ABSTRACTS OF PATENT SPECIFICATIONS.

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

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AERODYNAMICS.

488,942. *Improvements in or connected with Aerofoil Surfaces for Aircraft.* Vickers (Aviation), Ltd., and Ellis, D. L., both of Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated Jan. 16th, 1937. No. 1,397.

It is proposed to use means for producing a suction on the under surface of an aerofoil and to communicate this suction to selected points on the upper portion of the aerofoil by means of a passage. It is claimed that the result is to modify the boundary layer flow so as to increase lift or reduce drag. The method proposed is to form a venturi passage under the aerofoil, possibly by using an auxiliary aerofoil spaced a short distance underneath it. The combination of the under surface of the main aerofoil and the upper surface of the auxiliary produces the desired venturi. The auxiliary aerofoil may be retracted into the main aerofoil.

484,405. *Improvements in Aircraft.* The Bristol Aeroplane Co., Ltd., Fedden, H. R., and Owner, F. M., all of Filton House, Bristol. Dated Nov. 2nd, 1936. No. 29,804.

Inside a body such as a wing forming part of an aircraft there is a chamber connected to perforations on the skin. There is also an ejector nozzle within the chamber, an exhaust pipe from the engine leading to the nozzle so that the ejector action of the exhaust gas draws air from the boundary layer along the conduit into the chamber, and discharges the air and gas rearwards.

483,561. *Control of Air Cooling Streams.* Cowdrey, C. L., 66, Long Hill Rise, Hucknall, Nottinghamshire, and Tate, J. W., 64, Long Hill Rise, Hucknall, Nottinghamshire. Dated Oct. 16th, 1936. No. 28,207.

It is proposed to control the airflow through a direct housing containing air cooling means by varying the size of the entrance to, or exit from, the duct by means of a member composed of flexible steel arranged at the entrance or exit

of the duct and forming part of the wall of the duct. Means are provided for bending it to varying extents.

AEROFOILS.

488,614. *Improvements in Aerofoils.* Ely, E. E., 4, Birkdale Road, Dewsbury, Yorks.; Ely, E. C., 45, Fairdale Gardens, Hayes, Middlesex; Ely, A. R., 4, Birkdale Road, Dewsbury, Yorks.; and Ely, D. G., 4, Birkdale Road, Dewsbury, Yorks. Dated Jan. 7th, 1937. No. 484.

The proposed aerofoil has a number of slots which project forward so that the opening on the top of the aerofoil is in front of the opening on the bottom. In flight it is stated that air passes from the upper to the lower surface of the aerofoil thereby breaking up any eddies or cushions of air on the upper surface of the wing.

489,853. *Improvements relating to Aerofoils.* Miles, F. G., Reading Aerodrome, Woodley, Reading, Berkshire. Dated Feb. 3rd, 1937, No. 3,229, and Dec. 9th, 1937, No. 34,147.

This is a flap gear, including at least two flaps which are adjacent, each flap being capable of angular movement relative to the wing and at least one having mechanism adapted to displace it to the rear. There is also claimed a combination of a split flap with an extensible flap whereby the area of the wing is virtually increased, having a slot between the wing and the flap. A number of flaps may be displaced rearwardly, simultaneously presenting slots between the flaps and the wing.

AIRCRAFT—CONSTRUCTION.

488,924. *Valves for Liquid Containers in Aircraft.* Ellor, J. E., Grandell, South Drive, Chain Lane, Mickleover, Derby, England. Dated Jan. 12th, 1937. No. 923.

This arrangement is intended for use in fuel tanks, etc., in aircraft where the tanks have branch pipes which unite in common outflow pipes and which are arranged so that during flight the contents of one tank might flow into the other. In order to prevent this each tank outlet is provided with a flap valve, the seat of which is inclined to the vertical. The arrangement is such that if flow from one to another tank is possible the appropriate flap valve shuts automatically so as to prevent it.

488,986. *Arrangements for Balancing the Torques Set Up in Rudders by the Action of Kinetic Forces.* Junkers Flugzeug-Und-Motorenwerke Aktiengesellschaft, 39, Junkersstrasse, Dessau, Anhalt, Germany. Convention date (Germany), March 1st, 1937.

It is proposed to attach a hinged member to the rudder which works in a chamber contained in the rear of the fin. The chamber is divided into two compartments by the hinged member, each compartment communicating with external space. The hinged member fixed to the rudder has a hinged auxiliary surface which is movably fixed in a fluid tight manner with one wall of the chamber.

488,105. *Improvements in Petrol Tanks.* Hall, F. H., Cleeve Cottage, Holford, Bridgwater, Somerset. Dated Dec. 31st, 1936. No. 35,784.

The proposed tank is arranged so that the fuel can be jettisoned quickly while the delivery of the fuel to the engine from this tank is interrupted, there being a reserve supply for the engine during interruption. A source of gaseous pressure is used which operates on the surface of the fuel and when this is turned on the air inlet is closed and the discharge syphon is automatically opened. The pressure required may be derived from any source of compressed gas or by means of an explosive cartridge.

487,404. *Improvements in and relating to Aircraft.* Nash, A. G. F., Oakcroft Road, Kingston By-Pass, Tolworth, Surrey. Dated Nov. 17th, 1936. No. 31,489.

This is an arrangement for reducing the resistance of an aircraft turret when the latter is extended, the fairing arrangement being movable and so arranged that it can cover the opening in the structure through which the turret is projected. The fairing is arranged to be brought within the space in the aircraft adjacent to the turret or below the skin of the aircraft when the turret is extended or projected.

487,548. *Improvements in or relating to Cockpit Covers for Use on Aircraft, Motor Boats and Ships and in Similar Positions.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex; Lobelle, M. J., Ludlow, 298, Langley Road, Langley, Bucks; and Trotter, J. C., 2, Manor Parade, Hillingdon, Middlesex. Dated July 1st, 1937. No. 18,323.

A vane is pivoted to the aircraft at what is normally its rear edge and is connected by a series of links and levers with the cockpit cover, the arrangement being such that when such flap or vane is opened from a forwardly directed position it becomes projected into the airstream. The air load acting on it tends to increase its opening movement and to balance the air forces on the cockpit cover which, owing to the link and levers, opens with the vane.

487,799. *Improvements in or relating to Aeroplanes.* Armstrong, J. J. V., 12, Church Street, Liverpool. Dated Dec. 24th, 1936. No. 35,459.

The proposed longeron consists of a core of wood tightly surrounded by a sheath of thin metal; means are provided to hold the core in endwise compression. Metal sheaths are formed by overlapping edges of sheet metal strips and welding. Bracing members are welded to the sheaths. Spars are formed by joining upper and lower longerons together by diagonal bracing.

483,085. *Improvements in or connected with the Construction of Wings, Surfaces and Fuselages for Aircraft.* Blackburn Aircraft, Ltd., and Petty, G. E., both of Seaplane Base, Brough, Hull, Yorkshire. Dated Oct. 12th, 1936. No. 27,626.

The proposed construction consists of using a number of tubular members running longitudinally through the wing or fuselage. These are of constant outside diameter but of varying gauge. These are spaced by transverse ribs or formers having a series of recesses round their borders which receive the tubular members. There is also an external cover of sheet material attached to the tubes.

483,302. *Improvements in and relating to Panel Securing Means in or for Aeroplanes and Vehicles with Sunshine Roofs or the Like.* Mobbs, R. O., United Building, Trading Estate, Slough, Buckinghamshire. Dated Aug. 14th, 1936. No. 22,449.

It is proposed to provide a simple means whereby sliding panels may be secured in any desired position. The retaining device proposed depends for its action on the flexibility of the hatch cover, and the device requires that the panel is flexed upwards whilst it is being moved and is engaged in position when it reaches the desired position by recovering its normal shape.

