ABSTRACTS OF PATENT SPECIFICATIONS

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

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Aerodynamics

438,991. *Improvements in or relating to Means for Reducing the Resistance to Motion of Material Bodies.* Huet, A., 27, Rue de Longchamp, Paris, France. Convention date (France), December 19th, 1933.

The inventor states that he has discovered that when deflectors of normal type are used to reduce the resistance of bodies in air, swirls, eddies and friction are caused and also a vacuum behind the deflectors so that the reduction of resistance aimed at is not obtained. In order to obviate this the inventor has discovered that it is not enough to admit fluid behind the deflectors, but that this fluid must have a certain direction and velocity. Drawings are given of bodies having suitable deflectors of various forms intended to carry out the proposed principle.

Aeroplanes—Construction

439,954. *Improvements in Aeroplane Wings.* A.T.S. Co., Ltd., 3/4, Clement's Inn, Strand, London, W.C.2, and Lloyd, J., Whitley Aerodrome, Coventry, Warwickshire. Dated June 13th, 1934. No. 17,516.

This specification describes a metal box spar for aircraft in which the spar is formed of corrugated top and bottom members and two side webs, the spar being shaped to the camber of the wing and covered with fabric or the like. Transverse members are fitted which support the top and bottom members of the spar. The corrugations may have flat sides, tops and bottoms and the webs may also be corrugated.

439,645. *Improvements in and relating to Windshield Devices for Cockpits of Aircraft or for Equivalent Spaces in other Vehicles.* Petters, Ltd., and Davenport, A., Westland Aircraft Works, Yeovil, Somerset. Dated June 27th, 1934. No. 19,028.

This windscreen has a transparent roof which is capable of being slid backwards and there is also a door on each side for the access and egress of the pilot. The upper part of the door contains radial movable panels arranged as in a fan

so that when these are opened the pilot can put his head outside for vision in foggy weather. The roof is supported in cantilever fashion over the space occupied by the doors, so that when all are open the pilot has a free exit.

437,177. *Device for Absorbing Torque in Spring Cantilever Struts on Flying Machines.* Vereinigte Deusche Metallwerke Aktiengesellschaft Zweigniederlassung Heddernheimer Kupperwerk, Heddernheim, Frankfort-on-Main, Germany. Convention date (Germany), July 2nd, 1934.

In order to transmit the torque which may occur between the movable and fixed portions of a single leg chassis from the wheel axis to the fixed portion, it is proposed to use a system of links hinged respectively to each other and to the fixed strut and to the fixed axes, the whole arrangement resembling roughly a lazy tongs drive with a single link system. The links are formed with a central oval-shaped hole through which passes the movable strut of the chassis.

Aeroplanes—Control

437,447. *Improvements in Aeroplanes.* Buheiji Fugimoto, No. 63, Chomes, Kagura-cho, Ushigoma-ku, Tokyo, Japan. Convention date (Japan), May 23rd, 1933.

It is proposed to make the inner portions of the wing of, say, a monoplane movable about an axis located approximately about the front spar position. This movable portion has flaps and carries an engine so that by manipulating the flaps it may be rotated into a vertical position. The outer portion of the wing is of normal form and is supported by the member on which the inner portion rotates. It is stated that this arrangement facilitates landing.

439,592. *Improvements relating to Controlling Arrangements for Aeroplanes.* Messerschmitt, W., Hannstetterstrasse 118a, Augsburg, Germany. Convention dates (Germany), February 24th, 1934, March 14th, 1934, and March 24th, 1934.

This specification is concerned with the use of spoiler vanes as a means of lateral control for aircraft. The vane is placed on the upper surface of the wing, and is hinged on its forward edge so that raising the vane spoils the airflow over the wing. It is stated that at angles of incidence of less than 10° the spoiler vane has little effect on the control until it is raised to a larger angle and methods are described by means of which this disadvantage may be overcome. For this purpose the vanes may be constructed in sections, being raised one after the other, or the vane may be flexible, one end being moved more than another.

