ABSTRACTS OF PATENT SPECIFICATIONS

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

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Aerodromes

410,265. *Improvements in or Relating to Air Port Constructions.* Wood, J. W., 101, Park Avenue, City and State of New York, U.S.A. Dated January 20th, 1933. No. 1,973.

This specification describes an arrangement of an aerodrome possessing runways running in four directions, hangars, passenger accommodation and parking areas for road transport. The passenger station is arranged to accommodate aeroplanes on both sides, one side being normally for in-going and the other for out-going traffic, and arrangements are made to enable the aeroplanes to be put into position for loading by mechanical appliances and to be transferred from one side of the passenger station to the other. Claims are made for allowing vehicles to enter via a tunnel or bridge for the position of the hangars, the parking space and for intersecting runways, etc.

Aerofoils

409,133. Jutting, B. G., Post Office Box 105, Newton, New Jersey, U.S.A. Dated April 18th, 1933. No. 11,314.

The inventor proposes, instead of a propeller for the propulsion of aircraft, to drive a blower by the engine and to conduct the compressed air to channels on the leading edges of the wings. These channels possess nozzles projecting backward through which the air is emitted above and below the wings. It is stated that the upper surface of the wing is to be cambered, and the lower surface flat.

Aeroplanes—Construction

407,009. *Improvements in or Connected with Cantilever Wings for Aircraft.* Vickers (Aviation), Ltd., and Wallis, B. N., both of Weybridge Works, Byfleet Road, Weybridge. Dated September 7th, 1932.

In the case of cantilever wings for aircraft, it is known that the movement of the centre of pressure on the wing when the ailerons are operated produces a torsional force on the wing which tends to produce a torsional distortion, and that this distortion may affect seriously the lateral control. In order to obviate this difficulty it is proposed to use a wing, preferably of the single-spar type, which is so arranged that the centre of pressure of the forces caused by use of the aileron lies on or in front of the torsional axis of the wing structure. This is attained by sweeping the torsional axes of the wing structure forward, so that the outer section of the wing possesses a sweep forward. The remainder of the wing may be at right angles to the fuselage, or may also be swept forward or back. Means are described for varying the sweep forward of the wing so that this may be set to the angle found best from experiments with the actual aircraft.

406,908. *Improvements in Aerofoils for Use in the Construction of Aeroplanes and the Like.* Payne, M., 50, Hook Road, Surbiton, Surrey, and Sir J. V. Carden, Tomlin's Cottage, Frimley, Surrey. Dated July 3rd, 1933. No. 18,859.

It is proposed to construct aeroplane wings by moulding a material described as "solidified foam," and it is suggested that rubber or cellulose acetate are suitable materials for this purpose. The skin or outer surface of the wing is to be made continuous and hard, and may be reinforced by metal, by corrugating or by woven fabric.

410,405. *Improvements in and Connected with Aeroplane Wings and/or Tail Sections.* Martin, J., Martin's Aircraft Works, Higher Denham, Bucks. Dated October 20th, 1933. No. 27,090.

This specification describes a method of constructing wings or tail surfaces for aircraft in which the structure is stiffened torsionally by means of cross bracings between the spars. These cross bracings are formed of members of full spar depth and are strongly connected where they cross. These cross members are formed of channel sections when metal construction is used and the general arrangement is stated to have advantages in connection with biplanes. Wood construction may also be used, the disposition of the structural members being similar.

412,232. *Improvements in or Connected with the Construction of Wings for Aircraft.* Vickers (Aviation), Ltd., and Wallis, B. N., both of Weybridge Works, Byfleet Road, Weybridge, Surrey. Dated December 22nd, 1932, No. 36,307, and November 24th, 1933, No. 32,879.

The arrangement of wing described in this specification is of the single spar type, this spar normally consisting of upper and lower members connected by warren bracing. The normal ribs of an ordinary wing are replaced by two sets of ribs running diagonally and interconnected where they cross, these crossing ribs making a diamond pattern on the wing. This construction is claimed to provide torsion bracing and to save weight. It is also stated that the warren bracing of the spar may be omitted, enabling an outer wing to be telescoped within the main wing, thus enabling the total wing area of the aeroplane to be varied. The diagonal ribs, as shown, are without bracing connecting the upper and lower booms. Many constructional details of this type of wing are described.