487,049. *A New and Improved Method of and Improvements in or connected with the Design and Construction of Folding Wings or Planes for Aircraft.* Hudson, R. J. H., Yennadon House, Dousland, South Devon. Dated Nov. 14th, 1936. No 31,126.

When wing folding is required to take place by rotations about two mutually inclined axes a wing is connected to the steel wing by means wholly within the thickness of the wing, comprising an element pivoted about a first axis carrying a

pivot joint of which the axis is substantially perpendicular to the first. There is a link to restrain the movement of the wing during folding. This member has for its function the constraining of the wing to move with a composite motion.

486,758. *A New and Improved Method of and Improvements in or Connected with the Design and Construction of Folding Wings or Planes for Aircraft.* Hudson, R. J. H., Yennadon House, Dousland, South Devon. Dated Oct. 9th, 1936. No. 27,388.

In folding wing aircraft in which folding is required to take place by rotation about two mutually inclined axes a wing is attached through connections comprising an element rotatably connected to the structure about a first axis and to the wing about a second axis intersecting the first at approximately a right angle. An external strut is pivoted to the aircraft about a third axis and pivoted to the wing about a fourth axis, the four axes being concurrent and the third axis lying in a plane to which the first axis is substantially perpendicular.

486,823. *Improvements in or relating to Aircraft Wings.* Dornier Metallbauten G.m.b.H., and Dr. Ing. H. C. C. Dornier, both of Friedrichshafen, Lake Constance, Germany. Convention date (Germany), Aug. 3rd, 1936.

The wing proposed consists of a main wing and a rigid or movable auxiliary wing the distance between them being a small fraction of the main wing chord. The trailing edge of the main wing and that of the auxiliary are each provided with one or more members extending over their length, which members are movable in an up or down direction. There may be more than one auxiliary wing.

486,849. *Improvements in and relating to Aircraft.* Lee, A., 851, Kingsway, East Didsbury, Manchester. Dated Nov. 3rd, 1936. No. 29,880.

The proposed aircraft wing has a series of impellers disposed in passages extending from the underside of the wing to the upper and adapted to be driven by the wind or by motive power. The axis of each set of impellers is at right angles to the longitudinal axis of the aircraft and is substantially horizontal, and is located at about one third of a chord from the leading edge. The diameter of the impellers may be reduced towards the wing tips.

486,067. *Improvements in or relating to Wind or Like Screens for the Cockpits of Aircraft, Motor Boats or Motor Cycle Sidecars, or for Use in Similar Situations.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex; Lobelle, M. J. O., Ludlow, 298, Langley Road, Langley, Bucks; Disch, A. G., 15, Melbourne Avenue, West Ealing, London, W.13; and Bolton, F., 22, Shanklin Road, Southampton, Hants. Dated July 1st, 1937. No. 18,322.

This specification is an addition to 427,226, and it is proposed that instead of the arched member being arranged to co-operate with the guides which extend horizontally forwards and then upwards and forwards, then upwards and rearwards, and then vertically upwards, it is pivotally connected at each side with a member slidable on a fixed vertical guide, mounted on the aircraft or the like, and with the upper end of a radius link, the lower end of which is pivoted to a fixed part of the aircraft.

485,324. *Method and Apparatus for Forming Aircraft Flotation Members from Fuel Tanks.* Walter Kidde and Co., Inc., 60, West Street, Bloomfield, New Jersey, U.S.A. Convention date (U.S.A.), April 15th, 1936.

A tank is proposed having a vent which conducts the fluid under pressure to means for closing the vent after said fluid under pressure has opened the discharge port. The fuel is evacuated so that the tank can be used as a flotation member.

The fluid under pressure may be introduced into the tank after it has opened the discharge port. Means are also provided for closing a vent in the tank and for closing the vent by the fluid under pressure.

484,305. *Improvements in or relating to Aircraft Wing Construction.* Beckay Aircraft Corporation, Ltd., and Hart-Still, S. C., both of 61, Crutched Friars, London, E.C.3. Dated Nov. 3rd, 1936. No. 29,909.

It is proposed to construct an aeroplane wing by a number of cells running spanwise formed by spars of vertical fly webs and flanges of the same material. These spars are reinforced throughout their lengths by beams secured to them.

484,622. *Improvements in or relating to Folding Wing Aircraft.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex; Lobelle, M. J. O., Ludlow, 298, Langley Road, Langley, Bucks; and Trotter, J. C., 2, Manor Parade, Hillingdon, Middlesex. Dated March 2nd, 1937. No. 6,210.

It is proposed that the wings of a low-winged monoplane shall be pivoted about vertical axes at the sides of the fuselage and between the leading and trailing edges while a part of the under side of the fuselage is retractable so as to allow parts of the wings when in their folded position to underlie the fuselage.

489,703. *Improvements relating to Cabin Tops, Cupolas and the Like for Aircraft.* Hawker Aircraft, Ltd., Canbury Park Road, Kingston-on-Thames, and Bower, C., of the Company's address. Dated May 15th, 1936. No. 13,855.

The cabin top proposed has a continuous covering of streamline form, and having a section rotatable out of continuity about the axis transverse to the length. A rear end section may be rotatable about a longitudinal axis, this being especially applicable when there is a rear gun mounting. The first rotatable section may be rotatable with a gun mounting so that it rotates turretwise and may be slotted so as to enable the gun to be elevated. The rear section rotatable horizontally has preferably a presto-conical section.

489,837. *Improvements relating to Cabin Tops and the Like for Aircraft.* Hawker Aircraft, Ltd., Canbury Park Road, Kingston-on-Thames, Surrey, and Bower, C., of the Company's address. Dated May 15th, 1936. No. 367.

The cabin top has a covering structure with a slidable door guided and supported on rails. The rails are displaceable transversely to their length, the door being thereby displaced transversely independently of its sliding motion. The door completes the streamline when closed and may have anti-friction rollers retained by a pair of parallel channel rails connected to the structure by parallel links.

490,151. *Improvements relating to Folding Wings for Aeroplanes.* Bagenische Flugzeugwerke A.G. Hannstetterstrabe 118a, Augsburg, Germany. Convention date (Germany), May 8th, 1936.

It is proposed to fold the wings of an aeroplane by arranging at a central position of the wing profile a joint movable about to angularly disposed pivoting axes. A brace is rotatively connected with a fixed point relative to the fuselage and to the foldable part of the wing. The path of the foldable portion of the wing may be so determined that the wing need not touch the ground, while the central position of the joint ensures that the wing need not be lifted. Hence it is claimed that the wing may be folded by one person.

490,031. *Improvements in and relating to Rubber and Metal Parts for Elastic Suspension Purposes.* Goldschmidt, M., Frankfurt, a.M., Germany. Convention date (Germany), Oct. 25th, 1935.

This proposal is concerned with an arrangement of rubber and metal parts in order to prevent vibration, especially for the suspension of aeroplane engines, the rubber being vulcanised to the metal. There is a number of concentrically bored out discs so arranged in two groups that in each case one of the discs mounted on the journal alternates with a disc fixed in the bearing, the rubber being vulcanised on between the discs.

AIRSCREWS.

488,455. *Paddle Wheel Propelling Means for Ships and the Like.* Mollica-Landi, A., Via F. Crispi 98, Naples, Italy. Dated July 7th, 1937. No. 18,856.

The proposed propeller has a rotating part provided with blades which are radially assembled on radial shafts on the body. These are controlled by spindles which can move axially forwards or backwards during the rotation of the body. On their forward stroke the spindles operate on the back of the blades so as to push them forward. As a result the blades are brought from a flat position on the body to a perpendicular position after which they gradually fall back to the flat position.

