stiffness, overlapped by the smooth ends of the intermediate sections. Each section is so shaped that the complete fuselage is of normal form.

467,153. *Improvements in and relating to Cockpit Covers for Use on Aircraft, Motor Boats and Ships, and in Similar Positions.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex; Lobelle, Ludlow, 298, Langley Road, Langley, Bucks; Rees, E., Badgercroft, 8, St. Anselm's Road, Hayes. Dated Dec. 7th, 1935. No. 34,442.

The cover when closed forms a continuation of the surrounding part of the body. It has pivoted to it and to the body two pairs of links of different length so that when the cover is raised about a virtual pivot its inclination is controlled by the links. A spring device is used to balance air pressure.

466,664. *Improvements in and relating to the Arrangement and Construction of Rudder and Tail Plane Unit of Aeroplanes or Other Aircraft.* Martin, J., Higher Denham-sur-Uxbridge, Middlesex. Dated Dec. 2nd, 1935. No. 33,338.

It is proposed that the rudder be formed as a continuation of the fuselage section, the forward end being radiused to fit into the fuselage so that there is no gap. The tailplane and elevator are arranged forward of the rudder and are relatively high up so that there is no interference and that the elevator need not be split. The tailplane is streamlined into the fuselage.

- 466,665. *Improvements in and relating to the Construction of Aircraft Wings.* Baynes, L. E., 144, Cromwell Road, South Kensington, London, S.W.7. Dated Dec. 3rd, 1935. No. 33,507.

This specification describes a form of wing spar. The spar proposed is rectangular, formed of four corner longerons with cross-pieces and is covered on all four sides by a sheet material.

- 466,709. *Transverse Driven Bodies.* Zugler, J. F., Haas Columbia, Portschach-on-Worthersee, Austria. Convention date (Germany), Nov. 27th, 1934.

The aeroplane wings proposed consist of an outer portion of aerofoil sections and an inner portion fixed in a hollow in the outer portion. It is claimed that the arrangement increases lift and does not increase, or may even reduce drag. The top and bottom surface of the outer portion have gaps and the upper part of the surface may be scaly so the outlets of the channels in this surface may be enlarged by the effect of the under pressure during slow flying.

- 465,733. *Improvements in Windscreens for Aircraft.* Vickers (Aviation), Ltd., and Wallis, B. N., both of Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated Nov. 12th, 1935. No. 31,266.

It is proposed to provide a combined windscreen and cockpit cover comprising a single part hood shaped in plan so as to correspond with the opening in the cockpit and to cover this opening. It is to be shaped longitudinally and transversely to an arcuate form, and means are provided for mounting the hood so that it can be turned as a whole forwards about a lateral axis into a position in which it forms a convex windscreen.

- 467,302. *Improved Construction of Wing or Controlling Surface for Aircraft.* Dr. Karl Michaelis, 'T Hoenstraat 9, Den Haag, Holland. Convention date (Germany), June 9th, 1936.

In order to produce a plywood wing which has an unobstructed space for the accommodation of fuel machinery, etc., and also to enable the skin to withstand higher compression stresses, it is proposed to form the skin of the wing from two separated sheets of plywood each conforming to the desired section. The two sheets are connected by corrugated plywood fastened to each.

- 463,498. *A Steel Covering for Light Structures.* Tichy, R., 2 ul. V. Vejvodu, Prague I, Czechoslovakia. Dated Jan. 16th, 1936. No. 1,475.

In order to prevent buckling of thin covering sheets and to provide sufficient strength it is proposed that the covering sheets are to be grooved and that tension cables are to be inserted in the grooves. The cables may be tightened by turnbuckles in the usual manner.

- 464,249. *Improvements relating to Metal Aeroplane Bodies.* Messerschmitt, W., Hannstetterstrasse 118a, Augsburg, Germany. Dated Aug. 24th, 1936. No. 23,233.

In the body proposed the hull sections which are arranged end to end with their edges flanged are each bent inwardly at one end only of the section, this end being overlapped by the adjacent section. The profile stiffening members pass through openings in the edges of the sections.

- 467,670. *Improvements in Aircraft.* Garden, A. D., 58, Gloucester Terrace, Hyde Park, London, W.2. Dated Dec. 14th, 1935, No. 34,736; Dec. 20th, 1935, No. 35,281; and July 17th, 1936, No. 19,833.

In order to facilitate the loading and unloading of aircraft it is proposed to shape the rear of the fuselage so that, when resting on the ground, it forms a

ramp or runway for the loading of goods. Alternatively a flat platform may be hinged to the underside of the fuselage, mechanism being provided for lowering it so that it may be used as a ramp.

AEROPLANES—GENERAL.

452,053. *Improvements in and relating to Aircraft.* Malcolm, A., 66, South Street, Perth, Scotland. Dated Feb. 26th, 1935.

This specification describes a flying machine shaped somewhat like a snowshoe. It has hinged wings movable on the principle of a venetian blind. There are four propellers which are capable of swivelling so as to propel or lift.

452,116. *Improvements in Aeroplanes having a Variable Lifting Surface.* Geren, J., 24, rue de la Tourelle, Boulogne-sur-Seine (Seine), France. Convention date (France), Feb. 20th, 1934.

The variable lifting surface is given by the movement along fixed planes of flexible surfaces mounted on operating drums and provided with ribs pivotally connected together and movable transversely of fixed planes in order to extend the latter in front of and behind the fixed plane.

464,502. *Atmospheric Pressure De-Equaliser or Mechanical Balloon for Use in Giving Buoyancy and Lateral Propulsion to Air and Under-Water Vehicles.* Quest, O. K., West, 409, Second Avenue, Spokane, County of Spokane, Washington, U.S.A. Convention date (U.S.A.), March 2nd, 1935.