Aeroplanes—General

439,365. *Improvements in Aircraft.* Downing, A. E., 35, Clive Street, West Bromwich. Dated June 13th, 1934. No. 17,484.

This invention is intended to make flying safer and easier to accomplish, which can, it is stated, be effected by economy of power, high thermal efficiency combined with silence, light loading, great capacity for gliding, ability to fly slowly, automatic stability and absence of risk from fire. The machine proposed has a long car body with a series of laterally extending fixed or adjustable gliding wings, and a series of wings which are reciprocated for propulsion. The propulsive and lifting power is applied with great power to a series of movable wings so that in their propulsive thrust they leave behind a series of isolated vortices rather than produce columns of wasted energy with voids to fill up with furious winds.

439,963. *Improvements in or relating to Aircraft.* McLaughlin, R. J., 73, West End Avenue, Manhattan Beach, Brooklyn, New York, U.S.A. Dated June 18th, 1934. No. 17,985.

The aeroplane shown in the drawings is approximately of the normal form of a high wing monoplane, but the rear part of the fuselage is provided with a passage into which air enters from underneath the front of the fuselage and the air is discharged in an orifice at the tail. In this passage way there is a cylindrical rotor, rotated by the air passing through and operating two Magnus rotors placed externally of the fuselage. In the passage way there are, in addition, three smaller cylindrical rotors which, it is stated, produce a lift, Instead of the external Magnus rotor an arrangement of rollers carrying a canvas cover, so arranged that when exposed to air currents the canvas takes a form approximating to an aerofoil, may be used. A Magnus effect may be obtained by revolving the rollers and moving the cover in the appropriate direction.

441,074. *Improvements in or relating to Aircraft.* Bishop, W. H., 48, Moor Street, Birmingham. Dated July 12th, 1934. No. 20,450.

In order to prevent stalling of the wings of aircraft it is proposed to provide an opening in the upper part of the wing in the position where it is stated that the pressure of the boundary layer falls below a safe minimum. This opening is provided by raising the upper surface of the wing up to this point, thereby leaving a gap between this raised portion and the normal wing. The backward edge of this raised surface is turned inwards and there may be a backwardly curved member fitted below it so as to prevent flow of air into the opening from the upper portion of the wing. An opening or openings are provided on the compression side of the wings and/or fuselage in order to feed the opening with air.

441,084. *A New and Improved Windscreen for Aircraft.* Vickers (Aviation), Ltd., and Wallis, B. N., Weybridge Works, Byfleet Road, Weybridge. Dated July 13th, 1934, No. 20,575, and March 23rd, 1935, No. 9,141.

This windscreen is primarily intended for use as a gun mounting in which protection is given to the gunner and is intended to be mounted either in the front or rear of an aeroplane fuselage. It is circular in section so as to form a faired continuation of the fuselage, is constructed mainly of transparent material and is fitted with a slot on one side in which moves the gun mounting. The whole mounting can be rotated while the gun can be rotated in its mounting, or the mounting may be moved along the slot enabling in this way the whole of the possible gun arc to be covered. Sliding covers are provided for closing part of the slot, brakes are provided for holding the gear in any required position; counterbalance weights are provided and are moved so as to automatically balance the weight of the gun. Provision is also made for balancing wind loads on the gun. The gunner's seat is adjustable and is attached to the fuselage proper.

Autogiros

438,525. *Improvements in and relating to Aircraft with Rotative Wings.* Cierva Autogiro Co.; Ltd., Bush House, Aldwych, London, W.C.2, and Bennett, J. A. J., Genista, Newton Mearns, Renfrewshire, Scotland.

This specification refers to the type of autogiro rotor in which the rotor may be revolved by the engine at a speed greater than that used in flight, the rotary blades being at a reduced angle of incidence. On cutting out the engine and simultaneously increasing the blade incidence angle the machine may be caused to jump off the ground, the energy for this action being provided by the excess rotary energy of the rotor. Each rotor blade is provided with three articulations, one in the flapping plane, another in the drag plane, and a third inclined

outwards. The purpose of this last is to come into action when a torque is applied to the hub and to reduce by its movement the angle of incidence of the blades. When the torque vanishes, as by declutching the motor, the blades take up their normal flying incidence. The movement is limited by stops where necessary and arrangements are made so that the bearing of the third articulation has a greater friction than the second.