485,053. *Improvements in Mechanical Transmission Systems for Aircraft.* Almonacid, V. A., 105, Grande Rue, Boulogne-sur-Mer, Pas-de-Calais, France. Convention date (France), May 4th, 1937.

The proposed transmission system relates to a method of causing a rotating shaft to drive other rotating shafts located at a distance and parallel to the driving shaft. There are one or more driving shafts driving two or more driven propellor shafts, arranged so that the entire wing is subjected to the slip-stream of the propellors. The shafts have each at least two opposed cranks which are connected together by wires, rods, tubes, etc., so that the respective cranks are always parallel.

484,338. *Lifting Tackle for Airscrews.* Dorey, R. N., Grasmere, Burton Road, Findern, Derby, and Bellamy, R. A., 14, Stables Street, Derby. Dated Jan. 28th, 1937. No. 2,512.

The tackle proposed is attachable to a hoist-rope and also readily attachable to the airscrew, the two members being connected together by a member having a coarse thread by which one member can be caused to traverse with reference to the other, the effect being to vary the inclination of the airscrew. There may be a yoke member adapted to be clamped at each end to the root of one of the airscrew blades.

489,293. *Improvements in and relating to Propellers.* Duris, M., 9, Rue de la Mouilliere, Orleans, France. Convention date (France), Feb. 7th, 1936.

The propeller proposed has a rotor and a fixed portion, the former being mounted on the nose of the latter. The outer surfaces of each are formed as surfaces of revolution about a common axis, along which the device moves as a whole. The rotor has an annular rim which has a surface profile similar to that of the upper surface of an aerofoil with the leading edge pointing inwardly. Working fluid is caused to flow nearly parallel to the axis towards the centre of the rotor and thereafter radially and rearwardly over the annular rim and in an annular diverging stream, over the front portion of the nacelle.

490,747. *Improvements in or relating to Oppositely Rotating Co-Axial Propellers.* United Aircraft Corp., 400, South Main Street, East Hartford, Connecticut, U.S.A. Convention date (U.S.A.), Feb. 29th, 1936.

This specification describes an arrangement by which the co-axial propellers are driven by one engine at less than engine speed. The propellers have pitch changing mechanism. There is provided a pair of bevel gears and a number of pinion gears in a cage for rotating the sleeve, carrying one propeller in a direction opposite to the propeller shaft. There is also an axially movable sleeve disposed between the shaft and the sleeve connected to the propellers and capable of being controlled for the purpose of changing the propeller pitch.

AIRSHIPS.

487,906. *Airships.* Clark, F. B., 820, Connecticut Avenue, North West, Washington, Columbia, U.S.A. Dated April 6th, 1937. No. 9,826.

The proposed airship has a keel containing a cabin projecting from its underside and lying beyond the major curvature of the hull, the skin of the hull and keel being nearly continuous. The surface of the hull between it and the keel protrudes outward so as to provide an air tunnel on each side of the ship parallel with the longitudinal axis. Propellers are provided on each side and are arranged under the protruding portions of the hull.

487,639. *Improvements in Lighter-than-Air Aircraft.* Reichert, H. G., 2256, Lake Street, Salt Lake City, Utah, U.S.A. Dated Aug. 31st, 1937. No. 23,845.

The proposed airship has a number of individual cells each comprising a gas chamber bounded partly by a rigid wall and partly by a movable diaphragm, and means for moving the diaphragms to compress or expand the lifting gas to a pressure higher or lower than that of the surrounding atmosphere. The movable diaphragm divides the cell into a gas chamber and an air chamber and air can be blown into or exhausted from the air chamber so as to alter the pressure.

483,606. *Improvements in Airships.* Allen, A. W., 3307, North 16th Street, Philadelphia, Pennsylvania, U.S.A. Convention date (U.S.A.), April 21st, 1936.

This specification refers to the framework of airships of the Zeppelin type. In order to prevent the rigidity of the structure which is suggested is the cause of accidents, it is proposed to provide a framework which has a predetermined degree of flexibility. The proposed framework has a succession of rigid members flexibly connected together by means of resilient elements.

ARMAMENT.

485,750. *Towing and Dropping Bombs and Other Articles from Aircraft.* Castelli, J. L. A., 16, Rue des Sables, Viroflay (Seine et Oise), France, and Fremont, A. A., 3, Boulevard Julien Potin, Neuilly-sur-Seine (Seine), France. Dated Aug. 24th, 1938. No. 23,191.

There is a winding drum operated manually and fitted on the aircraft, a retractable towing device connected with the drum, a safety housing to be connected with the other end of the towing device and to be releasably engaged with the object to be towed and/or dropped. The body has stabilising fins for ensuring that it has a trajectory similar to said attacking or other carrying means.

490,028. *Improvements in and relating to Bomb Carrying and Dropping Apparatus for Use on Aircraft.* Short Bros. (Rochester and Bedford), Ltd., and Gouge, A., both of Seaplane Works, Rochester, Kent. Dated Oct. 12th, 1936. No. 27,627.

It is proposed to suspend the bombs in tiers between opposed guides which allow the bomb carriers to slide up and down and to drop completely out of the

guides. Means are provided for retaining the bombs in the stowed position and for releasing the bombs and the carriers when it is desired to drop them from the aircraft. Separation of the bomb from the carrier is automatically effected.

CATAPULTS.

489,417. *Improvements in or relating to Controlling Means for Aircraft Catapults.* Deutsche Werke Kiel Aktiengesellschaft, Werftstrasse 114, Kiel, Germany, and Hollmann, C., Gabelsbergerstrasse 28, Kiel, Germany. Dated Jan. 5th, 1938. No. 330.

The controlling means proposed has a piston operated by pressure, and a starting lever controlling the flow of air to the piston, the starting lever being automatically moved to its starting position after the movement has been initiated by hand. Accidents which might occur if the lever was not properly operated are thus avoided.

490,408. *Improvements in or relating to Apparatus for Aeroplane Launching.* Courtney, F. T., Sunray, Wroxham, Norfolk. Convention date (U.S.A.), Aug. 31st, 1936.

This is a type of launching catapult in which the aeroplane is carried on a special car which can be accelerated up to the flying speed of the aeroplane. The aeroplane support on the car can be swivelled laterally so that when starting the aeroplane can be pointed into the direction of the resultant wind. The support can be rocked fore and aft by the pilot so that the aircraft cannot take-off until full flying speed is attained. This action of changing the attitude of the aeroplane to take-off attitude may operate the releasing gear automatically.

490,214. *Launching and Landing Device for Aircraft.* Margeram, A. F., 48, Pullayns Avenue, East Ham, London, E.6. Dated Feb. 6th, 1937. No. 3,586.

It is proposed to launch the aircraft by means of an endless track. The aircraft is mounted on a carrier unit which rests on the endless track and which, after the track has gathered speed, is frictionally engaged with it so as to accelerate the aeroplane.

CONTROL OF AIRCRAFT.

488,967. *Improvements in or relating to Aircraft.* Pollopas Patents, Ltd., 2 and 3, Charterhouse Square, London, E.C.1. Dated July 2nd, 1937. No. 18,468.

This proposal concerns aircraft provided with a controlling and stabilising surface carried at a considerable distance above the wing of the machine. It is proposed that this surface shall consist of a number of independently adjustable elements mounted one behind the other in a fore and aft direction, the elements forming one unit in their zero position. The elements may also be arranged in the spanwise direction or the elements may be universally mounted, each being in the form of a unit.