This specification describes a species of centrifugal blower which is used to centrifugally expel air, creating a vacuum which gives lifting power enabling air vehicles to rise.

463,881. *Improvements in or relating to Dirigible Craft such as Ships, Aircraft and the Like.* Kresel-Williams, G. H., Calle Corrientes 345 (altos), Rosario de Santa Fe, Argentina. Dated Oct. 29th, 1935. No. 29,850.

This arrangement is designed to make use of the fluid flowing relatively to the craft due to its movement to assist the propulsion. Conduits are arranged from the exterior of the craft to the rear, so that fluid can pass; there is a pump to assist the inflow of the fluid. Turbines may be fitted in the conduits to operate auxiliary propellers.

464,515. *Flying Machine.* Swingle, E. L., 23, High Street, Brentford, Middlesex. Dated Nov. 14th, 1935. No. 31,508.

It is proposed to construct flying machines of a lightness and shape so that they will readily start almost perpendicularly without having to travel over the ground for any great distance. To accomplish this the machine has a tilting frame extending across an oblong frame and carrying lifting propellers, and two adjustable wings, one in front of and the other behind the tilting frame, or the wings may be replaced by two tilting frames. It has also two steering propellers one behind the other which are carried in a rudder or a tilting frame.

AEROPLANES—WINGS.

468,149. *Improvements in Devices for Increasing the Lifting Power of the Wings of an Aeroplane.* Caproni, G., 4, Via Durini, Milan, Italy. Convention date (Italy), April 24th, 1935.

This is a device intended to improve the aerodynamical efficiency of wings, and particularly to improve their lifting efficiency. A drag-producing element is pivoted at or near the trailing edge of the wing and may be moved upward or downward by the pilot. There is a space between the element and the wing through which an air current passes either upward or downward when the element

is moved. The element may be in the form of a round rod, or its section may be triangular, aerofoil, or rectangular.

464,607. *Improvements relating to Aeroplanes, Seaplanes and the Like.* Owen, B., 779, Colombo Street, Christchurch, New Zealand. Convention date (New Zealand), June 13th, 1935.

This specification relates to aeroplanes having one or more pairs of wings in addition to the normal wings, such wings being arranged to project laterally from the fuselage. Each such wing terminates at its root in an arm extending in-board and having its extremity mounted in a universal joint at a fixed point, said arm being drivably and non-rotatably received in a member disposed longitudinally in the fuselage and having at its forward end a bearing with a crank or eccentric fixed on a rotatable shaft, the rear portion being supported by a pivoted guide. On this guide the member is adapted to longitudinal sliding movement with up and down rocking movement.

468,365. *Improvement in Means for Damping Vibrations of Aircraft Fixed Wings or Supporting Surfaces having a Limited Pivotal Movement.* Rouy, A. L. M. A., 42, Rue de Dantzig, Paris (Seine), France. Convention dates (Luxembourg), Dec. 29th, 1934, and May 8th, 1935.

In order to damp vibrations it is proposed to use reciprocal inertia masses with a frequency as near as possible to that of the parts concerned and which are capable of doing sufficient work to destroy the vibratory energy at each pulsation.

ARMAMENTS.

467,485. *Improvements in and relating to Turret or Cupola Mountings for Guns and Other Instruments in Aircraft, Particularly Aeroplanes and Other Vehicles.* Nash, F. A., Oakcroft Road, Kingston By-Pass, Tolworth, Surrey. Dated Sept. 13th, 1935. No. 25,502.

The turret proposed has a dome which is adapted in use to extend over and protect the gunner. There is a second portion which can be retracted within the first portion. This second portion is connected to the gun so that it will be moved with it, extending or retracting according to the gun position.

464,691. *Improvements in the Mounting and Employment of Guns on Aircraft.* Short Bros., Ltd., and Gouge, A., both of Seaplane Works, Rochester, Kent. Dated Oct. 22nd, 1935. No. 29,119.

The arrangement proposed is intended to enable larger guns than the .303 to be used without seriously affecting the pitching of the aircraft. A flying boat may be provided with one or more central guns adapted to fire downwards and arranged so that when firing directly downwards the recoil is directed towards the centre of gravity of the machine. The apertures can be closed in a water-tight manner. It is stated that the ideal position for such a gun is the centre of gravity of the aircraft, this position not being normally possible it is proposed to bring the gun as near to it as is possible.

CONTROL OF AEROPLANES.

467,357. *Improvements in or relating to Aeroplane Wings and Propellers.* Charpentier, J. F. G. M. L., 5, rue Talière, Saint Cloud (Seine et Oise), France. Convention date (France), March 2nd, 1936.

The wings or propeller blades are fitted with one or more narrow solid conical tips, the general direction of which are contrary to the direction of motion of the wing; the tips have a cross-section which decreases gradually to zero at the free end. The object of the arrangement is to guide the air eddies to the rear of the wing and to limit their movement so as to suppress interaction between the flows

to the rear of the trailing edge. There is a mathematical discussion of the principles involved.

464,548. *Improvements in and relating to Dual Control Arrangements for Aeroplanes.* Junkers, Flugzeugwerk, Aktiengesellschaft, 40, Junkerstrasse, Dessau, Anhalt, Germany. Convention date (Germany), July 2nd, 1935.

The entire control system is divided into halves which are independent of each other, but which can be operated simultaneously from either control post. Clutches arranged to be operated singly are interposed between identical actuating members of the halves of the control mechanism.

466,800. *Improvements in or relating to the Control of Wing Flaps on Aircraft.* Hamilton Motors, Ltd., and Theed, W. D. L., both of 466-490, Edgware Road, London, W.2. Dated Dec. 5th, 1935. No. 33,735.