410,750. *Improvements in or relating to Aeroplane Wings and like Aerofoil Structures.* The Bristol Aeroplane Co., and Pollard, H. J., both of Filton House, Bristol. Dated November 19th, 1932. No. 32,750.

This specification describes a method of bracing an aeroplane wing torsionally. It is proposed to cover the top surface of the wing with sheet metal and to arrange the usual drag bracing between the bottoms of the two spars. Alternatively, the bracing may be carried through between the bottoms of the two spars while other bracing is carried alternatively from the bottom of the rear spar to the top of the front spar, then back to the bottom of the rear spar, etc. The combination of the sheet covering and the bracing is claimed to render the wing stiff torsionally.

411,255. *Improvements relating to Fabric Bodies for Vehicles.* Marsden, L., The Shrubbery, Sir Harry's Road, Edgbaston, Birmingham. Dated March 17th, 1933. No. 8,111.

It is proposed to cover the bodies of vehicles by covering them with fabric and then spraying the fabric with metal. The fabric thus treated may be finished, if desired, by coating with cellulose or other enamel. The thickness of the metal sprayed does not interfere with the flexibility of the fabric.

411,242. *Improvements in or relating to the Construction of Aircraft Wings.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Hollis Williams, D. L., Hillside, Swakeley's Road, Ickenham, Middlesex. Dated February 27th, 1933. No. 5,954.

It is proposed to construct wing spars for aircraft by forming the spar as a laminated structure to the opposite sides of which are secured outwardly-directed flanged marginal elements, of the sections of which the wing proper is composed. A cover plate is provided over the junction of these elements to preserve the continuity of the covering. Provision may be made for water-tight bulkheads in the wing.

412,084. *An Improved Method of Construction of Automobile Bodies and the like, such as Aeroplane and Light Sea Craft.* Boyd, H. B., 72, Hornchurch Road, Romford, Essex. Dated October 18th, 1933. No. 28,760.

It is proposed to construct the bodies of vehicles by making a framework of wood or metal and covering this structure with panels made of bakelite or some similar material, the panels being reinforced with wire gauze, etc. The panels are to be secured to the framework with studs cast in the panels, or nuts cast therein. Rubber pads are introduced for insulation purposes.

408,457. *Improvements in or Relating to Sustaining or Propelling Surfaces, Particularly Aeroplane Wing Structures.* Canova, F. P., 4, Via Mario, Giuriati, Milan, Italy. Convention date (Italy), May 4th, 1932.

In wings of bi-convex section it is stated that there is a lowering of pressure on the underside of the leading edge of the wing. In order to reduce this, it is proposed to blow air out of this part of the wing through holes in the wing, the air being conducted to the holes by an internal duct. The air is supplied through holes in the leading edge of the wing, and arrangements are made by which the quantity of air may be regulated.

Aeroplanes—Control

409,993. *Improvements in Stabilising Devices for Aircraft.* Gianoti, M. I. L., 15, Rue Louis-Phillipe, Neuelley-sur-Seine (Seine), France. Convention date (France), September 30th, 1932.

It is proposed to fit a vane to aircraft in the neighbourhood of and under the main plane, the vane having a negative angle of incidence with a spring tending to increase this negative angle. The vane is therefore forced downward by the air forces when the machine is in flight, but the angle which it would take up is controlled partially by the spring. The inventor states that the variation of the angle such a vane would take up would be in the same direction for an increase of the angle of incidence of the aircraft as for a reduction in the speed of the aircraft and in the other direction for a reduction of the incidence angle or an increase of speed. He therefore proposes to stabilise the aircraft by connecting this movable vane suitably to the elevator. Several methods are described for carrying out and arranging the device.

408,122. *Improvements in or Relating to Hydraulic or Pneumatic Rudder Steering Installations for Air or Watercraft.* Siemens and Halske Aktiengesellschaft, Berlin-Siemenstadt, Germany. Convention date (Germany), November 24th, 1932.