483,497. *Improvements relating to the Control of Drag on the Outer Surfaces of Aircraft.* Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex; Lobelle, M. J. O., Ludlow, 298, Langley Road, Langley, Bucks; Hooper, M. S., Pophley, Iver Lane, Iver, Bucks; and Morrey, P., Zosmor, 665, Great West Road, Osterley Park, Middlesex. Dated Oct. 22nd, 1936, No. 28,751; April 16th, 1937, No. 10,918; April 16th, 1937, No. 10,919.

The proposed wings are provided with apertures and means are provided for withdrawing air through said apertures. The apertures are arranged only over the trailing two-thirds of the top or corresponding surface of the body, and over

the trailing four-fifths of the bottom or corresponding surface thereof. The openings have forward projecting louvres, the length of the slits being from .025 upwards and the depth between .01in. to .04in.

484,693. *Improvements in or relating to Apparatus for Controlling the Tail Units of Aircraft.* Bleriot-Aeronautique Societe Anonyme, 167, Quai Gallieni, Surmesmes (Seine), France. Convention date (France), Aug. 5th, 1935. Specification not accepted.

It is proposed to provide a control system which permits of operating a V or similarly shaped tail unit by means of the same members as are usually employed for controlling an ordinary cruciform tail unit. Such members being a control stick and a foot bar or pedals for steering.

486,565. *Improved Mechanism for Actuating the Wing Flaps of Aircraft.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex, and Lobelle, M. J. O., Ludlow, 298, Langley Road, Langley, Bucks. Dated April 9th, 1937. No. 10,182.

The apparatus proposed consists of a link pivotally connected near the upper surface of the main wing and flap, and a lower link pivotally connected near the lower surface of the main wing and flap. Movement of the flap is effected by an hydraulic ram which is pivotally connected at one end with the main wing, and at the other end with the junction of the upper link and flap.

486,568. *Improvements in or relating to Controlling Devices for Aeroplanes.* Fairey, C. R., The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex. Dated June 5th, 1937. No. 15,656.

In this specification the trailing edge of the wing is split into an upper and lower section, the upper section being connected with the lower by a link, the connection with the upper section being behind the connection with the lower. These connections are to be near the centres of pressure of the two sections.

486,682. *Improvements in or relating to Control Apparatus especially for Aircraft.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex; Roberts, H. F., 21, Glebe Road, Hayes; and Venning, W. H., 24, Argyll Avenue, Southall, Middlesex. Dated Feb. 13th, 1937. No. 4,387.

This device relates to a method of registering the degree of rotation of a control device such that several such devices may be combined in a compact structure. Each such control device is provided with an involute spiral form on a wheel and a pivoted arm, one end of the arm forming a pointer co-operating with a fixed scale and the other end of the arm engaging with the spiral groove.

486,749. *Improvements relating to the Operation of Control Surfaces of Aircraft.* Hudson, R. J. H., Yennadon, House, Dousland, South Devon. Dated Dec. 8th, 1936. No. 9,608.

The control mechanism consists of a spindle rotatable about a first axis carrying a pivot joint with an axis substantially perpendicular to the first, these two axes intersecting at the hinge of the surface at a point. The pivot joint is a connection with a further rotatable element which can rotate in the surface and which intersects at the said point and which is inclined to the first and third axes.

485,794. *Improvements in or relating to Aircraft.* Back, W. E., Mancroft Towers, Oulton Broad, Suffolk. Dated March 4th, 1937. No. 6,479.

The proposed aeroplane has ailerons and a control member by which the ailerons can be moved differentially for banking and which when moved fore and aft moves the ailerons in the same direction and simultaneously moves a tail elevator in

the opposite direction. There is a separate control member so that the aileron can be moved together or to cause the ailerons to act as a brake without moving the elevator appreciably.

485,069. *Landing Flaps on Aircraft.* Deutsche Versuchsanstalt fur Luftfahrt, E. V., Rudower Chausee 16/25, Berlin-Aldershof, Germany. Convention date (Germany), July 27th, 1936.

The proposed flaps are stated to avoid disturbance of the stability and trim of the aircraft when they are deflected. They are slot flaps with a chord dimension of from 50 to 60 per cent. of the wing profile, the slot being closed in the neutral position.

486,954. *Improvements in Means for Laterally Controlling Aircraft.* Blackburn Aircraft, Ltd., and Fenton, G. B., both of Seaplane Base, Brough, nr. Hull, East Yorks. Dated Nov. 11th, 1936. No. 30,776.

There is a main flap on the wings at each side of the aircraft, upper and lower subsidiary flaps on each main flap which can be raised and lowered with respect to the main flap; means for operating the subsidiary flaps independently of the main flaps so as to raise the upper flap on one side and lower the lower one on the other while the remaining flaps remain against the main flaps.

489,771. *Improvements relating to Fluid-Pressure Jacks, Particularly for Air craft Flap or Like Control.* Miles, F. G., Reading Aerodrome, Woodley, Reading, Berkshire. Dated Feb. 3rd, 1937. No. 3,228.

The proposed fluid pressure jack has two cylinders in a single body each with a piston, the pistons extending oppositely and having differing strokes. The body is movable, rotating to the points of attachment. The points are part of the wing structure and part of a wing flap, etc., and the jack can be used for two or three differing stroke lengths by selecting how pressure is supplied, either to one cylinder or both. The cylinders are preferably in tandem and double acting.

490,419. *Improvements in or relating to Aeroplane Wing Flaps and Multi-Position Actuating Mechanism Therefor.* United Aircraft Corporation, 400, South Main Street, East Hartford, Connecticut, U.S.A. Convention date (U.S.A.), Feb. 15th, 1936.

The wing flap is moved to various positions for increasing lift and is maintained in such positions by means of a hydraulic ram, having an outlet and a number of inlets corresponding to the various desired positions of the flap. There is a pump for supplying pressure and a manual means for controlling it and manual means for selectively opening the desired one of the inlet openings.

489,392. *Improved Method and Means for Operating Trimming or Balancing Flaps on the Control Surfaces of Aircraft.* Boulton, Paul Aircraft, Ltd., The Airport, Wolverhampton, and Clark, W. H. V., Westholme, Wood Road, Codsall, near Wolverhampton. Dated 25th Feb., 1937. No. 5,634.

The proposed trimming tab is operated through a lever fixed inside the frame of the control surface so as to control the rotation of the tab about its hinges. The lever is itself coupled to a member attached to a fixed part of the aircraft, the point of connection being near the axis about which the control surface is hinged. The degree of movement of the tab can be determined by moving this point of connection.

CONTROLS.

485,467. *Improvements in and relating to Liquid Pressure Remote Control Systems.* Automotive Products Co., Ltd., Brook House, Langham Street, London, W.1, and Parker, S. M., of the same address. Dated Nov. 17th, 1936. No. 31,469.

This is a double acting liquid pressure remote control system having a number of slave cylinder units fed from a common source of pressure through either one of two pipe lines. The slave cylinders are arranged to effect a number of operations in a predetermined sequence when pressure is fed through one pipe line and in the reverse sequence when pressure is fed through the other pipe line.

DE-ICING.

488,820. *Improvements relating to Anti-Icing Devices for Aircraft.* Rideau, J. R., 33, Rue Greuze, Paris, France, and Ducrat, A. M., 11 bis, Rue des Acacias, Paris, France. Convention dates (France), Nov. 6th, 1936; April 30th, 1937; and Oct. 21st, 1927.

The scheme proposed is to mount on the parts of the aircraft which require protection a superficial electrically conducting covering from which heat is evolved by the passage of an electric current; the covering may consist of bands of metal deposited by spraying. The covering may be supported by a sheet of asbestos which may be applied to a covering of cork. Again, the covering may consist of finely divided carbon deposited from a colloidal suspension or of a fine wire mesh or of a thin metal sheet.