It is proposed to control wing flaps from the suction in the induction pipe of the motor. A pneumatic servo motor is provided with a double acting cylinder and piston with a manually controlled valve for controlling the communication between the cylinder and induction manifold. There is also a servo cylinder so that the flaps may be set or maintained in any desired position.

466,462. *Improvements in Devices for Operating the Control Surfaces of Flying Machines.* Potez, H. C. A., Meaulte (Seine), France. Convention date (France), Oct. 25th, 1935.

This is a safety device for operating the control surfaces of aircraft. To the controls themselves an inertia device, consisting of a weight and a lever, is connected by spring means, so that if the pilot should hold the control in a fixed position the action of the inertia will move the control surfaces in a direction reducing the accelerations produced.

463,983. *Device for Stabilising Apparatus for Aerial Navigation.* Oehmichen, E. E., Rue de Graviers, Valentigney (Bombs Department), France. Convention date (France), Oct. 31st, 1934.

An aircraft of the helicopter type is to be fitted with an envelope partly or completely closed, containing air, the centre of volume of the aircraft being distinct from the centre of gravity and located above the same. The machine is to be characterised in that surfaces offering aerodynamic resistance to horizontal flight are disposed below the centre of gravity but so positioned that the resistance of the air to fore and aft and lateral movement is as near as possible to the centre of gravity of the aircraft. The object of the arrangement is to obtain stability in flight.

465,131. *Trimming Devices for Aircraft Flying Controls.* Vickers (Aviation), Ltd., Pierson, R. K., and Firman, R. A., all of Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated Nov. 1st, 1935. No. 30,206.

This is a device for operating flaps on the main control surfaces, such as the rudder and elevator, for the purpose of trimming the aeroplane. It enables both trimming devices to be set by a single lever and also allows instructive operation. The lever operates the controls by being adjustable in two directions, each direction operating one of the controls.

465,586. *Improvements in or relating to Aircraft.* Walker, G. E., Lynwood, Wood Lane, Sheffield, 6. Dated Aug. 6th, 1935. No. 13,374.

This specification relates to flap controls for the wing tips or tailplane which are operated about pivot axes, which converge towards the direction of flight

and such flaps forming continuations with the leading edges of the wings or tailplane to constitute overlapping tips thereto, and are movable to operative positions in which they extend above and below the level of the wing or tailplane.

468,559. *Improvements relating to Means for Controlling Aeroplanes when in Flight.* Pitt, H. L., 374, Southbourne Grove, Westcliff-on-Sea, Essex. Dated Oct. 7th, 1935. No. 27,683.

It is proposed to provide control surfaces for aeroplanes, each of which is not greater in area than half the wing and which is mounted in an orifice in the wing. The surface can be turned on an axis directed forward and inclined to the longitudinal axis at an angle less than 90° . When turned, the leading edge projects downwards and forwards, the trailing edge projects upwards and rearwards.

468,062. *Improvements in or relating to Elevation Control Mechanism for Aircraft.* Heinkel, E., Dr. Eng., Seistrasse 15, Warnemunde, Germany. Convention date (Germany), Dec. 1st, 1934.

It is proposed to provide means sensitive to the angular correlation of the aircraft so that the movements of the elevators may be controlled in such a way so as to prevent excessive stresses being produced in the aircraft structure. The means proposed consist of resiliently controlled masses, mounted remote from the C.G. of the aircraft which may have an auxiliary elevator controlled by the masses.

468,331. *Improvements in or relating to Aircraft.* Saulnier, R., 5, Rue de Monceau, Paris, France. Dated Nov. 9th, 1936. No. 30,524.

It is proposed to provide friction bearings for the hinges of control members of aircraft which will exert a braking action upon the bearing; these friction bearings can be the entire supports of the control members or in combination with normal bearings. The bearing is provided with a shoe moving radially which is forced against the bearing by a spring, the whole being enclosed within the wing or control member.

467,969. *Improvements in or relating to Manual Elevation Control Mechanism for Aircraft.* Dr. Ing. E. Heinkel, Seestrassse 15, Warnemunde, Germany. Convention dates (Germany), Nov. 17th, 1934, and Aug. 21st, 1935.

In order to prevent excessive stresses being imposed on the structure of an aeroplane by violent use of the elevator and to permit a larger elevator movement at low speeds and a small movement at high speeds and also to permit the pilot to lift the machine quickly in emergencies, it is proposed to provide elevator control in which initially stressed resilient devices are superimposed in the transmission mechanism between the control column and the elevator. These devices may be so stressed that full control is obtainable at low speeds, while at high speeds the maximum force imposed on the structure may be restricted.

464,184. *Improvements in or connected with Control Surfaces of Aircraft.* Short Bros, Ltd., and Parkes, D. L., both of Seaplane Works, Rochester, Kent. Dated Aug. 7th, 1936. No. 21,785.

This specification refers to a servo flap device. A two-armed lever is mounted inside the control surface, the rear end of which carries a fork which engages a pin on the rear extending arm of the flap. The front end of the lever engages with a pin and a slot to a bracket connected to the wing of the aeroplane.

- 452,047. *Improvements in or relating to Hydraulically Actuated Apparatus and Controls, Particularly for Aircraft.* Automotive Products Co., Ltd., and Brown, F. V., both of Brook House, Langham Street, London, W.1. Dated Feb. 14th, 1935. No. 5,107.

In hydraulic control mechanisms it is proposed to interpose between the master cylinder and the slave cylinder a valve which is controlled by a spring so as normally to assume a position in which operation of the master cylinder tends to move the slave cylinder in a preferred direction, position adjustment of the valve being required for otherwise actuating the slave cylinder. Also the arrangement provides a controlling system comprising a single acting master cylinder, the position of which is associated with a free packing cup adopted to cover a breathing aperture in the cylinder wall at the beginning of its stroke, and a slave cylinder having one boundary of its walling space arranged for limited lost motion.

