

ABSTRACTS OF PATENT SPECIFICATIONS.

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

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AEROPLANES—GENERAL.

493,836. *Improvements in or relating to Aircraft.* Back, W. E., Mancroft Towers, Oulton Broad, Suffolk. Dated March 13th, 1937. No. 24,229.

This specification refers to a thick sectioned cantilever monoplane having aileron control so arranged that the ailerons can be moved differentially for banking or together for climbing or diving and a separate lever for utilising the ailerons as an air brake. The machine proposed has a wide chord in the centre while the wings taper towards the tips. The wings are swept appreciably forward so that the leading edges of the wings at the tips may be forward of the leading edge of the centre section. The machine is stated to resemble an eagle in soaring flight. The wings have a dihedral angle, have ailerons on their outer portions, control surfaces on the rear of the centre of gravity, and governing surfaces connected to the trailing edges of the ailerons so as normally to lie in equilibrium in the air stream, and which tend to move the ailerons when the air stream alters.

493,655. *Improvements in and relating to Aircraft.* N. V. Berde, Hillegomsche Maatschappij tot Exploitatie van Onroerende Zaken, Hillegom, The Netherlands. Convention date (Netherlands), June 29th, 1936.

The proposed aeroplane is claimed to have a large speed range, to be stable and to be easily controlled. The wing is composed of various sections which, when closed up, form a wing with a stable C.P. position. When the sections are spread apart they form a slotted wing. The forward section moves forward and at least one of the sections can rotate about a spanwise axis. The arrangement is such that the centre of lift is unaltered when the wing is unfolded.

493,762. *Improvements in or relating to Aircraft.* Back, W. E., Mancroft Towers, Oulton Broad, Suffolk. Dated March 13th, 1937. No. 7,387.

This specification relates to aeroplanes in which the C.P. of the outer part of each wing lies in front of the centre of gravity of the machine while the C.P.

of the inner part of each wing is in the rear of the centre of gravity. There are surfaces in rear of the centre of gravity which assist longitudinal balance. The trailing edge portions of the inner parts of the wings can constitute stabilising surfaces while the after control surfaces are situated in rear of the stabilising surfaces. The outer part of each wing has an angle of incidence which is preferably greater than that of the inner part of the wing. Ailerons are fitted to the outer section of the wing and the wings may have a dihedral angle.

494,863. *An Auxiliary Wing for Aircraft.* Blume, W., Schillerstrasse 3, Brandenburg (Havel), Germany, and Arado Flugzeugwerke Gesellschaft mit beschränkter Haftung, Brandenburg (Havel), Germany. Dated Nov. 17th, 1937. No. 31,577.

The wing proposed has a nested extension flap or auxiliary wing carried by levers so that the flap may be swung downwards and rearwards over its whole width, and it can serve either as a lift-increasing flap or as an aileron.

AIRCRAFT—CONSTRUCTION.

493,627. *Improvements in Aircraft Structures.* Huth, F., 8, Ecksteinweg, Berlin, Johannisthal, Germany. Dated April 16th, 1937. No. 10,932.

It is proposed to construct aircraft bodies from plates of materials, either wood, metal or plastics, and the various interconnecting members of the structure are formed with slits so as to provide interlinked joints. It is proposed to use a material which can be glued and it is stated that the joints are reliable, even when the glue dries or sets with difficulty, as the construction is such that loosening of the glued portions is impossible. The proposed structure has high coherence by itself, but the strength is still further increased by the binding medium.

493,471. *Extendible and Contractile Strut or Jack for Aerial Machines.* Turner's Motor Manufacturing Co., Ltd., and Milner, H. C., of the Company's Works, Moorfield Road, Wolverhampton. Dated April 10th, 1937. No. 10,255.

The proposed jack has a group of locking elements and an auxiliary piston mounted on the main piston, arranged so that the former has a movement relative to the main piston when the elements arrive at the locking rebate and the locking is effected by a positive action. The locking plungers have inclined surfaces at their outer ends, a locking rebate in the cylinder with an inclined wall. Locking is effected positively by a movement of the auxiliary piston when the plungers arrive at the rebate. Unlocking occurs by the co-operation of the inclined surfaces on the plunger ends and the rebate.