This specification refers to cases where the controls of an aircraft are operated by compressed air or hydraulically, the movement of the controls being effected by a piston in a cylinder, the supply of fluid to which is controlled in its turn by a servo motor apparatus controlled automatically, say by gyroscopic means. The apparatus described is for the purpose of cutting out this control entirely so that the aircraft controls can be operated manually by the pilot. This is effected by arranging a pipe between the two ends of the working cylinder in which is fitted a valve arranged to close automatically when pressure is on, thereby permitting the system to operate with power control. When the pressure is off the valve opens permitting fluid to pass between both sides of the piston and permitting manual control. Arrangements are made by which the pilot can turn off the pressure by means of a cock.

Airscrews

404,817. *Improvements in Apparatus Provided with Dynamic Lifting Surfaces or with Dynamic Lifting Propelling Surfaces, Particularly Aircraft.* Loth, W. A., and Guyot, S. M. H., 26, Avenue Charles, Floquet, Paris, France, and 1, Rue Dante, Paris, France. Convention date (France), February 20th, 1932.

This specification relates to helicopter lifting screws—not only when the screw is used solely for lifting, but also when it is used, in addition, for propulsion, and the stated object of the invention is to increase the lift and propulsion effect of such screws. It is proposed to effect this by providing the upper surfaces of the hollow rotating aerofoils with slots through which air is passed under pressure or by suction. It is proposed to provide the pressure by means of a blower in the hub of the screw, etc., and the suction by providing holes in the extremity of the blade communicating with the hollow interior, by which means it is stated that the air will be sucked out by centrifugal force. Alternatively, it is proposed to provide the rotating aerofoils with slots communicating with both upper and lower surfaces.

Autogiros

410,532. *Improvements in and relating to Aircraft having Rotative Wings.* J. de la Cierva, Bush House, Aldwych, London, W.C.2. Dated November 26th, 1932. No. 33,559.

This specification refers to aircraft of the autogyro type and has for its object the purpose of effecting the control in flight of the altitude and motion

of such an aircraft by operating on the elements of the rotor itself so as to modify its action. This controlling operation is performed by varying the geometrical pitch angles of the blades of the rotor. It is claimed that this arrangement has an advantage as the control does not involve changing the circulation of the rotational axis of the rotor hub laterally to the aircraft, which is particularly advantageous when a power drive is applied to the rotor hub. Drawings and a description of the mechanical details are given, and there are 28 claims in connection with the arrangement.

Catapults, etc.

409,937. *Improvements in or Relating to Aircraft Catapulting Apparatus.* Deutsche Werke Kiel A.G., Werftstrasse 114, Kiel, Germany. Convention date (Germany), July 18th, 1932.

This specification describes a method of bringing the movable parts of a pneumatic aircraft catapult to rest after the aircraft has been propelled. The portion of the mechanism connected with the cradle for the aeroplane is braked by means of a piston provided with leaks situated in a cylinder containing fluid, but the main piston which transmits the force of the compressed air is slowed down by means of an auxiliary piston situated in the same cylinder which is moved forward by the main piston by virtue of air pressure between them until sufficient air pressure is built up behind the auxiliary piston to cause it to come to rest. Until this latter piston is slowed down the fluid brake does not come into action.

Control of Aircraft

410,986. *Improvements in or relating to Control Arrangements for Motors, Particularly Rudder Motors.* Siemens and Halsk, Aktiengesellschaft, Berlin-Siemensstadt, Germany. Convention date (Germany), January 4th, 1933.

In the case of rudders operated by a servo motor system, operating by means of liquid pressure in a cylinder, it is stated that a resilient connection between the piston of the operating mechanism and the operating valve is normally advisable in order to enable a certain displacement of the zero position of the whole regulating device. It is stated that this resiliency is undesirable in the zero position, and a resilient mechanism is described which is intended to overcome this difficulty. This mechanism consists of a piston working in a cylinder, which piston contains a smaller piston working in a cylinder formed within the first. This smaller piston is controlled by a spring, and the passage of fluid in it is controlled by a valve. The arrangement is such that the mechanism is normally rigid, but when the piston is moved with greater force fluid is allowed to pass from one side to the other of the smaller piston, thereby giving resiliency.

411,620. *Improvements relating to Automatic Steering or Stabilising Devices, particularly for Aircraft.* Boykow, J. M., 2A, Fontonestrasse, Berlin-Lichterfelde-West, Germany. Convention dates (Germany), March 12th, 1932, and May 6th, 1932.