438,660. *Improvements in and relating to Blades for Aircraft Sustaining Rotors.* Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2, and Bennett, J. A. J., Genista, Newton Mearns, Renfrewshire, Scotland. Dated May 16th, 1934. No. 14,816.

This specification refers to a proposed method of construction of the blade of an autogiro. The main structural member consists of a metal tube running the length of the blade. The tube has a section the top of which is that of the upper front surface of an aerofoil, the lower portion having the same section inverted and reversed. The aerofoil section is completed by means of wood fairing, say, of balsa and spruce, the latter wood being used where strength is necessary. The main tube may be reinforced by other approximately oval tubes sprung into place, and details of the method of attachment of the hub connections are described.

Bombs and Ballistics

440,156. *Improvements in or relating to Means for Carrying Bombs on Aircraft.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex; Youngerman, R. T., Walcot, Church Crookham, Aldershot, Hants; and Holroyd, F., Old Hatch Manor, Ruislip, Middlesex. Dated May 8th, 1935. No. 13,567.

In order to enable bombs to be stored within the fuselage of an aeroplane and to be released, if desired, outside the propeller disc, and also to facilitate loading, it is proposed to provide a runway transversely to the fuselage and situated in the wing so that a bomb to be released may be carried along the wing away from the fuselage and there released. Such a runway could be used in the reverse direction to facilitate loading, bombs being placed on the runway and carried into the fuselage. The opening in the wing caused by the runway is closed by a roller blind device.

441,350. *Gun Mountings for Aircraft.* Mare Birkigt, Rue du Capitaine Guynemer, Bois-Colombes (Seine), France. Convention date (Belgium), Nov. 20th, 1934.

This specification refers mainly to guns buried in the wings of aircraft so that only the muzzle projects from the leading edge. The chase of the gun is connected to the front spar, preferably through springs, so as to prevent abnormal loads affecting the spar, while the rear of the gun is attached to the rear spar in a manner which prevents the spars being stressed when the gun lengthens when hot. References are made to specifications 414,300 and 441,349.

438,717. *Improvements relating to the Mounting and/or Control of Machine Guns, Camera Guns, their Sights and the Like.* Stieger, H. J., General Aircraft, Ltd., Croydon Aerodrome, Croydon, Surrey. Dated June 14th, 1933. No. 16,999.

It is proposed to mount a machine gun or guns in an aeroplane in a position slightly distant from the gunner. For instance, the rear gunner may sit within the fuselage and the gun may be positioned above his head. In order to manipulate the gun the gunner has a separate sighting device attached to the gun and his seat, so that on rotating the seat the gun traverses for elevating. The

gun is connected to the sight by a chain gear or link gear so that the gun follows the elevation or depression of the sight. Arrangements are described from one or two guns, for various positions of the gunner in the aeroplane, and for means for automatically preventing the gunner from hitting portions of the aeroplane.

Control of Aircraft

436,680. *Improvements relating to Brake Controls for Aircraft.* Miles, F. G., and Powis, C. O., Reading Aerodrome, Woodley, Reading. Dated July 18th, 1934. No. 21,048.

It is proposed to operate Bowden wire brake controls by means of a plate carried under the rudder bar, which plate carries two levers adapted to come in contact with the rudder bar. These levers operate the brakes on each side of the machine. Variable braking is arranged for by means of another manually-operated Bowden cable which moves the plate carrying the levers in a fore and aft direction. When the plate is farthest from the rudder bar each brake can go on only when the rudder bar is moved to an extreme position; when the plate is moved near to the rudder bar both brakes may be on, but there is still differential action when the rudder bar is moved.

436,579. *Improvements relating to Automatic Course Control Devices for Aircraft, Marine Vessels, or Vehicles.* Siemens and Halske Aktien Gesellschaft, Berlin-Siemenstadt, Germany. Dated January 8th, 1934. No. 686. The application for a patent has become void.