493,761. *Improvements in Ball and Socket Joints.* Cowdrey, C. L., Derby Road, Chellaston, Derby. Dated March 12th, 1937. No. 7,357.

The joint consists of a ball carried by one member, the other portion consisting of a half socket for the ball. The rest of the socket is made up by a split ring shaped internally as a portion of the socket, and a screwed member which holds the split ring in position. A spring ring may be used if desired. In this construction the ball may be in one piece with the member to which it is attached.

491,302. *Improvements in and relating to Bracing Members for the Wings, Steering Surfaces and the like of Aircraft.* Junkers, Flugzeug-und-Motoren-werke, Aktiengesellschaft, 39, Junkers-strasse, Dessau, Anhalt, Germany. Convention date (Germany), Aug. 30th, 1938.

It is proposed to use in the spars of aeroplane wings, etc., a web plate which is curved in cross section while sections of standard form are used for the flanges. The flanges adapt themselves to the contour of the wing while the curvature of the webs is such that the webs meet the flanges at the normal angle. Hence

the depth of the spars is the maximum possible. The web plates can be of any standard form, plain or profiled, or corrugated.

491,358. *Improvements in and relating to Cabins for Aircraft.* Junkers, Flugzeug-und-Motoren-werke, Aktiengesellschaft, 39, Junkers-strasse, Dessau, Anhalt, Germany. Convention date (Germany), Dec. 28th, 1936.

The part of the fuselage enclosing the occupants is formed of transparent material in the shape of a self-supporting dome, the axis of the dome being the longitudinal axis of the body or an axis parallel thereto. The dome may be situated at one end of the fuselage or an annulus may be arranged at any point intermediate between the ends. Lattice structural members are dispensed with so that there is nothing to obstruct the sight. Designing the transparent wall as a self-supporting shell enables it to support pressure as in the case of cabins intended for high altitude flying. Supporting structural members may be used in addition.

492,289. *Improvements in or relating to Mechanics' Platforms for Aircraft.* United Aircraft Corporation, 400, South Main Street, East Hartford, Connecticut, U.S.A. Convention date (U.S.A.), March 17th, 1936.

The proposed platform is carried inside the wing and is hinged about the lower part of the fixed portion of the wing. When it is in a closed position it forms part of the wing aerofoil curve. When it is in use as a platform it is supported horizontally and part of it may be moved outward to increase the area of the platform.

494,888. *Improvements in and relating to the Positioning of Jigs or the like for Supporting a Work Piece during Construction or Assembly.* Junkers Flugzeug - und - Motorenwerk, Aktiengesellschaft, 39, Junkers - strasse, Dessau, Anhalt, Germany. Convention date (Germany), April 8th, 1937.

It is proposed to check the position of jigs by using a pattern corresponding to the assembly parts, the jigs being arranged in the erecting arrangement so as to engage with lugs in the pattern so that the adjustment can be easily obtained before the jigs are locked in position. If the pattern is not rigid it is itself first aligned by means of plans of reference which may be indicated by wires or optical base lines.

494,936. *Improvements in or relating to Fuselages for Aircraft.* Arado Flugzeugwerke Gesellschaft mit beschaenkteter Haftung, Brandenburg (Havel), Germany. Convention date (Germany), Sept. 16th, 1937.

The fuselage consists of individual longitudinal plates connected with each other by riveting or welding, the plates consisting of plain plates alternating with flanged plates. The plates may be of trapezium form with flanged margins and plain plates in the form of staves.

AIRSCREWS.

493,145. *Pressed Articles, particularly Airscrew Blades, of Laminated Wood and Method of Manufacturing the Same.* Zablousky, B., Brettenham House, Lancaster Place, Strand, London, W.C.2. Dated March 31st, 1937. No. 9,219.

The proposed wooden airscrew blade is hollow and consists of two shell sections which are formed separately and joined together. Each section consists of several thin wooden laminations which are glued together, the wood fibres running mainly parallel and longitudinally. The assembly is pressed between two shaped dies so that the shell is formed to shape and increased in density, the pressure being maintained until the adhesive has hardened.