- 465,891. *Improvements in and relating to Aircraft Controls.* Vickers (Aviation), Ltd., Pierson, R. K., and Firman, R. A., all of Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated Nov. 16th, 1935. No. 31,790.

This specification deals with methods of operating control balancing flaps. The control surface and the flap can be adjusted separately, the flap being connected to tension members which are attached to a fairlead which is held against angular adjustment with the control surface. The distance between the points of connection of the tension members may be varied, the adjustment of the flap relatively to the control surface may be varied. The fairlead may be mounted on a link which has a limited amount of lost motion.

- 467,465. *Improved Mechanism for Actuating the Control Surfaces of Aircraft.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex, and Youngman, R. T., Walcot, Church Crookham, Aldershot. Dated Dec. 13th, 1935. No. 31,602.

The device is described for operating a flap which is of normal aerofoil form and, when not in use, is let into a recess near the trailing edge of the wing. It is supported by two links of differing length pivoted each to the flap and to the wing, the rear link being the longer. When the wing hinge point of the front link is turned the flap is forced below the wing and may take up a range of angles of incidence.

ENGINES.

- 451,918. *Improved Cowling Construction for Aircraft Engines.* Potez, H. C. A., Meaulte, Somme, France. Convention date (France), June 12th, 1935.

In the case of engines mounted in front of the leading edge of a wing it is proposed to use a duct arrangement so that the air escaping from the cowling is deviated from the upper side of the wing. There may be deflecting surfaces between the cowling and the fairing or the ducts may be so arranged that the air cannot escape in the neighbourhood of the leading edge of the wing.

- 463,303. *Oil Coolers for Aircraft.* De Paravicini, T. P., The Old Manor, Abbots Ann, Andover, Hants. Dated Sept. 20th, 1935. No. 26,125.

It is proposed to place an oil cooler in a tunnel in which it is exposed to the airstream after the airstream has been heated by cooling surfaces in order to avoid drag. The heated air supplied to the cooler helps the oil to warm up when the engine is started. If radiator shutters are used in a liquid cooled engine, shuttering will affect both radiator and cooler, helping to keep the oil within temperature limits.

465,640. *Improvements relating to Liquid Coolers for Use on Aircraft.* Serek Radiators, Ltd., Warwick Road, Great Birmingham, 11, and McIntyre, J. T., of the same address. Dated Feb. 17th, 1936. No. 4,748.

This specification describes the combination of a liquid radiator for the engine jacket fluid, and an air-cooled oil radiator arranged transversely across the jacket radiator so that it occupies only a part of the facial or cross-sectional area of the jacket liquid cooler and means whereby the air can be caused to flow in either direction through the oil cooler. The object is to be able to minimise the area of the radiator housing, and to use the oil radiator for either heating or cooling the oil and for heating the carburettor air.

463,303. *Oil Coolers for Aircraft.* de Paravicini, T. P., The Old Manor, Abbots Ann, Andover, Hants. Dated Sept. 20th, 1935. No. 26,125.

It is stated that owing to increased air resistance and blocking by stagnant oil, the usual method of placing aircraft oil coolers externally is objectionable. It is therefore proposed that the air cooler should be placed inside the engine cowling of aircraft in a position where it is cooled by air already warmed by the engine.

463,474. *Cooling of Aircraft Engines.* Sir W. G. Armstrong-Whitworth Aircraft, Ltd., and Lloyd, J., both of Whetley, Coventry, Warwickshire. Dated Aug. 30th, 1935. No. 24,261.

In order to reduce the resistance entailed in cooling an aircraft engine, it is proposed to allow the cooling air to escape by an outlet situated near the trailing edge of the wing. A flap may be used at the outlet to control the air flow and it may be also used as an air brake or lifting flap. The outlet may be near the forward edge of an aileron.

468,578. *Engine Mountings.* Ellor, J. E., Grandell, South Drive, Chain Lane, Mickleover, Derby. Dated March 13th, 1936. No. 7,136.

It is proposed to provide a mounting which will absorb torque reactions and not transfer these to the frame by which the engine is carried. The mounting supports the engine laterally resiliently so that the engine can rock on a longitudinal axis.

468,719. *Improvements in or relating to Aircraft.* Rababel, H. A., 50, Avenue de Wagram, Paris, Seine, France. Convention date (Belgium), March 1st, 1935.

In the case of liquid cooled engines, it is proposed to arrange the radiator in the body of the fuselage behind the motor so that they are both covered by the same streamlined cowling. A number of conduits are provided communicating with the front of the cowling for the purpose of feeding air to the radiator, while at the back of the radiator there is an annular slot in the fuselage to allow the air to escape. In the fuselage behind the radiator there is a cone-shaped member for conducting the air to the slots with little disturbance.

468,281. *Fluid Reaction Propelling Apparatus.* Endron, H., 116, Kullerstrasse, Solingen, Germany, and Bachmann, E., 1106, South Ogden Drive, Los Angeles, California, U.S.A. Convention date (Germany), Nov. 26th, 1935.

It is proposed to utilise the speed energy of a driving stream producing reaction pressure in such a manner that a number of compression devices are provided for the production of the driving stream producing the reaction pressure, the compression chambers of these devices terminating in a common discharge nozzle forming the first nozzle of a set of nozzles and the vacuum forces produced by the driving stream in the set of nozzles acting as driving forces upon the compression devices and being thereby utilised for production of the driving stream.

467,989. *Fluid Reaction Propelling Apparatus.* Endres, H., 116, Kullerstrasse, Solingen, Germany, and Bachmann, E., 1106, South Ogden Drive, Los Angeles, California, U.S.A. Convention date (Germany), Dec. 31st, 1934.