This specification refers to automatic course control devices and describes a means whereby deviations from the direct course, caused by wind, etc., may be compensated for. This is achieved by a supplementary adjustment of the said automatic course steering device corresponding to the angle of duration determined from the desired course, for example, by taking a bearing by means of a wireless direction finding frame or by means of a telescope, the angle between the actual course and the desired course being ascertained in this way. Since the angle of deflection is known to the pilot, the latter can influence the steering of the craft accordingly or can supervise the operation of the steering on the indicating apparatus of an automatic steering device.

441,102. *Improvements in and relating to Control Surfaces for Aircraft.* Short Bros. (Rochester and Bedford), Ltd., and Gouge, A., both of Seaplane Works, Rochester, Kent. Dated November 17th, 1934. No. 33,126.

In the case of aircraft fitted with balanced control surfaces, such as ailerons, in which the balance is provided by hinging the surface at some position behind the leading edge, it is stated that considerable air resistance is caused normally by the gaps necessitated by the brackets which carry these hinges. It is proposed, therefore, to carry these hinges by a shallow member, such as a tube, projecting from the plane and working in a slot in the leading edge of the aileron. Provision is made for cover piece to be readily detachable so as to enable the hinges to be easily accessible.

441,103. *Improvements connected with Slots for Aircraft.* Blackburn Aeroplane and Motor Co., Ltd., Seaplane Base, Brough, and Bumpas, F. A., Elloughton, Brough, Hull, East Yorks. Dated December 27th, 1934. No. 37,059.

In the case of aircraft wings fitted with slots it is stated that it is desirable that the slots should be locked while the machine is on the ground in order to prevent wind damage. This specification describes a method by which the slots may be manually locked while the machine is standing and also automatically unlocked when the machine is operated, as, for instance, by the pilot operating

the ailerons. The apparatus described is a bell crank lever, provided with a lock to engage with a member attached to the slot, and maintained in either the locked or unlocked position by a spring device.

440,659. *Air Circulating Valve in the Supporting Surfaces of Aeroplanes.* Mazzini, F., Via Andrea Doria 42, Milan, Italy. Convention dates (Italy), July 5th, 1933; March 10th, 1934.

In order to increase the resistance of aircraft wings while landing so as to facilitate this operation and possibly also to increase lift, it is proposed to provide a slot shaped passage from the lower to the upper side of the wing capable of being closed by a valve. This passage runs along the span of the wing and its location in the chord direction may be in any position found desirable. The valve may be of the plug type with either parallel or tapered passage, or may be of a hinged type so formed as to give when open a passage of any desired shape. In certain cases the valve may be automatically operated.

Engines

438,384. *Emergency Fittings for Aircraft.* Horsbrugh, A. M., 12, Renfield Street, Glasgow, C.2. Dated July 3rd, 1934. No. 19,550.

For the purpose of rapidly emptying the fuel tanks of aircraft in emergency, the fuel tank is provided with a large emptying valve which is cross-connected to a valve connecting with a compressed gas reservoir so that both valves open together. The escaping gas enters the fuel tank driving out the fuel.

435,879. *Flexible Mountings for Aircraft Power Units.* Armstrong-Siddeley Motors, Ltd., Wylie, H. N., and Gay, A. R. B., all of Armstrong-Siddeley Works, Park Side, Coventry, Warwickshire. Dated May 22nd, 1934. No. 15,241.

The flexible mounting proposed includes an annular support and a radial flange on the engine having parts which spigotally engage one another through resilient means. Thus, to take the main portion of the weight of the engine attachment, bolts carried by the support or by the flange and extending through the latter with clearance and resilient means located on the support and on the flange to absorb the engine torque reaction chiefly in shear, the compression of this latter resilient means being variable by adjustment of the bolts.

440,656. *Apparatus for Handling Engines.* Vickers (Aviation), Ltd., Glen, W. A., Rayner, F. W., all of Weybridge Works, Byfleet Road, Weybridge Surrey. Dated July 3rd, 1934. No. 19,575.