ARMAMENT.

494,399. *Aerial Bombing Devices.* Connolly, E., Springer Sturgeon Gold Mines, 67, Yonge Street, Toronto, York, Ontario, Canada. Dated March 26th, 1938. No. 9,351.

The proposal consists of a composite aircraft of which the upper member is a glider. The lower component has a vertically grooved flange extending around the front of the cockpit, the glider carries an endless collar which fits within the flange of the power plane. The separation takes place by a strap fitting the groove adapted to extend round the flange carried by the lower component and means are provided for uncoupling the divided ends of the strap. It is intended that separation shall take place near the bomb target and that, after gliding to the bombing position and directing the glider to the target, the pilot is to escape by parachute.

495,047. *An Improved Method and Means for Preventing Freezing of Machine Guns Mounted on Exposed Positions on Aircraft.* Martin, J., Higher Denham, Uxbridge, Middlesex. Dated May 6th, 1937. No. 12,949.

The guns are mounted in closed compartments in the aeroplane, which compartments are warmed by leading into them hot air from the engine compartment. It may be circulated by forced and or induced draught, and it may either be allowed to escape or be returned to the engine compartment. Inlet arrangements may be used to ensure that the hot air is suitably distributed through the compartment.

494,248 *Improvements in and connected with Adjustable Windscreens for Use in conjunction with Guns, Cameras, and Other Instruments Mounted on Aircraft.* Vickers (Aviation), Ltd., and Wallis, B. N., Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated April 23rd, 1937, No. 11,643; and March 10th, 1938, No. 7,484.

The windscreen is flexible and has a gun slot so that the gun projects in such a manner that the gun carries the screen with it when the gun is trained, but otherwise the screen can move relatively to the gun towards and away from the training axis. The screen is arranged to keep to a predetermined shape as it moves round. The windscreen may be a flexible or articulated band which moves with the gun when training, but otherwise the movement of the two is independent.

CONTROL OF AIRCRAFT.

492,300. *Improvements in or connected with Air Brakes for Aircraft.* Short Bros. (Rochester and Bedford) and McVie, R., both of Seaplane Works, Rochester, Kent. Dated March 18th, 1937, No. 7,960; and Sept. 4th, 1937, No. 24,214.

The proposed air brake is mounted on the aircraft wing flap and is operated by fluid pressure, the supply of fluid being controlled electrically so that the resistance flap can be operable independently of the wing flap in whatever position the latter may have. The resistance flap, when closed, is entirely within the contour of the wing flap. Locks may be provided for locking the resistance flap in either the open or closed positions, the locks being operated electrically. The fluid pressure pumps may be operated electrically and electric indicators may be provided.

493,652. *Apparatus for Controlling the Operation of Devices Operated by Fluid Pressure such as Aircraft Flaps.* Dunlop Rubber Co., Ltd., 32, Osnaburg Street, London, N.W.1; Beharrell, G. E.; Wright, J.; and Trevaskis, H., all of the Company's Works, Fort Dunlop, Erdington, Birmingham.

The apparatus concerns the operation of a wing flap operated by a pneumatic jack. The control device proposed has a number of valves which are adapted

to be selectively operated in predetermined sequence where the flap can be raised or lowered or moved to a wind position and automatically locked in such position. The valves are arranged in two groups, each of which is operated by a separate cam. One valve or a pair of valves is operated to admit air to the jack to raise or lower the flap, while another valve controls the automatic locking.

493,198. *Improvements in Index Mechanisms for the Steering Wheels of Vehicles.* Pauli, K. M., Saltsjobaden, near Stockholm, Sweden. Convention date (Sweden), May 14th, 1937.

This is an apparatus by means of which the direction of motion of a vehicle as set by the steering wheel is indicated directly. A pinion on the steering shaft is engaged with a toothed rack which is fitted on the internal side of a rotably mounted ring. An index member is fixed on this ring, the gearing being such that it will show the direction of movement as set by the steering wheel.