It is proposed to arrange that the propelling jet compressors are arranged in the direction of the relative wind so that air under aerodynamic pressure is admitted to them. The compressors may be arranged in the fuselage or hull near the front with their axes parallel to and on a circle about the ball axis. The compressors may also be arranged in the supporting surfaces of an aeroplane. Funnel-shaped admission ports may be used.

464,348. *Improvements in Intercoolers for Superchargers of Internal Combustion Engines.* Ellor, J. E., Grandell, South Drive, Chain Lane, Mickleover, Derby. Dated Oct. 24th, 1935. No. 29,396.

The proposed intercooler is mounted in a duct opening in the direction of motion of the aeroplane, the duct being so shaped that kinetic energy is converted into pressure energy before the cooler, the reverse taking place afterwards when the air is discharged. The cooler and the duct are accommodated inside the cowling. The size of the duct entrance may be varied.

468,064. *Improvements in Air Supply to Carburettors of Internal Combustion Engines for Aircraft.* Ellor, J. E., Grandell, South Drive, Chain Lane, Mickleover, Derby. Dated Nov. 26th, 1935. No. 32,746.

Means are provided for supplying the air to the carburettor either from the external air stream, or from the rear of a radiator tunnel. Various connections are provided with flap valves so that any combination of warm or cold air can be provided.

468,206. *Improvements in or relating to the Mounting of Internal Combustion Engines.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex, and Forsyth, Venlaw, Burden Lane, Cheam, Surrey. Dated Jan. 31st, 1936. No. 9,424.

The proposed mounting consists of plates shaped like obtuse triangles lying in planes which diverge from the longitudinal axis of the crankcase or from lines parallel with said axis. Each plate is connected by one side to the crankcase and is connected at the point of convergence of the other two sides with projections from the corners of the front end of the fuselage.

HELICOPTERS.

468,063. *Improvements relating to Aircraft.* Myers, G. F., 3516, 80 Street (Jackson Heights, L.I.), City and State of New York, U.S.A. Dated Nov. 23rd, 1935. No. 32,534.

It is proposed to provide an aircraft capable of flying like an ordinary aeroplane, but provided with a variable pitch propeller capable of moving to negative pitch. It has landing wheels and tail wheel. The propeller contains weights which are movable radially, the cords controlling these weights being wound on a power-driven drum. It is claimed that the machine will fly like a helicopter.

468,241. *Improvements in or relating to Aircraft.* Charuvy, I., Queen Mary College, University of London, Mile End, London, E.1. Dated June 13th, 1936. No. 1,055.

In order to produce vertical lift it is proposed to compress air in two stages and deliver it in the form of one or more jets against a vane on the underside of a wing or aerofoil on the aircraft. Alternatively air may be withdrawn from above the wing by a fan and delivered into the compressor, the air being then delivered through a nozzle which is adapted to expel it in an annular stream so

as to flow along the undersurface of a vane arranged on the underside of the wing.

- 468,186. *Improvements in and relating to Helicopters.* Gourlay, G., 883, Janette Avenue, Windsor, Ontario, Canada. Dated Nov. 12th, 1936. No. 31,120.

It is proposed to devise a helicopter of the type which will ascend vertically from the ground. The propulsion means consist of a motor and a pair of propellers rotating in opposite directions. The propellers have curved blades with oppositely disposed parallel cutting edges. There is also vertical rotatable propulsion means. The vertical and horizontal propulsions are effected independently by separate belt pulley drives operable from the cabin.

ICE FORMATION.

- 453,825. *Method of and Means for Warming the Wings and other Parts of Aeroplanes.* Schmid, F., Eiken, Aargon, Switzerland. Dated June 8th, 1935. No. 1,257.

It is proposed to cowl the engine exhaust manifold and to conduct the heated air into the interior of the wing along the nose. In order to conduct the maximum amount of heat to the air a number of skeletons or spiders are provided, made preferably of copper strip bent to shape. The duct in the wing may have a number of apertures graduated in size so as to warm the wing in a uniform manner.

MISCELLANEOUS.

- 465,832. *Improved Means for Moving One Body Relatively to Another.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex; Lobelle, M. Z. O., 298, Langley Road, Langley, Bucks; and Voss, E., Broome House, Bowley Road, Hayes, Middlesex. Dated Dec. 5th, 1935. No. 33,758.

This specification describes a means for raising one body relatively to another by means of the employment of Watts parallel motion at each end of one of the bodies. The arrangement is proposed for use in military aircraft where retractable units such as gun mountings are normally employed. It is proposed that these units should be fixed and the portions of the fuselage surrounding them should be retracted.

- 463,196. *Improvements relating to Apparatus for Signalling from or for Display Purposes on Aircraft.* Rangare, A. R., 3, Smith Street, Chelsea, S.W.3. Dated Sept. 23rd, 1935. No. 26,358.

In order that a banner towed by aircraft may fly vertically it is proposed to have a movable weight on the leading tow bar which, as the banner lifts, moves towards the lower part and causes the banner to fly vertically. The arrangement also allows the banner to be taken from the ground horizontally and allows it to assume a vertical position gradually.

- 466,959. *Improvements in Propelling Devices.* Societe Coanda, 10, Rue Bardin, Clichy (Seine), France. Convention date (France), Jan. 15th, 1935.

The propelling device operates by creating a depression in front of the body to be propelled by discharging a compressed fluid through a narrow slot formed in said body and causing the fluid to escape along a surface of chosen contour.

466,960. *Improvements in Propelling Devices for Aircraft, Road and Other Vehicles.* Societe Coander, 10, Rue Bardin, Clichy (Seine), France. Convention date (France), Jan. 16th, 1935.