This specification refers to the type of apparatus known as an automatic pilot, and is intended to obviate the trouble which the inventor states occurs with the known apparatus of this type, that it is liable to produce an oscillating movement in the aircraft which it controls. In this device the gyroscope controls the making of a contact which starts the motor operating the particular control required, and this contact is also controlled by a spring and also by a damping device. A method is also described for controlling the speed of the motor by a magnetic brake. Both the brake and the spring are adjusted according to what the inventor calls the stabilising value of the aircraft. The gyroscope acts

on electrical resistances constructed either of carbon or crystal, constructed so that the force produced by the gyroscope produces an alteration in their electrical resistance, the advantage claimed being that the precessional movement of the gyroscope is very small.

411,220. *Controls for Aircraft and other Vehicles.* Dunlop Rubber Co., Ltd., 32, Osnaburg Street, London, N.W.1. Goodyear, E. F., Wright, J., and Trevaskis, H., of the company's works, Foleshill, Coventry. Dated January 31st, 1933. No. 2,960.

This specification is concerned with the dual controls fitted to aircraft for instructional purposes. The mechanism described is intended to enable the pupil to have complete control while enabling the instructor at any moment he desires to take over the control himself, either partially or wholly. The invention is described in its application to aircraft brakes. The mechanism described is suitable for employment in brake systems referred to in Specifications 379,529, 397,895, 397,896, 397,897, 398,301, and 399,622. Both the instructor's and pupil's controls are connected to the valve gear of the fluid brake system by means of Bowden cables. The outer sheath of the cable from the pupil's control is connected to a rocking lever, to the other end of which a further control is connected, the latter being operated by the instructor through a separate lever. By the operation of this lever the instructor can render the pupil's control either partially or wholly inoperative. Different arrangements of the control levers are described.

Engines

406,485. *Improvements in or Relating to Means for Use in Cooling Aircraft Motors.* Dornier Metallbauten G.M.B.H. and Dr. Ing. C. Dornier, Friedrichshafen, Lake Constance, Germany. Convention date (Germany), May 20th, 1932.

It is proposed to cool the radiator of a water-cooled aero engine by forcing through it by a fan the boundary layer of air from the wing. The motor may be fitted either in the fuselage or in or on the wing, and in each case the cooling air is drawn from openings dispersed towards the rear of the upper surface of the wing, from whence it is guided by ducts to the fan and forced through the radiator and is finally discharged into the atmosphere. The discharge may be arranged to take place through the bottom of the fuselage, through ducts provided in the trailing edge of the wing, or in any other suitable position. The fan may be driven either directly from the engine or by means of an exhaust turbine.

410,199. *Improvements in or Relating to the Cooling Systems for Internal Combustion Engines.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Forsyth; A. G. Venlaw, Burdon Lane, Cheam. Dated September 17th, 1932, No. 25,936, and February 1st, 1933, No. 3,122.

This specification describes a method of cooling an aero engine by means of a combination of water and steam cooling. It is proposed to provide a water radiator of a size sufficient to cool the engine under normal conditions and to allow any steam generated owing to the engine becoming abnormally hot to pass to a separate condensor where it is condensed and returned to the system by a pump. Centrifugal separators can be used to assist in the separation of the steam from the water and different dispositions and types of the radiators and condensors required are described.

409,834. *Improvements in Air-Cooled Condensers for Aircraft.* Ellor, J. E., South Drive, Chain Lane, Mickleover, Derby, England. Dated December 28th, 1932. No. 36,676.

It is proposed to improve the heat dissipating property of an air-cooled aircraft condenser by fitting it with fins parallel to the direction of the airflow.

The example described fits into the leading edge of a wing. Alternatively, the fins may be boxed in, air being admitted through a slot along the leading edge of the condenser and emitted through slots at the point of junction between the condenser and the wing proper.

406,925. *Improvements in or Relating to Aircraft Engines.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Forsyth; A. G. Venlaw, Burdon Lane, Cheam, Surrey. Dated August 8th, 1933. No. 22,196.

In cases where the reduction shaft of an aero engine is formed in one piece with the propeller hub it is necessary to arrange for the reduction gear housing to be split in order that the parts may be assembled. It is proposed in this specification to construct the propeller hub and shaft so that they fit into the interior of the reduction gear shaft, the drive between the two being taken by serrations. The two shafts are connected by a nut on the rear of the reduction gear shaft and a taper shoulder on the front end.