493,391. *Improvements in or relating to Flaps for Aerofoils.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex; and Youngman, R. T., Walcot, Church Crookham, Aldershot. Dated Aug. 19th, 1937, No. 22,805; and March 16th, 1938, No. 8,153.

It is proposed to use a flap which can be lowered bodily below the level of the wing and which can be turned about an axis at or near to the centre of pressure to raise the leading edge of the flap. The leading edge can be raised or lowered until the plane of the flap is nearly normal to the wing.

493,427. *Device for Controlling the Gliding Angle in Aircraft.* Orado Flugzeugwerke Gesellschaft mit beschränkter Haftung, Brandenburg (Havel), Germany. Convention date (Germany), Aug. 14th, 1937.

The proposed device consists of a number of flaps adapted to be swung away from the wing. The flaps are coupled with one another and the flap opening in the direction opposed to the direction of flight is smaller than the flap opening in the direction of flight. The smaller flap is arranged in front of the larger one so that in the swung out position the smaller flap partially covers the other.

491,664. *Improvements in Control Means of Land Vehicles, Aircraft and Watercraft.* Sampietro, A. C., 3, Observatory Gardens, London, W.8. Dated March 10th, 1937. No. 7,104.

In a vehicle provided with an accumulator which forms part of the electrical equipment, and which is mounted so as to be capable of displacement relative to the frame of the vehicle in response to change in the state of motion of the vehicle, it is proposed that displacement of the battery in response to a change of motion of the vehicle shall be used to operate controls. The movement of the battery may be used to accentuate the change, or to oppose it.

491,505. *Improvements in or relating to Control Mechanisms for Aircraft and other Vehicles.* The India Rubber, GuttaPercha and Telegraph Works Co., Ltd., Thames House, Millbank, London, S.W.1; Webb D.; and Tarris, F. J., of the Company's Works, Silvertown, London, E.16. Dated March 2nd, 1937. No. 6,243.

This specification relates to dual control mechanisms which permit control to be effected from either one of two control positions. Means are also provided at one control whereby the other can be cut out. A cam is provided between a pair of cables which operate a control, the fulcrum of the cam can move so as to produce slack in the cables, while it can be held firmly when the cables are in use. The control of this movable fulcrum is operated from the first control position.

- 493,709. *Improvements in or relating to the Control of Aircraft.* Gallay, H. M., 21, Yorke Street, Glace Bay, Cape Breton Island, Nova Scotia, Canada. Dated April 10th, 1937. No. 10,244.

In combination with an aeroplane wing having normal ailerons it is proposed to use an external flap which extends right across the wing except the fuselage. The flap is behind or below and behind the trailing edge of the wing and the trailing edges of the ailerons. Means are provided to enable its incidence to be altered. The ailerons and the flap are relatively so mounted as to clear each other in operation.

- 491,538. *Improvements in or relating to Aircraft.* Westland Aircraft, Ltd., Yeovil, Somerset, and Widgery, W. M., of the Company's address. Dated March 6th, 1937. No. 6,714.

In the case of a balanced aircraft control member it is proposed to arrange a pair of stationary shields disposed one on each side of the forward part of the control member having their outer surfaces conforming with the shape of the associated aerofoil and terminating rearwards in the vicinity of a plane normal to the longitudinal axis of the aircraft and containing the said hinge axis. The control member has its forward part of such shape that it can be moved over the desired range in the space between the shields.

- 491,549. *Improvements relating to Aircraft Controls.* Phillips and Powis Aircraft, Ltd., The Aerodrome, Reading, Berkshire; and Emery, G. A. St. C., of the Company's address. Dated May 18th, 1937. No. 13,849.

The proposed control comprises means for operating an angularly movable control surface consisting of a link pivoted at one end directly to a lever arm on the surface controlling the angular movement of the surface and supported between its ends by guide means allowing combined sliding and angular swinging motion, the link carrying a cam follower co-operating with a cam formation on a member rotatably mounted on a part relative to which the control surface is angularly movable. The control surface may consist of a first control surface movable on a second control surface which later is movable about the aircraft, the rotatable member being carried by the second surface. The first control surface may be a trimming tab.