In this specification the propulsion is effected by fluid under pressure, comprising an elongated cylinder having a narrow longitudinal slot through which the compressed air escapes. The slot has a rear wall extended to form a curved surface receding progressively from its axis and so arranged that the line of the surface on the opposite side of the slot intersects the curved surface of the rear wall of the slot near the outlet of the slot.

466,445. *Improvements in Land or Water Vehicles.* Borrmann, W., and Keune, A., Badersleben, Oschersleben, Germany. Dated May 16th, 1936. No. 13,926.

This specification describes a vehicle shaped approximately like an aeroplane and intended for amusement. It has very small wings, has an engine and propeller, normal aeroplane tail unit and is a low wing monoplane. There is a central wheel and tail wheel and a wheel or skid in each wing. In action it is stated that high speeds can be attained owing to the wing taking much of the weight.

467,486. *Improvements relating to Undercarriages for Aircraft.* Fande, F., 5, Bahnhofstrasse, Kronberg, Frankfurt-on-Main, Germany. Convention date (Germany), Jan. 28th, 1935.

The arrangement described shows a shock-absorbing strut in three parts, one connected to the wheel, a middle part carrying shock-absorbing apparatus, and a third attached to the fuselage. Back, upper and lower part are capable of shock-absorbing movement with respect to the middle part. The middle part is guided, possibly by a hinged link, to move outwards on the occurrence of a shock, and it is stated that, in action, the landing device is able to move in a plane parallel to the plane of symmetry of the aircraft.

464,404. *Pneumatically Operated Game Apparatus.* Burke, R. J., and Burke, M. L., both of Altadena, Los Angeles, California, U.S.A. Dated Oct. 14th, 1935. No. 28,294.

This specification proposes a game depending on a device whereby a model aircraft is caused to move over a map of the world and in which the model may be suspended over the map by concealed jets of air.

PARACHUTES.

466,089. *Improvements in Parachutes.* Rousselot, M., 98, Rue Erlanger, Paris, France. Convention date (France), Nov. 29th, 1935.

The arrangement described is intended to avoid untimely opening of parachute bags. The bag consists of a back and a flap, the flap when the bag is closed being connected to the back by a number of closing strings independent of each other and which can be severed by a cutter. The cutters are controlled by braids of unequal length attached to the cable connecting the pilot. The cutters consist of a small plate perforated with an elongated opening, the middle part of which is constricted, whilst one of its ends has a cutting portion.

467,884. *Improvements in and relating to Parachutes.* Mastrosanti, R., 50, Avenue des Temes, Paris, France. Convention date (France), Oct. 24th, 1935.

The sustaining surface of the proposed parachute has two concentric portions connected at their adjacent edges to create a central chamber and a peripheral chamber, each fully open on the underside and so formed as to comprise vents or escapes for the imprisoned air at the top, the sustaining cords being attached to each portion.

PILOTS AND PILOTING.

463,957. *Instructional Device for Aircraft Pilots.* Kronfelt, R., London Air Park, Feltham, Middlesex. Dated Oct. 5th, 1935. No. 27,573.

This is an instructional aircraft which can be propelled over the ground, but which is or may be made incapable of constant flight. It is, preferably, in the form of a high wing monoplane and has a complete normal control system, but its movement about any axis is constrained elastically. This elastic constraint is adjustable.

ROTOR CRAFT.

467,589. *Improvements in and relating to Rotary Wing Aircraft.* Coats, A. G., Gloucester House, Park Lane, London, W.1, and Hafner, R., Mantlergasse 47, Vienna, 13, Austria. Dated Dec. 19th, 1935. No. 35,248.

In rotary wing aircraft with pitch controlling mechanism resilient stabilising means are used acting on the rotor system tending to maintain a predetermined pitch and a pitch varying member for varying the pitch against the resilience of the stabilising means. As the gear has a low mechanical advantage large changes of pitch may be made instantaneously by the pilot.

465,408. *Improvements in or relating to Power Transmission Mechanism.* Propello Inventions, Ltd., 105, Cheyne Walk, Chelsea, London, S.W.10, and Yoxall, J., York House, Deganwy, N. Wales. Dated Nov. 1st, 1935. No. 30,267.

This is a coupling arrangement for the rotors of aircraft with rotating wings. It is intended for quick engagement and disengagement and consists of a friction or dog clutch operated by fluid pressure acting through an extensible bellows and arranged in series with a fluid coupling.

467,980. *Improvements in and relating to Aircraft having Freely Rotative Wings.* de la Cierva, J., Bush House, Aldwych, London, W.C.2. Dated Dec. 23rd, 1935. No. 35,539.

In autogiro aircraft in which the rotor is initially speeded up by means of a starter mechanism when the pitch is zero and in which the machine is caused to jump off the ground by disconnecting the mechanism and increasing the pitch manual control means are used operating on the clutch and pitch varying mechanisms permitting full operation of each mechanism without varying the other, and arranged to prevent conjoint operation of both mechanisms by one simple manual movement by the pilot.

464,293. *Improvements in Rotary Blades or Wings for Aircraft.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2, and Bennett, A. J., 67, Grove Way, Esher, Surrey. Dated Oct. 15th, 1935. No. 28,457.

This specification refers to autogiro blades. In order to increase the torsional stiffness of the blade it is proposed to use a tubular spar of oval cross-section, the major axis being parallel to the chord of the blade and the spar being located near the nose of the section. The spar may be solid drawn or built up and the leading edge of the blade should be covered with a stiff material such as plywood. The tubular spar should not have sharp radii.

468,183. *Improvements in and relating to Aircraft with Rotative Wings.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2. Convention date (U.S.A.), Nov. 13th, 1935.