486,549. *A New and Improved Apparatus for Preventing Ice Formation on Aircraft Surfaces.* Headen, L. A., St. Mary's Works, Frimley Road, Camberley, Surrey. Dated Dec. 7th, 1936. No. 33,503.

The method proposed consists of providing an air heater on the engine, heated air from which is forced by a blower into a tube located in the leading edge. This tube has apertures so situated that the heated air is directed to impinge in jets against the interior of the leading edge.

486-891. *Automatic Control Means for De-Icing Mechanisms for Aircraft.* Eclipse Aviation Corporation, 545, North Arlington Avenue, East Orange, New Jersey, U.S.A. Convention date (U.S.A.), Dec. 14th, 1935.

The de-icing device consists of a member attached to the aircraft surface which can be agitated, including inflatable members: Means are provided for periodically inflating such inflatable members and means are provided for automatically controlling inflatable means. The automatic control consists of a paddle mounted in a tube fixed to the aircraft so that when the aircraft is in flight the paddle is forced backwards. In front of the tube there is a gauge which becomes coated with ice under ice-forming conditions. This stops the air supply to the paddle which then moves forward under the action of a spring. In doing so it makes an electric contact and sets the de-icing mechanism into action.

485,395. *Means for Preventing the Formation of Ice on the Wings and/or Fuselage of Aircraft.* Brookfield, J. C., Floreat, Copsom Drive, Esher, Surrey. Dated Dec. 3rd, 1936. No. 33,165.

A heat radiating pipe carrying exhaust gas is carried along the wings or fuselage immediately behind the leading edge. There is an internal partition which, in conjunction with the surface of the wing or fuselage, forms a hot air chamber through which the pipe is led. This portion is made of, or impregnated with, a heat conducting material which is exposed on one side to the hot air chamber and on the other to the atmosphere.

ENGINES.

487,677. *Improvements in or relating to the Remote Control of Aircraft Engines.* Dumax, G. C., 15, Rue de la France-Mutualiste, Boulogne-sur-Seine (Seine), France. Convention date (France), Dec. 23rd, 1935.

The operating member is connected by a sheathed cable to a distributing member which is, itself, connected by distant drives to a number of control devices consisting of fuel and lubricating oil cocks and the earthing switches of the engine magnetos. The operating member consisting of a lever provided with a toothed sector that engages with a rack which is attached to one end of the cable. The distributing member has a number of cams serving as a track for a roller pusher, the rod of which is connected to one end of a drive. Cams are provided on which the earthing contacts of the magnetos bear.

486,759. *Improvements in Aircraft.* The Bristol Aeroplane Co., Ltd., and Radcliffe, J. M., both of Filton House, Bristol. Dated Nov. 2nd, 1936. No. 29,805.

It is proposed to supercharge an engine by heating the charge, by compressing it to a pressure greater than that at which it would be fed to the engine, cooling it, and expanding it after it leaves the cooler to the desired supercharger pressure so as to reduce its temperature still further. Air drain from underneath the wing passes through a compressor and a cooler. It is then discharged into a duct which takes air from the top of the plane to the carburettor, the discharge taking place so as to accelerate the air in this duct towards the carburettor.

484,300. *Control of Cooling Air Stream of Aircraft Engines.* Ellor, J. E., Grandell, South Drive, Chain Lane, Mickleover, Derby, England. Dated Sept 30th. No. 26,567.

The radiator is housed in a tunnel or duct at the exit of which there is a flap mechanism which is balanced aerodynamically as nearly as possible. The size of the exit is controlled by one or more vanes or flaps of streamline section each hinged transversely, the axis passing through or close to the aerodynamical centre. The flap can be moved so as to more or less obstruct the flow.

489,594. *Improvements in or relating to Cowlings for Aircraft Engines or Radiators.* Mercier, P. E., 11, Rue Jacques Dulud, a Neuilly-sur-Seine (Seine), France. Convention dates (France), Aug. 26th, 1937; Oct. 19th, 1937.

It is proposed that the inlet and outlet of the cooling air entering a cowling should be simultaneously controlled. At the entry there is at least one annular element so that there are two concentric inlets. The annular elements can be axially displaced, altering the area for the entry of air. If more than one annular element is used different elements may move in opposite directions.

489,076. *Improvements in or relating to the Air Cooling of the Cylinders of Internal Combustion Engines on Aircraft.* Mercier, P. E., 11, Rue Jacques Dulud, a Neuilly-sur-Seine (Seine), France. Convention dates (France), March 10th, 1937; April 16th, 1937; July 29th, 1937; Aug. 9th, 1937.

It is proposed to furnish air-cooled engine cylinders with hollow fairings forming deflectors, each of which divides the in-coming air into two sheets which flow towards the two sides of the cylinder, the air being guided by the surface of the fairing adjacent to the cylinder which fairing is so shaped as to cause the air to traverse the gills and to flow out through the flue-like interior of the hollow fairing.

FLYING BOATS.

483,423. *Improvements in or connected with Flying Boats.* Short Bros. (Rochester and Bedford), Ltd., and Gouge, A., both of Seaplane Works, Rochester, Kent. Dated April 23rd, 1937. No. 11,644.

This specification refers to the detailed structures of flying boat hulls and claims a hull comprising cross frames composed of floor members with flanges and webs and inclined bottom members with flanges and webs, said members having flanges disposed outwards convected by bracing members longitudinal members and webs extending continuously across the cross frame, means for attaching the webs of the longitudinal members up to the flanges of the inclined bottom members and bottom plating supported by the flanges of the longitudinal members.

INSTRUMENTS.

487,010. *Improvements in Means and Method of Instrument Indication in Aeroplanes and the Like.* Link, E. A., Binghampton, Broome, New York, U.S.A. Dated Aug. 26th, 1937.

It is proposed to project optically the images of aircraft instruments on to a screen so as to provide a single group of these images. They may be grouped differently from the grouping of the instruments and those having similar movement characteristics may be correlated in vertical and horizontal planes. These images may be closer together than the instruments themselves and the images may be projected with the aid of prisms and optical lenses.

487,755. *Improvements in or relating to Indicating Instruments for Aircraft.* Siemens Apparati und Maschinen Gesellschaft mit beschrankter Haftung, Askanischer Platz 4, Berlin, S.W.11, Germany. Convention date (Germany), Dec. 12th, 1936.

This is an indicating instrument for retractable undercarriages comprising two electrical measuring instruments, the pointers of which represent, and are controlled by, the movement of the supports of the landing wheels. The pointers are vertical when the wheels are in the position for landing. The pointers are concealed behind the lower edge of a diaphragm of an aeroplane when the aeroplane is in the flying position. Pointers for a foldable tail skid or wheel and for landing flaps may be added.

MISCELLANEOUS.

489,001. *Movable Apparatus for Lifting and Manipulation of Loads.* Kervarree, B., 3, Rue de Villejust, Paris, France. Convention date (France), Jan. 15th, 1936.

This proposal relates to derricks intended to be mounted on ships for the repair of seaplanes. The derrick has two or more cables serving for translatory motion and for supporting the jib. The cables are attached, one at platform level and the other at the height of the derrick so that the translation of the derrick is obtained by winding the said cables over winches mounted on the derrick or its carriage. The displacement of the derrick occurs with a nearly constant inclination of the jib. The apparatus may be operated with compressed air.

484,657. *Improvements in or relating to Means for Coupling or Uncoupling Aircraft during Flight for Landing or Launching.* Plesman, A., Hofweg, 9, The Hague, the Netherlands. Dated Jan. 11th, 1937. No. 3,045.