- 494,496. *Control Device for Aircraft.* Arado Flugzeugwerke Gesellschaft mit beschränkter Haftung, Brandenburg (Havel), Germany. Convention date (Germany), June 7th, 1937.

Between the control column and the elevator it is proposed to insert a linkage incorporating a transmission that is variable by the dynamic pressure existing, due to the motion of the aircraft, which linkage in every position of the transmitting device affords a rigid connection between the control column and the elevator. The linkage permits the use of the maximum throw of the control column possible at the lowest pressure.

- 494,579. *Improvements in the Means for Controlling the Movements of Ailerons, Rudders, Elevators, or other Moving Surfaces of Aircraft.* Tampier, R., 1, Rue de Bellevue, Boulogne-sur-Seine, France. Application dates, April 22nd, 1937, No. 11,522; and May 6th, 1937, No. 12,948.

This specification describes a frictional device for controlling or preventing the movements of ailerons, rudders, elevators, or other moving parts of aircraft, and consists of a ball and socket, the socket being made in two parts which can be adjusted so as to vary the friction between them and the ball. The ball and socket constitute a hinged connection between the control surface and the machine. By means of a cam acting on a spring, which forces the parts together, the friction may be controlled from the cockpit of the aeroplane.

494,961. *Locking Aircraft Control Surfaces.* Flugzeugwerke Halle G.m.b.H., 70, Boelckestrassen, Halle (Saale), Germany. Convention dates (Germany), May 2nd, 1936; Nov. 14th, 1936; and Nov. 24th, 1936.

It is proposed to lock the controls for the purpose of preventing fluttering when the machine is parked. There is a bolt for locking the surface, a manually controlled mechanism for operating the bolt, means for locking the mechanism, and an automatic control under the command of a part which must be operated when the aeroplane is started, for releasing the locking. This device may be operated by a part of the undercarriage, a cam on the accelerator by the tail skid, etc.

ENGINES.

493,651. *Mounting of Aircraft Engines.* Horrocks, W. A., 1, Devon Court, Villa Road, Nottingham. Dated June 15th, 1937. No. 16,569.

It is proposed to support an aircraft engine from four points by members which do not need crossbracing and from which the engine may be lifted without fouling the mounting. The construction proposed is tubular and a horizontal member is provided for the engine feet which is stiffened laterally by a kingpost construction. Both engine feet are connected to the upper and lower frame points by means of tubes or tie-rods, which are connected to the structure in the neighbourhood of the feet.

493,673. *Improvements in and relating to Radiators for the Engines of Aircraft or other Vehicles.* Junkers Flugzeug-und-Motorenwerke Aktiengesellschaft, 39, Junkerstrasse, Dessau, Anhalt, Germany.

The proposed radiator is of annular form arranged in an annular passage formed on the inner side of the engine cowling which approximately forms a body of revolution. It tapers towards the front. There is a surrounding shell, the arrangement being such that the air intake of the radiator is exposed to an unrestricted air flow, while the outlet consists of an annular channel which tapers towards the rear, the issuing air flowing smoothly over the engine cowling.

493,328. *Improvements in and relating to the Resilient Mounting of Motors for Vehicles and Aircraft.* Getefo Gesellschaft für Technischen Fortschritt m.b.H., 13, Woyrschstrasse, Berlin, W.35, Germany.

The motor is resiliently mounted by rubber blocks inside a ring-like frame, so that its C.G. lies approximately in the plane of the frame. The frame is fixed to the vehicle. The frame and the framework may be divided up into groups.

491,483. *Improvements in or relating to Exhaust Systems for Aircraft Engines.* Mercier, P. E., 11, Rue Jacques, Neuilly-sur-Seine, France. Convention date (France), Dec. 24th, 1937.

It is proposed that flame shall be suppressed by cooling the gases and discharging them in the form of a sheet between two layers of air. The exhaust pipe is progressively flattened between the engine and the outlet and is bent so that the outlet is substantially parallel to the direction of flight. The exhaust gases can be discharged into the interior of the cowling and the pipe may be arranged in a compartment which isolates the exhaust pipe from the spaces traversed by the cooling air for other parts of the engine.