This specification describes an improved hub gear for autogiro rotors of the type in which the rotor blades have oscillatory movements so as to vary the pitch, and a control is provided for producing a periodic change in the blade pitch.

The blades are mounted on stubs journalled in bearings in a hollow hub member for pitch varying movements, and each stub is in pivotal engagement with an arm extending in the general direction of the axis of rotation permitting relative movement of the stub and arm only in a plane containing the arm and the axis of the stub so that the stub rotates in its bearing and varies the pitch angle of the blade. The several arms are arranged to constitute a parallel linkage, their ends being universally jointed to a member rotatable with the hub and movable at right angles to the rotational axis by non-rotative means. Modifications of the main proposals are described.

453,597. *Flying Machines with Rotary Supporting Surfaces.* Piscara, R. P., 115, rue de la Tour, Paris (Seine), France. Convention date (France), Feb. 6th, 1934.

The machine proposed has a stationary supporting surface and a rotor of the freely rotating type having adjustable blade length, the blades being flexible, the arrangement being such that at their shortest position the rotor will auto-rotate. The blades may slide longitudinally in the hub or they may be wound on to and unwound from rollers.

SEAPLANES AND FLYING BOATS.

464,408. *Improvements in or relating to Wing Tip Floats.* The Supermarine Aviation Co. (Vickers), Ltd., and Kimber, W. G., both of the Company's Works, Woolston, Southampton, Hants. Dated Oct. 16th, 1935. No. 28,585.

It is proposed to use wing tip floats of aerofoil section which are maintained when operative at a positive angle to the wing. The outer end of the float may be higher than the inner. By means of a system of links the float may be folded into a recess in the wing.

465,627. *Improvements in or relating to Flying Boats.* Blackburn Aircraft, Ltd., and Rennie, S. D., both of Seaplane Base, Brough-on-Hull, East Yorks. Dated Dec. 31st, 1935. No. 36,054.

In order to prevent damage to the tail members of flying boats it has been usual to make arrangements to carry these members at some height above the water. It is claimed that the proposed method, of giving the tailplane a pronounced dihedral angle and arranging that its projection each side of a hull which projects straight back, has advantages not possessed of the usual layout.

UNDERCARRIAGES.

463,739. *Improvements in Retractable Landing Gear or the like for Aircraft.* The Bristol Aeroplane Co., Ltd., and Frise, L. G., both of Filton House, Bristol, Gloucestershire. Dated Nov. 4th, 1935. No. 30,494.

This is a retractable undercarriage arranged so that the wheel folds backwards. The member of the undercarriage which extends rearwards and upwards is arranged so that its upper end slides in a guide when being retracted. When in the non-retracted position this portion fits into a portion of the guide which is sharply curved so as to act as a lock. Arrangements are made for the operating jack to move the upper portion of the rear support out of this sharply curved part of the guide before retraction.

463,807. *Improvements in or relating to Retractable Landing Gear and the like for Aircraft.* The Bristol Aeroplane Co., Ltd., and Frise, L. G., both of Filton House, Bristol, Gloucestershire. Dated Nov. 6th, 1935. No. 30,731.

In this case the gear can be arranged to fold the wheel backwards or sideways.

the other end to the aeroplane. A jack has its plunger rod connected near the upper end of this upright, while a collapsible strut connects the lower end of the upright with the middle of the body of the jack. By means of an angular linkage the joint of the folding strut is broken in the act of retraction.

467,424. *Improvements in and relating to Aeroplanes and Particularly to the Mounting of Tail Wheels or Tail Skids Thereon.* Percival, E. W., 20, Grosvenor Place, London, S.W.1. Dated Dec. 16th, 1935. No. 34,829.

In order that the tail skid or wheel of an aeroplane may return to the in-line positions, where the supporting device can swivel in a bearing, it is arranged that the upper end of the fork carrying the wheel is fitted with two or more pins at some distance apart which are acted on by spring controlled plungers. These plungers force the pins and the fork into the desired position.

465,278. *Improvements in Retractable Landing Gear and the Like for Aircraft.* Bristol Aeroplane Co., Ltd., and Frise, L. G., both of Filton House, Bristol. Dated Nov. 4th, 1935. No. 30,495.

This arrangement is primarily intended for the retraction of tail wheels and consists of a rotatable crank engaging with a rotatable link, the axes being spaced by a distance greater than the length of the crank. The point of attachment of the end of the crank with the link is movable lengthwise of the link, the effective length thereof is therefore variable. It is said that in this arrangement it is irrotatable in certain positions. This apparatus is made use of for retracting the wheel.

465,389. *Device for the Safe Landing of Air Vehicles.* Level, T. E., 129, 79th Street, Niagara Falls, New York, U.S.A. Dated Aug. 6th, 1936. No. 21,636.

The gear proposed has air-compression cylinders secured to the fuselage, the pistons being connected to the chassis, air-operated means carried by the landing gear and connected with the brakes, a conduit connection with the air-compression cylinders with a valve adapted to simultaneously control the exhausting of air from the cylinders and the feeding of air to the air-operated means.

453,797. *Improvements in Brake Operating Mechanism for Aircraft.* Bendix, Ltd., King's Road, Tyseley, Birmingham, and Hall, P. E., of the Company's address. Dated July 10th, 1935. No. 19,681.

The brakes can be applied equally from a hand control or differentially from a rudder bar being brought into connection with the rudder bar by a preliminary movement of the hand control. A cable from the hand control is coupled to one end of a lever pivoted at its other end in a light skeleton framework or cage which can be secured to the machine. On the lever there are two coaxial pulleys and cables from the brakes are carried round these in opposite directions, their ends being secured to points on opposite sides of a rocking bar pivoted about its centre in the cage and coupled to the rudder bar by rods or cables so that it moves with the rudder bar. To apply the brakes equally the cable from the hand control is tensioned and swings the lever carrying the pulleys so that the cables leading to the brakes are equally tensioned; if the rudder bar is now operated the brakes are applied differentially. When the hand control is in the off position there is sufficient slack in the cables to allow the normal movements of the rudder bar for controlling the rudder in flight to take place without operating the brakes.