410,387. *Improvements in and Relating to Elastic Fluid Turbine Drives, Particularly for Aircraft.* The British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2. Convention date (U.S.A.), September 13th, 1932.

This specification describes in considerable detail a proposed arrangement of an elastic fluid turbine combined with a reduction gear intended for the propulsion of aircraft. The turbine itself is mounted on a quill shaft which telescopes the pinion shaft, the latter being attached to the quill shaft at the low pressure end of the turbine. The casings containing the turbine and reduction gear are bolted together and are arranged to be attached to the areoplane at one ring position so that the turbine may be free to expand when heated. Numerous precautions for preventing the expansion of the turbine when hot from interfering with operation are described. It seems that steam is intended to be the operating fluid.

409,498. *Reaction Drive for Vehicular Craft.* Dr. Ing. e. h. H. Holywarth, Goethestrasse, 7, Dusseldorf, Germany. Convention date (Germany), March 30th, 1932.

The apparatus proposed consists primarily of a closed cylinder into which is injected compressed air and fuel. This mixture is exploded by a sparking plug and the products of combustion escape by a valve and are finally swept out of the cylinder by injecting further compressed air. This is again supplied with fuel and exploded by a sparking plug so that the explosions occur rhythmically. The burnt gases, which possess high temperature and pressure, pass through the blades of an exhaust turbine, the energy from which is used to partially supply the energy required for the air compressor. The rest of the energy required for the air compressor is obtained from a steam turbine plant, the heat for the generation of the required steam being obtained by passing water through jackets on the closed cylinder, the exhaust turbine, and also by superheating and other coils arranged in the path of the exhaust gases. The water used is condensed and returned to the boiler. The cooled exhaust gases then escape through a tapered nozzle which acts as the reaction propeller. Alternatively, when the speed of the vehicle is too low to permit of the reaction nozzle possessing a high propulsive efficiency, the nozzle can be cut out and the gases delivered to a further turbine which drives a propeller.

411,965. *Planetary Gearing for Transmitting the Drive from an Impulse Engine to a Rotary Element.* Armstrong Siddeley Motors, Ltd., and Viale, S. M., both of Armstrong Siddeley Works, Park Side, Coventry. Dated January 31st, 1933. No. 2,967.

This specification describes a planetary reduction gear for aero engines in which an internally toothed annulus is driven by the engine, the propeller is

driven by the planetary ring, and the reaction gear is flexibly mounted by means of spring blades and by means of a friction damping device controlled by the propeller thrust. The spring blades extend radially from a member connected with the reaction gear and engaged with the teeth of an internally toothed wheel bolted to the gear casing. A friction device on a cone seating is also provided, and means are described by which the surfaces are forced further together by the increased propeller thrust as the engine speed increases, therefore increasing the damping effect. An auxiliary damping device is also provided, and there is also a provision for taking the drive in the event of a failure of the springs.

Flying Boats

408,165. *Improvements in or Relating to Flying Boats.* Edward G. Budd Mfg. Co., 2500, Hunting Park Avenue, Philadelphia, Pennsylvania, U.S.A. Convention date (U.S.A.), May 12th, 1932.

This specification describes a method of constructing flying boat hulls and has special reference to a structure containing sheet metal structural forms especially adapted to being joined by spot welding and refers specially to the deck construction. This part is formed of downward facing channel sections forming deck beams and also deck longitudinals of similar form. These are joined by flat segment-shaped metal plates and the beams and longitudinals are joined by spot welded channel section knees.

407,835. *Improvements in or Relating to Flying Boats.* Edward G. Budd Manufacturing Co., 2500, Hunting Park Avenue, Philadelphia, Pennsylvania, U.S.A. Convention date, May 12th, 1932.

It is proposed to construct the fin of a flying boat in metal by utilising a number of vertical members extending from beams attached to the side keelsons of the hull. These members carry longitudinal members corresponding to the streamline section desired and the whole is completed by edge members of channel section. The arrangement is so designed as to be suitable for spot welding.

Fuselages

404,606. *Improvements in or Relating to Aircraft Fuselages and Aircraft Motor Gondolas.* Dornier Metallbauten G.M.B.H. and Dornier, C., both of Friedrichshafen, Lake Constance, Germany. Dated April 15th, 1932. No. 10,875. Complete not accepted.