This appliance consists of a tube bent into a quadrant of a circle, one end of which carries a further tube projecting inwards at right angles to which is hooked the engine crankcase, the other end of the quadrant being attached to the engine propeller shaft. On the tube there runs a sheave pulley to which is attached a strap which engages with a crane hook or other lifting device. The radius of the quadrant may be struck from the C.G. of the engine so that it is easy to place the engine in any desired position.

Helicopters

437,521. *Improvements in and relating to Aircraft.* Wilkening, F. W., Arlington and Braeburne Roads, Penn Valley, Montgomery County, Pennsylvania, U.S.A. Convention date (U.S.A.), February 2nd, 1934.

This specification describes a lifting rotor designed both to be power driven and also to autorotate, suitable medium angles for the two phases being obtained automatically and the motor being arranged close to the hub of the rotor. Each

blade is carried by a short link hinged at each end so that it is free vertically and horizontally. When power is applied the blades swing back owing to the torque and this action is utilised to increase their angle of incidence through a bevel gear, one member of which is carried by the link. The angle of incidence is stated to increase with an increase of torque and when power is cut off the blades swing forward and take up automatically a blade angle suitable for autorotation.

437,715. *Improvements in and relating to Aircraft.* Wilkening, F. W., Arlington and Braeburne Roads, Penn Valley, Montgomery County, Pennsylvania, U.S.A. Convention date (U.S.A.), February 2nd, 1934.

This specification describes an aircraft intended to be lifted by power driven rotary propellers acting vertically. The fuselage carries in front and rear vertical surfaces which can be placed at an angle to counteract torque, and there is also a tail plane or elevator which is used to tilt the whole machine so that propulsion can be obtained from a forward component of the lift force. The tail plane also carries ailerons and vertical surfaces.

436,981. *Improvements relating to Devices for Damping the Oscillation of the Revolving Wings or Blades of Aircraft.* Kay Gyroplane, Ltd., Kay, D., and Dyer, J. W., 18, Atholl Crescent, Edinburgh, Scotland. Dated June 26th, 1934. No. 18,889.

In the case of rotors with blades hinged on the two planes, it is stated that when movement is allowed in the plane of the blades rapid oscillations have been found to occur. It is therefore proposed to arrange in the wing a weight capable of movement in the chord direction which act by their inertia so as to oppose the rebound of the blade. Damping devices may, in addition, be fitted to the hub of the rotor.

437,034. *Improvements in and relating to Helicopter and Rotating Wing Aircraft.* Coats, A. G., Gloucester House, Park Lane, London, W.1, and Hafner, R., Mantlergasse 47, Vienna, 13, Austria. Dated April 23rd, 1934. No. 12,214.

This specification refers to the blades of lifting rotors and is concerned particularly with blades which are connected to the central hub by means of torsionally flexible radial members which take centrifugal forces in tension. In order to prevent the blade flying off if the tension member breaks, each blade is fitted with a collar which would come in contact with a member screwed into the hub, if breakage took place. Normally, there is clearance between these members.

441,445 *Improvements in or relating to Aircraft.* Mangold, S., 13, Gonzagagasse, Vienna 1, Austria. Dated July 5th, 1935. No. 19,312.

The proposed aircraft is provided with three or more lifting or propelling airscrews located at the apices of a polygon and arranged to be driven from the engine through a differential gear or gears. Steering can be effected by braking the propelling airscrews on one side of the aeroplane, while lateral control can be obtained by braking the lifting airscrews in the same manner.

439,298. *Improvements in Helicopter Flying Machines.* Porter, J. R., Whatley Road, Clifton, Bristol.

This invention comprises a horizontal lifting screw rotating in one direction and a second lifting propeller rotating in the opposite direction, the second lifting propeller consisting of a power-driven lifting propeller having radial arms at the end of which circular rings are attached, these rings being set at an angle with the vertical axis of the machine, the section of the lifting rings being of aerofoil

shape. The rings, during rotation, cut the air and drive it downwards, thereby producing an upward lift.