494,413. *Improvements in or relating to the Casings or Cowlings of Aircraft Engines.* Scott, B. D., Blewbury House, Blewbury, Berks. Dated March 19th, 1937. No. 8,191.

It is proposed to house wing engines in cowlings which project well forward of the plane and which are of an aerofoil section. The upper surface of the

cowling is faired into the wing at the trailing edge and the front of the cowling may be faired away from the propeller hub. Air inlets for cooling air may be formed in the front portion of the cowling and the exits may be above or below in the rear of the cowlings.

494,576. *An Improved Method of and Means for Mounting Air-Cooled Engines on Aircraft.* Richard, P. A., 6, Avenue Anatole France, Clichy (Seine), France. Convention date (France), March 10th, 1937.

This specification refers to aircraft having engines buried in the wing. There is a blower arranged in the wing which is in communication with the engine housing, the blower being so arranged as to increase the pressure of the cooling air or a mixture of cooling air and exhaust gas only after the air has performed its cooling function. Use may be made of the cooling air and sometimes of the exhaust gas to produce an auxiliary propulsive effect of the reaction type.

495,369. *Improvements relating to the Installation of Air Filters in Aircraft.* Vokes, C. G., 95-105, Lower Richmond Road, Putney, London, S.W.15. Dated May 7th, 1937. No. 20,795.

The filtering arrangement may be arranged within the fuselage and air is collected at a pressure depending on the speed of the aircraft so that a supercharging effect is obtained at high speeds. The filtered air may be delivered to the carburettors of the engine or may pass into the space containing the engine, all ways of access to this space being protected by filters.

495,346. *Improvements relating to the Starting of Internal Combustion Engines.* Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany. Convention date (Germany), Oct. 8th, 1936.

The arrangement comprises gearing operative only during starting interposed between the engine and the mass driven by it. The gearing is driven by the starter and is normally disengaged from the engine. Means are provided so that the energy stored in the rotating mass may be applied for engine starting. Between the engine and the rotating mass there is an automatic clutch which is gradually brought into operation and the gearing is arranged so as to give a speed reduction between the starter and the rotary mass. The automatic clutch closes when the engine overruns the rotary mass and opens when the latter overruns the engine.

PARACHUTES.

492,140. *A New and Improved Parachute and Method of Manufacturing Same.* Tinssonier, G., 42, Rue Labouret, Colombus (Seine), France. Convention date (France), Feb. 22nd, 1937.

The proposed parachute has a surface composed of synthetic impermeable material such as cellulose acetate. A sheathing which may be composed of non-elastic threads or ribbons is fixed on the surface, the suspension cords being attached to the reinforcements.

REFUELLING.

491,953. *Improvements in the Method of and Apparatus for Refuelling Aircraft in the Air.* Sir Allan J. Cobham, K.B.E., Johnson, H. C., and Allison, P. R., all of Ford Aerodrome, Yapton, Sussex, and Flight Refuelling, Ltd., 8, Sergeants' Inn, Temple, London, E.C.4. Dated Dec. 10th, 1936, No. 33,975; April 3rd, 1937, No. 9,493; and Aug. 19th, 1937, No. 22,737.

In the refuelling of aircraft during flight it is proposed to use the combination of a ball or socket component of a hose coupling intended to connect a refuelling hose carried by one aircraft with the fuel tank of another, a device for clamping

this component in liquid-tight engagement with a mating component. The device can be released at will and releases automatically under an abnormal pull. The component may have a valve which is normally closed but which can be opened by the clamping device.

ROTORCRAFT.

493,149. *Improvements in and relating to Aircraft with Sustaining Rotors.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2; and Bennett, 67, Grove Way, Esher, Surrey. Dated April 6th, 1937. No. 9,800.