It is stated that the ordinary method of manufacturing aircraft fuselages leads to serious delay in the time taken for the construction, as it is not possible to proceed with the covering until the fuselage itself has been completed. The number of men employed on this work is also limited by the space available. It is proposed to obviate this difficulty by constructing the fuselage covering in the form of separate panels, which can be stiffened by means of a lattice bracing, etc., and which can be covered with sheet metal, fabric, etc., as desired. These panels are constructed separately and can be attached to the fuselage members by various methods which can be arranged so as to make them to be easily detached. It is proposed to attach them by a form of U-bolt passing round the fuselage members, by a bolt passing through the fuselage member itself, or by a clamping device resembling a turn-buckle.

Gliders

411,063. *An Engineless Monoplane or Glider Manually Propelled.* Hayes, R., Marley, Borris, Co. Carlow, Irish Free State.

This specification describes a monoplane intended to be propelled by a pedal gear operated by the pilot and attached by gearing to an airscrew. The pilot

sits inside a fuselage and a steerable tail wheel is provided. The four main members of the fuselage are disposed diamond-wise and are of streamline form.

Helicopters

406,971. *Improvements in and Relating to Helicopters.* Nishi, N., 878, Ovaza Kimüdera Kimüdera-mura, Kaiso-gun, Wakayama-ken, Japan, and Imajo, K., 211, Ikejiri Setagaya-machi, Ebara-gun, Tokyo-fu, Japan. Dated May 30th, 1932.

This apparatus consists of an annular ring shaped somewhat like a saucer, but the radial section through the ring is similar to that of a normal aerofoil. Situated in the centre of the ring is a blower driven by a vertical shaft which emits air circumferentially over the top and bottom surface of the ring. In this manner, it is stated, vertical lift can be obtained efficiently. It is also proposed to propel a machine with this apparatus by means of a separate propeller.

412,487. *Improvements in or relating to Aircraft of the Helicopter Type.* Dr. Ing. Claude Dornier, Friedrichshafen, Lake Constance, Germany. Convention date (Germany), January 26th, 1933.

This specification refers to a helicopter lifting screen which is rotated by the reaction caused by compressed air being ejected from orifices near the blade tips. It is stated that it is not necessary for every blade to be driven in this way, and that those blades which are unprovided with air passages and orifices can be made thinner in section and therefore more efficient. These blades may be in a different plane to the driven blades. In the driving arrangement described, the air is collected from the nose of the fuselage of the aeroplane and impelled into the driving blades by a fan or air-pump driven by the engine. Drawings and descriptions are given showing certain blades hinged or mounted on universal joints.

410,747. *Improvements in Aircraft.* Jean-Michel Lado-Bordowsky, 21, Rond Point de la Reine, Boulogne-sur-Seine, Paris, France. Convention date (France), November 17th, 1931.

This specification refers to a form of helicopter in which the lifting screws are driven in opposite directions and are so placed that the axes converge upwardly, the size of the screws and their angle of convergence being so determined that a negative coefficient of drag obtains. These lifting screws are fitted below the plane on each side of the fuselage in an aeroplane of normal monoplane form driven by a tractor propeller, and the speed of the lifting screws can be controlled by the pilot and they may be allowed to windmill if desired. Curves are given, stated to show the aerodynamical advantage of this combination.

Instruments

397,166. *Improvements Relating to Means for Indicating the Height of Aircraft, Particularly for Use when the Aircraft is Landing.* Lucking, D. F., Tregenna, Queen's Road, Felixstowe, Suffolk. Dated January 20th, 1932. No. 1,799.

This specification describes a proposed method of assisting the pilot of an aircraft to land under conditions of bad visibility by indicating to him his exact height above the ground. A weight attached to a cord, or similar device, is attached to the aircraft which is so arranged that it operates a special mechanism when the weight is dragged by coming in contact with the ground. It will be understood that the height of the aircraft above the ground at this point is known. The special mechanism consists, usually, of a cock which is normally open but which is closed when the weight touches an obstacle. The cock, when open,

short circuits a sensitive altimeter which, therefore, comes into action on the closing of the cock and indicates the exact height of the aircraft on a special dial.