In connection with aircraft without landing gear by attaching auxiliary aircraft with landing gear during flight a method is described for permitting coupling and uncoupling. The auxiliary aircraft is provided with cup-shaped surfaces adapted to engage with corresponding parts in the shape of a segment of a sphere on the main aircraft. Each surface may be mounted on the top of a column while means

may be provided for catching one or more cables lowered from the main aircraft and means for coupling the auxiliary aircraft with the cables, and for drawing both aircraft together by the cables.

485,599. *Improvements connected with Advertising or like Appliances for Aircraft.* Airwork, Ltd., Heston Airport, Hounslow, Middlesex, and Addwell, H., of the same address. Dated Dec. 1st, 1936. No. 32,885.

The banner carrying roller is supported in a frame which is movable to bring the roller into or out of the banner displaying position. It is also retractable within the fuselage so that the banner may be changed. The framework supporting the roller is tiltable beyond the vertical so that the axis of the roller may be brought perpendicular to the centre line of the banner so as to facilitate winding.

486,983. *Improvements in Draining and Ventilating Eyelets.* Woods, L. R., 6, Milk Street, London, E.C.3. Dated Feb. 25th, 1937. No. 5,685.

The proposed eyelet consists of a plate with a median opening covered by a hood forming a dishing of the plate, the hood having an aperture. The hood may be of a streamline shape and its aperture may be of the form of a slot.

487,540. *Process for Manufacturing Hollow Bodies and Products Resulting from this Process.* Duverne, G., 33, Rue Mathurin Regnier, Paris (Seine), France. Convention date (France), May 15th, 1936.

It is proposed to form a hollow body of wood, etc., by forming a mould including parallel spaced transverse flat pieces having contours corresponding to those of the body to be formed and bending on this mould separable halves of the body to be formed, removing the halves from the mould and uniting them together along their corresponding edges.

486,556. *Improvements in or relating to the Braking and/or Mooring of Aircraft.* Sir George Godfrey and Partners, Ltd., and Theed, W. D. L., both of 466, Edgware Road, London, W.2. Dated Dec. 7th, 1936. No. 33,557.

It is proposed to provide the aircraft with an electro-magnet which can be energised by a current supply on the aircraft, the switch being under the control of the pilot. This magnet can be lowered by the pilot until it is in contact with the aerodrome. The aerodrome surface is composed partly of magnetic material.

486,441. *Improvements in and relating to Aerial Posters.* Air Publicity, Ltd., Phillips, P., and Tucker, S. A., all of 11, Buckingham Street, London, W.C.2. Dated Dec. 2nd, 1936. No. 33,071.

The poster is wound up round a post or roller and when it is desired to display it the post is projected below the aeroplane and the poster unwound. Several of these may be carried on the same aeroplane and they may be changed in flight, a poster being withdrawn by being rewound on the post and returned to the aeroplane.

485,415. *Improvements in and relating to Aerial Posters.* Air Publicity, Ltd., and Phillips, P., both of 11, Buckingham Street, Strand, London, W.C.2. Dated April 20th, 1937. No. 11,244.

An arrangement is proposed by which the poster can be canted towards the position in which it is to be read by means of a fin or vane. This vane is attached to the front vertical strut of the poster so as to co-operate with the slip-stream of the aircraft to urge the bottom of the poster away from the direction of reading, *i.e.*, the direction in which the letters face, or alternating to urge the upper portion of the strut inwardly towards the direction of reading.

489,139. *Improvements in or relating to Wind-Driven Power Apparatus.* Dr.-Ing. A. van Gries, 72, Nussbaumerstrasse, Koln, Germany. Dated July 27th, 1937. No. 20,813.

It is stated that wind-driven dynamos adapted to be lifted by captive balloons or kites have been proposed, the difficulty being the weight to be lifted. In order to get over this difficulty it is proposed to use a number of interconnected kites, by which method, it is claimed, the lift can be increased indefinitely.

489,931. *Improvements in and relating to Means for Testing Shuttlecocks.* Miéville, A. L., Cudlow House, Rustington, Sussex, and Slazengers, Ltd., Laurence Pountney Hill, Cannon Street, London, E.C.4. Dated Dec. 5th, 1936. No. 33,439.

The shuttlecocks are introduced into a chamber which is provided with an adjustable flow of air. As a result of the tests carried out in this chamber it is claimed that the flight characteristics of the shuttlecock can be ascertained without damage to the specimen tested.

MODEL AIRCRAFT.

488,585. *Improvements in Toy Aeroplanes.* Lines Bros, Ltd., and Wilmot, C. M., Tri-ang Works, Morden Road, Merton, London, S.W.19. Dated Jan. 16th, 1937. No. 1,408.

It is proposed to emboss thin material such as paper into the shape of half a fuselage, so that when two such pieces are stuck together a tubular fuselage is produced. The paper may be printed before embossing and apertures may be formed in it so as to attach plane, tailplane, etc.

487,616. *Automatic Flying Control for Model Aeroplanes.* Button, H. C., Field View, Wrenbury, Nantwich, Cheshire. Dated Feb. 23rd, 1937. No. 5,342.

The proposed automatic control consists of a tiltable tube arranged longitudinally in the aeroplane and containing a movable mass or weighted body such as mercury or a heavy ball which can move from end to end of the tube. The tilting of the tube is limited and it actuates through connections the elevators or, if desired, the flaps so as to control automatically the flight of the aeroplane.

486,396. *Improvements in Toy Aircraft.* The Lionel Corporation, 15, East 26th Street, City, County and State of New York, U.S.A. Convention date (U.S.A.), Jan. 4th, 1937.

The proposed toy aircraft is tethered to a stationary support and has a stationary electric motor actuating an airscrew to cause the aircraft to rotate about the support. The speed of the aircraft is controlled mechanically and the aircraft can be made to climb, dip, loop, etc.

484,303. *Improvements relating to Toy Aeroplanes.* Hammer, W. H., 631, Wilshire Boulevard, and Rhodes, L., of 1332, 15th Street, both in Santa Monica, California, U.S.A. Convention dates (U.S.A.), Nov. 4th, 1938, and Feb. 10th, 1936.

The proposed toy aeroplane is constrained to move about a centre and has a motor from which power is transmitted to the propeller. The aeroplane structure can be made to rotate tail over nose or nose over tail in a controlled fashion and the aeroplane may be caused to dip, rise or loop.

PARACHUTES.

488,774. *Improvements in or relating to Parachutes.* Willing, M. S., Bushfield Farm, Mount Holly, West Moreland, Virginia, U.S.A. Convention date (U.S.A.) Nov. 3rd, 1936.

The proposed parachute has a canopy and a number of rigid members through which a free passage of air is allowed which are temporarily positioned at spaced points in the interior of the canopy where the latter is packed. These members are of less diameter than the extended canopy and they are withdrawn through the mouth of the canopy when the latter is released for opening.

483,083. *Improvements in or relating to Parachutes.* Pool, J. H., Squadron Leader, Cranwell, Lincolnshire. Dated Oct. 12th, 1936. No. 27,603.

It is proposed to construct a parachute which is automatically prevented from swinging during descent. The parachute is attached to its head by means of lines of differing length so that the canopy is caused to assume a tilted position during descent.

486,343. *Improvements in or relating to Parachute Packs.* Lundholm, C. H., 29, Sveavagen, Stockholm, Sweden. Convention date (Sweden), May 7th, 1936.

The proposed parachute pack has a number of closing flaps at least three of which are held from opening by a common loose locking member and with automatically and manually controlled releasing means for the flaps each having a separate locking pin or pins in which in the closed condition of the pack the loose locking member and all the locking pins are disposed on the same face of the secured flaps and preferably on the outer face thereof.

490,798. *Improvements in or relating to Detachable Pack Parachute Apparatus.* Aerostatica Avorio Societa in Accomandita Semplice, 22, Via Pellegrino, Matteucci, Rome, Italy. Convention dates (Italy), Aug. 17th, 1936, and April 28th, 1937.