This specification refers to a sustaining rotor for a gyroplane of the "jump take-off" type in which each blade is independently connected to the hub by at least two pivots, of which the flapping pivot has its axis in a plane perpendicular to the hub axis and inclined at an acute angle to the radial blade axis, and the axis of the other is oblique so that the projections of the last mentioned pivot axis on a plane normal to the blade axis makes an acute angle with that of the hub axis and on a plane normal to the hub axis makes, with the projection of the blade axis, an angle of not less than 90° on the leading side of the blade; the oblique pivot axis also lying further from the hub axis than the flapping pivot axis.

493,173. *Improved Aircraft.* Mercier, G. E. P., 13, Rue de la Vistule, Paris, Seine, France. Convention dates (France), Nov. 3rd, 1936, and Oct. 11th, 1937.

The proposed aircraft has a stabilising and controlling autorotation rotor or rotors, rotating about a vertical axis and tiltable by the pilot in any direction situated forward of the C.G. and above the fuselage, and fixed supporting planes aft of the C.G. fitted with flaps and vertical fins.

492,013. *Improvements relating to Rotors for Rotating Wing Aircraft.* Prof. Dept. Ing. H. Focke, 30, Strassburger Strasse, Bremen, Germany. Convention date (Germany), Aug. 16th, 1937.

In the case of rotors for rotary wing aircraft it is proposed that a surface for supporting the blade at rest is arranged outwardly from the hub beyond the pivot of the drag joint. The parts which contact have complementary shapes so as to guide the blade into the position of rest.

493,439. *Improvements in or relating to Aircraft.* Baynes, L. E., Hollands, Bourne End, Bucks. Dated March 4th, 1937. No. 6,499.

The proposed aeroplane has a normal wing and a pair of rotors, one on each side of the machine, which are so mounted that they can be moved into alternative positions at which vertical lift and forward horizontal movement are aided by the craft to a greater or less extent. Each rotor is engine driven. The pitch of the rotor blades is altered automatically during the adjustment of the position of the rotors.

494,427. *Improvements in and relating to Aircraft Sustaining Rotors.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2, and Bennett, J. A. J., 67, Grove Way, Esher. Dated April 30th, 1937, No. 12,398; and Nov. 8th, 1937, No. 30,589.

The proposed aircraft has sustaining rotors with blades which are articulated to the hub by pivotal connections, including a pivot whose axis is inclined upwardly and outwardly with respect to the radial blade axis at an angle exceeding 45° , and with a driving member coaxial with and floating in the hub connected to a source of power having connections so that the driving force is transmitted to each rotor blade, so as to produce a sufficiently great movement about

the inclined pivot axis to hold the blade in the minimum pitch position as long as the rotor is driven.

- 494,739. *Improvements in and relating to Aircraft Sustaining Rotors.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2, and Bennett, J. A. J., 67, Grove Way, Esher, Surrey. Dated April 30th, 1937, No. 28,664; and Nov. 8th, 1937, No. 30,588.

In a sustaining rotor for aircraft in which the blades are articulated for leading and lagging displacements, a central frictional damper having frictional parts which are connected to the blades and which are arranged to damp unsymmetrical leading and lagging motions of the blades relative to one another. These parts have a greater surface or a higher pressure than the frictional surfaces which damp the symmetrical motions.

- 495,176. *Improvements in Rotating Wing Aircraft with Side-by-Side Rotors.* Prof. Dipl.-Ing. H. Focke, 30, Strassburger Strasse, Bremen, Germany. Convention date (Germany), May 24th, 1938.

The aircraft described has two fuselages each carrying a rotor which possess separate driving arrangements. The fuselages are connected by a streamlined or wing-shaped body and they are located at a distance from each other of somewhat more than the rotor diameter. Each of the fuselages has a single-wheeled undercarriage, preferably retractable. The driving arrangements of the two rotors are synchronised.

- 495,333. *Improvements in or relating to Aircraft.* Alexander, R. M., 1, St. Luke's Road, Maidstone, and Dixon, F. S., of 113, Loose Road, Maidstone. Dated May 10th, 1937. No. 13,331.

The aircraft described has positively driven rotary wings for providing lift. There are also elongated lifting surfaces and the upper one and sometimes the lower one has a gas envelope combined with its upper surface and there are also airscrews for propulsion; these airscrews are capable of being tilted. In plan form the lifting surfaces are of ovoid shape.