407,819. *Improvements in and Relating to Velocity Measuring Apparatus.* British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2; Heinz, W. B., 314, Fifth Street, Scotia, Schenectady, New York, U.S.A. Convention date (U.S.A.), February 25th, 1932.

In order to produce a speed-measuring device for aircraft, the accuracy of which is independent of the density of the air, it is proposed to suspend a body, say a cylinder, so that it is able to oscillate in a direction at right angles to the direction of motion of the machine. This oscillation is produced by the formation of vortices and it is stated that the frequency of the oscillation is dependent solely on the velocity of the air. The air speed is measured with the aid of an electrical instrument which is influenced by the oscillation so as produce a current whose magnitude is proportional to the frequency of the oscillation. Modifications of the method are described and the oscillating member may be mounted inside a venturi tube.

Miscellaneous

406,477. The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Williams, D. L. H., Hillside, Swakeley's Road, Ickenham, Middlesex. Dated February 27th, 1933.

This specification describes a method by means of which a bomb, or the like, may be loaded into a bomb cell in an aircraft without manhandling. In the form of the invention selected for description, the bomb cell is in the wing and the bomb is lifted by a winch fitted on a ladder which rests on the ground and against the leading edge of the wing. The rope from the winch passes over pulleys fitted on the top of the ladder and over the bomb cell, whence the rope passes to a frame carrying the bomb which is hinged to rods from its forward end and which can be swung up into the wing. Adjustments to the bomb release, etc., can be made before the bomb is drawn up into its cell.

406,713. *Improvements in or Relating to a Method and Means for the Propulsion of Aircraft.* Campini, S., 3, Viale Cossica, Milan, Italy. Dated July 30th, 1932. No. 22,000.

This specification describes a method propelling an aeroplane by means of a jet of air. The air may be drawn into the fuselage through an annular ring fitted round the fuselage, and is then compressed by compressors driven by the motor. It then passes through the engine radiator and is further heated by heaters burning fuel in order to increase its volume, and therefore its velocity, before being ejected through a large jet at the rear of the fuselage. Several modifications of the main scheme are described.

Parachutes

410,361. *Improvements in and Relating to Parachute Pack and Chair.* Switlik, S., Broad and Dye Streets, Trenton, Mercer, New Jersey, U.S.A. Dated August 4th, 1933. No. 21,963.

It is proposed to provide a parachute pack which is carried by the chair provided for the use of passengers in passenger aircraft, the purpose being to insure that the parachute is always available for the use of passengers. The passenger can leave the chair with the harness or with the parachute pack as well. When the parachute is removed from the chair the back collapses so as to reduce the difficulty of passengers leaving the machine in an emergency.

Seaplanes

409,019. *Improvements in or Relating to Undercarriages for Seaplanes, Amphibian Aeroplanes and Similar Aircraft.* Fairey, C. R., Cranford Lane, Hayes, Middlesex. Dated January 13th, 1926. No. 1,009.

This specification refers to an aircraft possessing both landing skids and floats, the floats, when in use, being fitted under the skids. It is proposed to arrange that the floats may be dropped while the aircraft is in flight so that deck landing may be carried out on the skids. The chassis is of the type described in Patent No. 228,245, and the float is normally attached on the front by a forward-projecting hook and at the rear by a movable pin engaging in lugs attached both to the chassis and the float. Arrangements are made so that the float or floats may be released by a single movement of a lever operated by the pilot and attached to the movable pin. Alternative methods of construction are described.

Signalling

407,826. *Improvements in and Relating to Sound Wave Systems.* British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2. Convention date (U.S.A.), March 16th, 1932.

This specification deals with a method of construction of sound producing apparatus and a method of arranging it so that the locality of an aerodrome may be apparent to an in-coming aeroplane under conditions of poor visibility. The sound producing apparatus may consist of three megaphones situated side by side and containing within each megaphone a high frequency whistle. The apparatus is arranged so as to throw a fan-shaped zone of sound vertically; the sound waves may be modulated if desired. These appliances are placed normally on the boundaries of the aerodrome and are arranged so that the sound produced by them intersect at a known height above the aerodrome. The aeroplane is fitted with a receiving megaphone and the sound waves are taken via an acoustic filter to a stethoscope worn by the pilot of the aeroplane. It is stated that by the difference in the signals heard the pilot can determine his location with reference to the aerodrome.