435,818. *Improvements in or relating to Helicopter and Rotating Wing Aircraft.* Coats, A. G., Gloucester House, Park Lane, London, W.1, and Hafner, R., Mantlergasse 47, Vienna 13, Austria. Dated March 29th, 1934. No. 9,867.

In the case of rotary wing aircraft it is stated to be desirable that the axes of the hinges of all blades should intersect. In order to enable this to be done with three blades, each blade is provided with an unsymmetrical fork, the longer leg of which lays outside the shorter leg of the adjacent fork. The hinge pins of the latter work in clearance holes in the longer legs of the forks. The blades are provided with means for altering their inclination by means of radius rods operated by a spider carried by a central control column.

440,476. *Improvements in and relating to Aircraft.* Wilkening, F. W., Arlington and Braeburn Roads, Penn Valley, Montgomery, Pennsylvania, U.S.A. Convention date (U.S.A.), February 2nd, 1934.

The machine proposed is a helicopter provided preferably with a device by which the lifting rotor may autorotate when the motor stops. As there is only one rotor, this, when engine driven, would cause a rotative force on the fuselage; this force is opposed by two or more surfaces disposed symmetrically with reference to the rotor axis and in the rotor slipstream and so inclined as to counteract this torque. These surfaces may have ailerons for control purposes and may also be used as radiators for cooling the motor.

Miscellaneous

439,038. *Improvements in or relating to Liquid Containers.* Dornier Metallbauten, G.M.B.H., Friedrichschafen, Lake Constance, Germany. Convention date (Germany), June 19th, 1933.

In order to make light tanks tight against leakage it is proposed to cover them internally with a porous fabric attached by means of an adhesive liquid proofing medium, the joints being covered by a metal bar riveted to the tank. The bar itself is covered by a further application of the fabric and medium. Alternative methods of applying the fabric are described.

439,240. *Improvements in and relating to Aircraft.* Holler, H. P., Town of Poplars, Maryland, U.S.A. Dated April 30th, 1934. No. 13,000.

The arrangement described consists of a combination between a dirigible balloon and an aeroplane. The balloon is elliptical in section and has underneath it a cabin fuselage which possesses wings with downwardly folding tips which are locked in the horizontal position in flight. Underneath and round the aerostat runs the narrow platform of the main bridge with railings and electrically-driven lifting propellers may be used.

439,284. *Method of and Means for Preventing the Accumulation of Ice on Aircraft.* Barker, G. G., 14-18, High Holborn, London, W.C.1. Dated April 3rd, 1934. No. 10,016. (A communication from Bendix Aviation Corp., 105, West Adams Street, Chicago, U.S.A.)

It is proposed to utilise for this purpose a system of appropriately located flexible and expansible overshoes, which are expanded and contracted in such a way that the ice formation is broken up before it becomes dangerous. The overshoes are alternatively inflated and deflated in such a manner that the exhaust of one shoe or a group of shoes is used for the inflation of other shoes. The air for inflation is supplied by an engine-driven pump and a slow speed distributor.

Model Aircraft

439,826. *Improvements in or connected with Toy Aeroplane Gliders.* Back, W. E., Oulton Broad, Suffolk. Dated June 16th, 1934. No. 17,880.

This specification describes a toy glider on which the angle of incidence of the wing on either side of the body is adjustable, in which the wing is mounted pivotally and controlled by rubber in which rubber is incorporated in the leading edge of the wing and on which the angle of the tail plane can be altered so that the glider can loop the loop.

Ornithopters

422,667. *Ornithopter.* Karl Haenle, 99, Finkenkrugerwey, Berlin-Staaken, Germany. Dated May 28th, 1934. No. 15,806.

Instead of making the wing ribs of an ornithopter flexible so as to get the required flapping action it is proposed to use stiff and indeformable wings capable of rotation round the spar and controlled by springs. The tension of the springs may be altered by turning the spar in order to give control. This control gear consists of a lever mounted on the wing spar operated by a screwed spindle.