- 463,235. *Improvements in and relating to Vehicles for Railless Traffic.* Sebek, R., Machern Bezirk, Leipzig, Germany. Dated Aug. 15th, 1936.

This specification refers to a method of arranging the wheels of vehicles so that they may negotiate, it is claimed, unevenness of the ground without appreciable shock. For this purpose the wheels are arranged one after another in a laterally staggered position, each being secured to the ends of a lever, the centre of which can pivot.

- 463,159. *Carriages for Vehicles Moved Principally in One Direction.* Montrose-Oster, L. E. W., C.901, Karlsbad, Czecho-Slovakia. Convention date (Germany), July 8th, 1935.

This specification describes a method of springing vehicles in which each wheel hub is connected to a bell crank lever hinged on the vehicle frame. The other end of the lever is attached to a horizontal flat spring, the other end of which is connected in a similar way to the bell crank lever of the opposite wheel.

- 463,346. *Fluid Pressure Apparatus for Brakes.* Dunlop Rubber Co., Ltd., 32, Osnaburgh Street, London, N.W.1; Wright, J., and Trevaskis, H., both of the Company's Works, Fort Dunlop, Erdington, Birmingham. Dated Feb. 28th, 1936.

In fluid pressure brakes for aircraft comprising a pair of reduction valves controlled by the steering mechanism and connected to a source of fluid under pressure and to a pair of brake operating mechanisms it is proposed to connect means for increasing the pressures released by the reduction valves. The apparatus proposed consists of two cylinders of differing bore, the pistons of which are connected together.

- 463,401. *Improvements relating to Aeroplane Landing Gear.* Cowey, L. E., 4, High Park Road, Kew Gardens, Surrey, and Engster, E. S. P., The Green House, Sonning, Berks. Dated July 23rd, 1935, No. 20,900, and Jan. 9th, 1936, No. 763.

In the case of an aeroplane with a normal chassis it is proposed to fit a third wheel behind the main chassis supported by struts at such a position that the machine adopts on the ground an attitude similar to that of normal flight. Thus additional chassis may be retractable and may be fitted with a skid in place of a wheel.

- 465,714. *Improvements in and relating to Tail Skids or Tail Wheels for Aircraft.* Elektronmetal G.m.b.H., Pragstrasse 26, Stuttgart-Bad Camstalt, Germany. Convention date (Germany), Dec. 4th, 1935.

In a tail wheel or skid for aircraft it is proposed to oppose a resilient resistance to lateral movement due to lateral shocks. It is proposed to use a hydraulic method of control and arrangements are made so that the tail unit may be stationary or swingable with a limited deflection or freely swingable, the type of mounting desired in each individual case being adjustable from the pilot's seat.

- 468,565. *Improvements in or relating to Aircraft.* Westland Aircraft, Ltd., Yeovil, Somerset, and Petter, W. E. W., and Davenport, A., of the Company's address. Dated Jan. 7th, 1936. No. 546.

In the case of aircraft in which the chassis is not folding, it is proposed to construct the chassis with a curved member, resembling an inverted U, the ends of which carry the wheels, while the curved portion passes through the fuselage. The member is constructed either by extended light alloy or it may be built up; it may be faired in and bomb racks may be attached to it. Machine guns may be mounted on it.

464,144. *Improvements in Retractable Landing Gear and the Like for Aircraft.* The Bristol Aeroplane Co., Ltd., and Ponting, R., both of Filton House, Bristol. Dated Nov. 6th, 1935. No. 30,733.

This specification refers to landing gear in which catches are provided to lock the gear in the open and retracted position and refers to means intended to prevent power being applied while the gear is locked by providing a valve arrangement which cuts off the hydraulic power except when the catches are disengaged. The gear proposed consists of a cylinder containing three pistons spaced apart, the cylinder contains seven ports.

468,092. *Improvements in or relating to Retractable Undercarriages for Aircraft.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Ordidge, F. H., 26, Charlton Avenue, Cheadle Hulme, Cheshire.

This specification describes an arrangement stated to be an improvement on Patent No. 450929. The leg is pivotally secured to a bracing strut carrying the wheel, the other end of both leg and bracing strut are mounted on the aircraft structure.

468,256. *Improvement in Means for Folding Elbow Stays for use more especially with Retractable Landing Gear for Aircraft.* Thornhill, P. W., 32, Heath Terrace, Leamington Spa, Warwickshire. Dated Feb. 25th, 1936. No. 5,579.

In the proposed arrangement the jack is at right angles to the stay when the latter is open and is situated at the joint. Each half of the stay is pivoted to a projection on the jack, and the piston of the jack carries two links pivoted respectively to the piston and the two halves of the stay. When operated, the links cause each half of the stay to fold in a position roughly parallel with the jack.

468,196. *A System of Retractable Landing Gear for Aeroplanes.* Société d'Inventions Aeronautiques et Mécaniques, S.I.A.M., Route des Alpes, Fribourg, Switzerland. Convention date (France), Nov. 10th, 1936.

This gear is described as an improvement to that claimed in Specification 425,207 and consists of an auxiliary safety device intended to ensure the descent of the landing gear when the energy available in the hydraulic accumulator ceases accidentally to be available. Between the pump and the jack, which is connected to the accumulator, there is provided an auxiliary safety pipe which, normally, is outside the hydraulic circuit, but which can be included in the circuit by means of a cock operated by the pilot.