The parachute apparatus has a belt, to be worn by the parachutist, having secured thereto a strap having a hook for connection to a pack. The hook is temporarily attached to the belt in a convenient position by a breakable pivot pin which breaks and thus frees the hook when the parachute is used. The belt may comprise inter-connected pairs of metal links. The hook may have a spring-closed detail for securing it to the ring on the pack.

PILOTS AND PILOTING.

484,243. *Improvements in and relating to Apparatus for Training Aviators.* Link, E. A., 10, Avon Road, Binghampton, New York, U.S.A. Convention date (U.S.A.), Sept. 30th, 1936.

The proposed dummy aircraft is rotatably mounted on a support and is controllable by a pupil and is provided with a recording device which marks on a chart the turning movement of the dummy. There may be an autosynchronous motor on the dummy electrically connected with an autosynchronous motor controlling the recording device.

ROTORCRAFT.

487,811. *Improvements in or relating to Aircraft having Rotative Wing Systems.* Societe Anonyme des Ateliers d'Aviation Louis Breguet, 24, Rue George Bizet, Paris, France. Convention date (France), July 20th, 1936.

The proposed aircraft has a pair of co-axial rotating wings revolving in opposite directions and arranged to flap in a plane including the axis of revolution of the wings. Spacing means are provided to prevent the clearance between the wings

falling below a predetermined amount. The spacing means include an abutment lever for each wing, the two levers being interconnected. Each lever is formed at its outer end for operative engagement with the corresponding wing, while its inner end engages an annual member co-axial with the wing revolution axis, the two annular members relating to the pair of revolving wings being interconnected by a linkage.

486,883. *Improvements in and relating to Rotary Wing Aircraft.* Coats, A. G., Gloucester House, Park Lane, London, W.1. Dated Dec. 11th, 1938. No. 34,078.

It is proposed to construct a sustaining blade, so that, with changes in the lift distribution along its span, its general centre of lift moves along a substantially straight spanwise line which passes through the general centre of mass of the blade. As a result there is a predetermined axis of reference in the blade about which there are no fluctuating moments during flight and the blade root attachments or flight control may be so arranged in relation to this axis so as to improve the smoothness of operation of the aircraft.

485,967. *Aircraft with Autorotatable Sustaining Rotors.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2. Convention date (U.S.A.), Aug. 8th, 1936.

The rotor blades are independently articulated on an intermediate member about a pivotal axis, the intermediate member being articulated to the hub member on a single pivotal axis, the pivotal axes being so disposed that the motion of the blades about the first axis is principally a flapping motion and that about the second axis is mainly a pitch varying motion, a specified angular movement about the first axis giving rise to a change of pitch angle.

485,299. *Improvements in and relating to Sustaining Rotors for Aircraft.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2. Convention date (U.S.A.), Dec. 19th, 1935.

A rotor blade is proposed in which the thickness ratio is decreased from the root to the tip, the chord being uniform throughout. The blade has also a substantially fixed centre of pressure for all normal angles of attack above, say, 2° positive. The blade centre has a rearward C.P. travel below the predetermined minimum. The centre of gravity of the blade coincides substantially or is slightly ahead of the sectional centre of pressure.

484,376. *Rotating Wing Aircraft.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2. Convention date (U.S.A.), July 22nd, 1936.

The connections to the hub of the blades of the proposed rotor include screw threaded joints co-axial with the blades, the direction of the threads being such that outward radial movement of a blade is accompanied by an increase of pitch angle, the pitch of the thread being steep enough to ensure that the action is reversible. The blades may be controlled on their threaded joints by fluid pressure which may be operated by the pilot. The blades may be released by a clutch so that they take up the high pitch position under the action of centrifugal force.

485,001. *Improvements in Aircraft Sustaining Rotors.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2; Bennett, 22, Grove Way, Esher, Surrey; and Ellis, G. B. L., Uldale, Ewell Road, Thames Ditton, Surrey. Dated Nov. 12th, 1936. No. 30,935.

The proposed self-contained pivotal mechanism for rotor mounting comprises means for transmitting end loads from one to the other of two relatively rotatable pivot parts, which include an elastic member of high resistance to end load and low torsional rigidity and the relatively rotatable parts have in other respects

limited axial freedom relatively to each other. The arrangement is such that the whole end load sustained by the pivotal mechanism is substantially transmitted by the elastic member, which, in contradistinction to the torsionally flexible connections of the above proposals, is relatively short and is wholly contained within the pivotal mechanism.

489,420. *Improvements in or relating to Rotary Wing Aircraft.* Asboth Helicopters, Ltd., 48-49, High Street, Bloomsbury, London, W.C.2, and de Asboth, O., of the same address. Dated Oct. 25th, 1936. No. 9,283.

The rotary wing proposed has two sets of rotary wing blades rotating in opposite directions. The individual blades of each set are rigidly connected to a hub. Each hub is connected to a shaft by a universal joint so as to permit the inclination of the rotor in all directions. The hub has a socket mounted on a spherical member on the shaft and there is interposed between the hub and the shaft means permitting the socket to swivel universally.

490,697. *Improvements in or relating to Rotary Wings or Blades for Rotating Wing Aircraft.* G. and J. Weir, Ltd., Holm Foundry, Cathcart, Glasgow, and Pullin, C. G., 104, Queen's Drive, Queen's Park, Glasgow. Dated Feb. 24th, 1937. No. 5,516.

In the case of blades having tubular spars it is proposed to interpose between the tubular spar and its socket member a rubber sleeve which is vulcanised to these members. The thickness of the sleeve and the degree of vulcanisation of the rubber may be varied so as to provide the resilience desired.

490,741. *Helicopter.* Mitchell, W. M., 320, Aldridge Road, Perry Bar, Birmingham. Dated Feb. 17th, 1937. No. 4,695.

It is proposed that a helicopter should have two or more pairs of rotors, each pair being arranged one above the other and rotating in opposite directions. The rotor blades have adjustable pitch.

SEAPLANES.

483,424. *Improvements in or relating to Seaplane Undercarriages.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex, and Lobelle, M. J. O., Ludlow, 298, Langley Road, Langley, Bucks.

It is proposed to provide an observation cabin or gun turret underneath the fuselage of a seaplane, the float undercarriage being so arranged that by hydraulic or other means the floats themselves may be moved in flight so as to restrict as little as possible the field of view or of gunfire of the observer or gunner in the cabin or turret.

UNDERCARRIAGES.

488,059. *Improvements relating to Retractable Undercarriages for Aircraft.* Hawker Aircraft, Ltd., Canbury Park Road, Kingston-on-Thames, Surrey, and Chaplin, R. H., The Hearth, Hamm Court, Weybridge, Surrey. Dated July 13th, 1937. No. 19,414.

The proposed retractable undercarriage leg may be a cantilever leg and it is retracted by swinging on a single axis, this axis being inclined to the longitudinal axis of the aircraft and also to the plane in which it is desired to retract the wheel, so that the wheel swings laterally fore and aft and upwardly between its extended and retracted positions.

485,617. *Improvements in or relating to Jacks, more particularly for Retractable Undercarriages for Aircraft.* Onions, J. H., 18, Telford Avenue, Leamington Spa, Warwickshire, and Automotive Products Co., Ltd., Brock House, Langham Street, London, W.1. Dated Nov. 14th, 1936, No. 31,159; and Oct. 11th, 1937, No. 27,577.

The jack described is arranged so that the movement of the plunger relative to the cylinder, produced by fluid pressure, compresses gas contained in a closed chamber within the jack so as to store up energy for moving the plunger in the other direction.