Rocket Propulsion

439,805. *Improvements in Jet Propulsion Apparatus for Aircraft, Projectiles and Turbine Apparatus.* René Laduc, 3, Avenue Gabriel Dupont, Le Vesinet-Seine-et-Oise, France. Convention dates (France), June 7th, 1933, and January 2nd, 1934.

This specification describes a jet propulsion apparatus which has variously shaped passages in which the temperature and velocity of the fluid may be varied in accordance with a cycle. The nozzle comprises a compression zone, a source of heat, an expansion zone, a source of cold and a compression zone.

Seaplanes

437,465. *Improvements in or relating to Wing Tip Floats for Seaplanes.* Short, H. O., and Gouge, A., Seaplane Works, Rochester. Dated June 28th, 1934. No. 19,101.

It is proposed to utilise the wing tip floats of a seaplane for the purpose of damping any oscillation which may occur in the wings. In order to do this the floats are attached to the wings by means of inverted wing struts and wire bracing and also by a diagonal member containing springs and a damping mechanism. As the period of oscillation of the wings and float are different, any oscillation of the former would cause the floats to endeavour to move in a different period which would bring the damping mechanism into action. The diagonal spring member may also absorb landing shocks.

Testing

440,198. *Apparatus for Testing the Resistance of Structural Parts, Particularly Parts of Aeroplanes.* Bugatti, J., Molsheim, Bas-Rhin, France. Convention dates (France), March 12th, 1934, and April 25th, 1934.

In order to approximate to flight conditions when testing aircraft structurally it is proposed to use a device consisting of a platform larger than the span of the machine, two columns at each end of the platform connected at their upper ends by a girder and two forked members capable of motion on the columns arranged to support air or water bags in contact with the wings. These bags may be inflated to any desired pressure and the load may be applied through them or through a down or up load applied to the fuselage. Tests may be made with engine running or other methods of producing vibration may be used.

Undercarriages

440,358. *Improvements relating to Retractable Undercarriages for Aircraft.* Hawker Aircraft, Ltd., Canbury Park Road, Kingston-on-Thames, Surrey; Duncan Davies, S., and Down, C. R., of the same address. Dated June 27th, 1934.

This chassis is stated to be particularly suitable for low wing monoplanes and is characterised by a device which enables the wheel to be swung inwards and backwards when retracting so as to clear the wing spar. Each wheel has its own chassis, this consisting, when extended, of one approximately vertical member carrying the shock absorbing device, one member leading upwards and backwards and a third member leading upwards and inwards. The member going backwards has in its length a link at its upper end which is straight when the chassis is extended. On turning a tube, which can be rotated hydraulically, this link is moved out of line, and in doing so draws the chassis backwards. At the same time the rotating of this tube turns the whole chassis inwards so that it folds into a recess provided.

438,770. *Improvements in and relating to Aeroplane Undercarriages.* Elektron-metall, G.M.B.M., Camstatl, Germany. Convention date (Germany), June 29th, 1934.

It is proposed to construct an aeroplane chassis by providing, for each wheel, a single supporting member which carries at its lower end a link projecting backwards. The other end of this link carries the wheel and the shock absorbing device is enclosed in a member starting from the wheel axis, the other end of which is attached to the single supporting member at some distance above its lower end. The link is connected rigidly to the brake plate for the purpose of taking braking loads.

441,432. *Improvements in or relating to Undercarriages for Aircraft.* G. and J. Weir, Ltd., Holm Foundry, Cathcart, Glasgow, and Pullen, C. G., 104, Queen's Drive, Glasgow, S.2. Dated January 21st, 1935, No. 1,906, and September 27th, 1935, No. 26,719.

The chassis referred to is stated to be particularly suitable for aircraft of the autogiro type and consists of a stub axle for each wheel connected to the fuselage by three struts, two in front elevation leading from the stub axle and connected to the fuselage one above the other, and one in side elevation proceeding from the stub axle upwards and backwards to the fuselage. All are fitted with shock absorbers, but the strut proceeding backwards and upwards has shock absorbers adapted to function only in tension.