UNDERCARRIAGES.

- 493,440. *Improvements in or relating to Hydraulic Valves.* The India Rubber Gutta Percha and Telegraph Works Co., Ltd., Thomas House, Millbank, London, S.W.1; Tarris, F. J.; and Webb, B., of the Company's Works, Silvertown, London, E.16. Dated March 4th, 1937, No. 6,500; and June 25th, 1937, No. 4,782.

A hydraulically operated brake mechanism with a hydraulic circuit which is closed against loss of hydraulic pressure, through which liquid is circulated under pressure. A valve to regulate the flow of liquid under pressure to the brake. The valve has an outer member with an internal bore, an element which slides in the bore and which is chamfered at one end. Means are provided for adjusting the valve longitudinally in the bore to vary the clearance.

- 494,542. *Improvements in or relating to Alighting Gear for Aircraft.* Blume, W., Schillerstrasse 3, Brandenburg (Havel), Germany, and Arado Flugzeugwerke Gesellschaft mit beschränkter Haftung, Brandenburg (Havel), Germany. Dated Nov. 27th, 1937. No. 32,783.

This specification refers to retractable shock absorbing tail wheels. There is a strut carrying the wheel and a strut pivotally connected thereto which rotates the mounting about a horizontal axis. The tail wheel can be steered and it is provided with a cover which in the retracted position forms an externally flush extension of the rear end of the fuselage.

491,298. *Improvements in or relating to Landing Gear for Aircraft.* Mercier, P. E., 11, Rue Jacques Dulub, Neuilly-sur-Seine (Seine), France. Convention date (France), April 1st, 1937.

In the case of aircraft having two vertical fins disposed at the extremities of a horizontal tail plane it is proposed to fit tail wheels or skids in front of the tailplane and within each vertical fin. There may also be a single steerable front wheel which is streamlined by a cover which turns with the wheel.

494,557. *Improved Automatic Means for Ensuring Extension of Retractable Alighting Gear for Aircraft.* Potez, H. C. A., Meaulte, Somme, France. Convention date (France), Feb. 9th, 1938.

The wheel in this gear is carried at the end of a leg projecting from and pivoted to the body of the aircraft. It is connected at an intermediate point on its length to a fixed axle through a jointed strut comprising a device acting like a compression spring and having its ends attached to the branches of the jointed strut so that the device tends to straighten the strut against the action of the retracting gear. The object is to ensure that the chassis can be extended if the normal extending gear fails.

REVIEWS.

THEORETICAL HYDRODYNAMICS.

By L. M. Milne-Thompson, M.A., F.R.S.E. Published by Macmillan and Co., Ltd. Price 31s. 6d.

Professor Milne-Thompson, who is Professor of Mathematics in the Royal Naval College, Greenwich, has founded this book on the lectures he has given to junior members of the Royal Corps of Naval Constructors, and it is a very interesting treatise on the mathematical theory of fluid motion with application to both hydrodynamics and aerodynamics. The mathematical treatment is based almost entirely on vector methods.

The author is to be congratulated on his method of presentation. He has a clear literary style, can explain matters in a way which makes them easy to understand, and the result is that he has produced a book which is a pleasure to read, and which is much more valuable as a text book on that account.

Whether the use of vector methods instead of the traditional presentation is an advantage for teaching is a question which can be left to those who are engaged in tuition. On this matter the author's experience must carry much weight, but it is probable that the conditions at the Royal Naval College are different from those at a university, and what may be suitable for one may not be suitable for the other. It should be said that the author has included a chapter on the properties of vectors, which are essential to the understanding of the book so that those who already possess a knowledge of the elements of infinitesimal calculus should have no difficulty in following the treatment.

THE STRENGTH OF MATERIALS.

By John Case, M.A. Published by Edward Arnold and Co. Price 30/-.

This is the third edition of this well-known work and it differs from the others in including some additional matter and also because Chapter VI has been rewritten, because, to quote Mr. Case, experience has led him to revise his ideas on the yield point of metals.