486,955. *Improvements in or relating to Fluid Pressure Operating Jacks.* Automotive Products Co., Ltd., Brock House, Langham Street, London, W.1, and Parker, S. M., of the same address. Dated Nov. 11th, 1936.

This is a fluid operated system of a number of jacks to be operated in unison, each being provided with individual locking means released by the fluid pressure fed to the jack. There is also a valve device which prevents any one of the jacks from being operated until the locking means of all the jacks are released.

483,467. *Improvements in Brake Control Mechanism for Aircraft.* Bendix Aviation Corp., 105, West Adams Street, Chicago, Illinois, U.S.A. Convention date (U.S.A.), Oct. 16th, 1935.

This specification refers to a control mechanism for aircraft wheel brakes which is intended to compensate the variations of volume of the operating liquid in the operating line, such as is due to fluctuations of temperature. The device comprises a pair of wheel brakes for a pair of landing wheels, a pair of wheel cylinders for the brakes, a pair of master cylinders each connected separately with one of said wheel cylinders, means for operating said master cylinders to supply liquid pressure to the wheel cylinders independently or concurrently and to relieve such pressure, and means for maintaining a positive pressure in said wheel cylinders regardless of the subsequent conditions of said master cylinder and of temperature conditions.

486,748. *Improvements relating to Retractable Undercarriages for Aircraft.* Hudson, R. J. H., Yennadon House, Dousland, South Devon. Dated Dec. 8th, 1936. No. 9,607.

The retraction of the undercarriage takes place by rotation about two mutually inclined axes. The connection to the aircraft has an element pivoted about a first axis and carrying a pivot joint substantially perpendicular to the first axes. There is also a part called a constrainer which is connected to the aircraft and to the part by further pivots at an angle to each other and also to the first and second axes.

484,938. *Improvements relating to Breakable Radius Rod or like Elements for Retractable Aircraft Undercarriages.* Aircraft Components, Ltd., and Bound, R. H., both of Arle Court, Cheltenham, Gloucester. Dated Jan. 4th, 1937. No. 237.

A breakable radius rod associated with the operating jack, a connection between the jack and the parts of the rod in the form of a line pivoted to the one part, connected to the jack on one side of the extended alignment of the rod, and extending to the other side of the alignment to a connection to the other part. One of the rod parts supports the jack, the piston is pivoted to one end of the lever which has its fulcrum on that part, the other end of the lever being connected by a pivoted link to the other rod part.

486,936. *Improvements relating to Locking Means for Retractable Undercarriages of Aircraft.* Dowty, G. H., Arle Court, Cheltenham, Gloucestershire. Dated Dec. 9th, 1936, No. 36,014; Jan. 4th, 1937, No. 36,015; Jan. 12th, 1937, No. 36,016.

In an undercarriage operated by a hydraulic jack there is a latch for locking the undercarriage down, which latch is connected to the jack through other connecting means affording positive connections in one sense and non-positive connections in the opposite sense. During lost motion between the jack and the undercarriage the jack operates positively to unlock the latch before retraction, the same thing also taking place before extension.

486,461. *Improvements in Retractile Undercarriages for Aircraft.* Willoughby, P. N., and the Willoughby Delta Co., Ltd., both of Bank Buildings, 20, Kingsway, London, W.C.2. Dated Feb. 4th, 1937. No. 3,350.

The proposed device consists of a rigid main strut hinged at its upper end to the wing, the shock absorber being mounted at its lower end. There is a two-part drag strut hinged to the wing and to the main strut, and a two-part radius rod hinged to the wing and to the main strut. When extended, the elements form a rigid tripod Vee arrangement being folded sideways towards the wing.

485,414. *Improvements in or relating to Self-Folding Struts for Aeroplane Landing Chassis.* Societe d'Inventions Aeronautiques et Mecaniques S.I.A.M., 1, Route des Alpes, Fribourg, Switzerland. Convention date (France), May 26th, 1936.

The proposed retractable gear has a self-folding strut composed of two spaced elements joined together by means of a third element articulated to the spaced elements. The elements of the strut are articulated at their outer ends, one to a carrier leg and the other to a pin mounted on the aeroplane. The members can be extended or folded by an extensible driving member, the driving member being articulated by one of its ends to one of the three elements, and by its other end to one of the other two elements.

490,087. *Improvements in Retractable Undercarriages for Aeroplanes.* Mercier, J., 131, Boulevard de la Seine, Neuilly-sur-Seine, Seine, France. Dated May 13th, 1937. No. 13,524.

The proposed undercarriage is intended for aircraft having high or mid-wings. Each wheel is suspended from the lower end of a member having the form of an elbow and shaped so as to mate with the fuselage and wing in the retracted position. The upper end of this member is hinged to the fuselage and to its upper part is attached a strut arrangement which operates the undercarriage for retracting or extending. This strut may be actuated by pneumatic, hydraulic, or other means.

489,385. *Improvements in Retractable Undercarriages for Aircraft.* Willoughby, P. N., and the Willoughby Delta Co., Ltd., Bank Buildings, 20, Kingsway, London, W.C.2. Dated Feb. 4th, 1937. No. 3,351.

This retractable undercarriage is intended for use with high wing monoplanes and is arranged for mechanical operation. There are two similar arrangements of hinged struts in parallel connected so as to be laterally rigid. Each arrangement consists of three struts forming a three-bar linkage hinged at its outer and upper ends to fixed members. There is a stabilising strut, one end of which slides along one of the three struts to produce rigidity, a radius rod and a shock absorbing strut.

486,211. *Improvements relating to Retractable Undercarriages for Aircraft.* Aircraft Components, Ltd., and Bound, R. H., both of Arle Court, Cheltenham, Gloucestershire. Dated Dec. 31st, 1936. No. 35,859.

The retraction jack is pivoted to one part of a breakable rod the jack being also pivotally supported about the same axis as that of the leg pivot. The connection between the jack and the rod part lies between the pivotal connections of the rod to the aircraft and to the leg. There may be locking means actuated by lost motion.

489,391. *Improved Form of Retracting Undercarriage for Aircraft.* Boulton, Paul Aircraft, Ltd., The Airport, Wolverhampton, and Hughes, H. A., Westfield, Keeper's Lane, The Werqs, near Wolverhampton. Dated Feb. 25th. No. 5,633.

The proposed undercarriage has two legs carrying wheels hinged at their upper ends to a common supporting member. This moves vertically within the aircraft for the purpose of raising the legs. Each leg carries a part engaging with guide slots fixed within the body so that as the legs are raised they are also caused to rotate into a more nearly vertical position, so that legs which protrude laterally may be withdrawn into the body.

CORRESPONDENCE.

To the Editor of the JOURNAL OF THE ROYAL AERONAUTICAL SOCIETY.

SIR,—From the viewpoint of the pilot I was particularly interested in Mr. Weyl's letter in the August Journal, dealing with lateral stability with special reference to his Dart Kitten.

Appearing as it does in so august a journal I feel compelled to challenge some of the statements and claims it makes, especially as I have recently done a considerable amount of flying near and beyond the stall on one of these machines.

Although I found it possible to fly the machine stalled, it was rather a tricky and uncertain business, and I do not think that by any reasonable stretch of imagination it could be scientifically said to possess " complete aileron control " when stalled. Likewise, although it was possible sometimes to keep it " sinking on an even keel " it more usually insisted on dropping a wing in the all-too-common incipient spin manner. I agree that the tail buffeting was mild.

Nevertheless, considered as a conventional aeroplane, I think that the Kitten is a pleasantly docile machine in view of the amount of wing taper used, and I have enjoyed flying it; but to claim that it is fool-proof at the stall would, I think, be misleading and unwise.—I am, Sir, yours faithfully,

W. E. GRAY.

15th September, 1938.