Undercarriages

409,163. *Improvements in or Relating to Aircraft such as Aeroplanes and the Like.* Boggio, A., 17, Via Insegnamente, Milan, Italy. Dated July 4th, 1933. No. 18,942.

It is proposed to obtain the power required for the operation of brakes on the landing wheels of aircraft from the rotation of the tail wheel. This is effected by arranging a friction pad fitted within the tail wheel so that it can be forced into contact with a brake drum on the tail wheel by means of a lever operated by the pilot. When this is done the friction pad will tend to be pulled round the wheel and it is the force resulting from this action that it is proposed to use for the operation of the landing wheel brakes. The connections may be made by means of Bowden wires, hydraulically or pneumatically, and arrangements may be made for differential braking on the landing wheels for steering purposes.

409,456. *Improvements in or Relating to Control Systems or Brakes for the Wheels of Aircraft.* The India Rubber, Gutta Percha and Telegraph Works Company, Ltd., Aldwych House, Aldwych, London, W.C.2, and Tarris, F. J., of the Company's Works, Silvertown, London, E.16. Dated January 4th, 1933. No. 261.

This specification describes a method by which wheel brake control mechanisms may be applied to both control positions of a dual controlled aero-

plane, and by which the pilot operating from one control position can cut out the wheel brake operating gear from the other control position while still retaining wheel brake control himself. The system is thus suitable for an instructional aircraft on which those occupying the control positions are the instructor and pupil. The brakes are operated by fluid pressure or vacuum, the pressure being obtained from pedal-operated pistons connected to the system through a special valve. In the case of fluid pressure operation the means for cutting out the second control gear consists of a valve allowing the brake pressure generated by the operation of this control to pass into a reservoir where it is retained until the pedals of this control are allowed to return to a position of rest.

408,435. *Improvements in or Relating to the Undercarriages of Aircraft.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Williams, D. L. H., Hillside, Swakeley's Road, Ickenham, Middlesex, and Churnley, J. S., Beaumaris, North Hyde Road, Hayes, Middlesex. Dated February 27th, 1933. No. 5,958.

This specification describes a folding chassis for aircraft in which the landing wheel is carried in a fork supported by a diagonal member running aft. The folding is effected by pivoting the fork containing the wheel at some point above the wheel and rotating the fork backwards from this point. The diagonal member is got out of the way by burying it in the middle and arranging to break the hinge before backward movement takes place. The arrangement described shows the apparatus operated by a cylinder and piston operated by compressed air. This is arranged to rotate the shaft carrying the fork pivot by means of a crank, but means are provided for obtaining a small movement of the sleeve carrying the crank before the shaft is rotated, this small movement being utilised to operate the locking pin of the hinge of the diagonal member. Shock-absorbing mechanism is provided for.

412,191. *An Improved Damping and Suspension Device for Landing Gears of Aeroplanes.* Messier, Y. L., 179, Boulevard Brune, Paris, France. Convention date (France), December 24th, 1932.

In the case of telescopic legs for undercarriages, it is often necessary to prevent the piston rod turning with respect to the cylinder. This is usually effected by means of keys or feathers, but it is proposed, in this specification, to do this by boring two eyes, one each on the piston rod and cylinder, and connecting these together by two links. These links are hinged together and the free ends of each are hinged to the eyes, the arrangement of the links being in the form of a V.

411,875. *Improvements in or relating to Aircraft Undercarriages.* The Bristol Aeroplane Co., Ltd., and Frise, L. G., both of Filton House, Bristol. Dated December 15th, 1932. No. 35,580.

In aircraft used for the transport of passengers it often happens that the door which permits ingress into the fuselage is at a considerable height above the ground when the machine is at rest, thereby making access to this door difficult. It is proposed to obviate this difficulty by arranging for the chassis to be retracted while the machine is on the ground, thereby bringing the door nearer the ground level. The chassis is raised to the flying position before the machine takes off. The mechanism described consists of a screw carrying a nut to which the oleo leg of the chassis is attached. This screw is rotated by a worm gear driven either electrically or manually. Alternatively, it is proposed to raise the chassis to the flying position while the aircraft is taxying. This is accomplished by pumping fluid into the oleo leg by a pump actuated from the landing wheel.