

## ABSTRACTS OF PATENT SPECIFICATIONS.

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

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### AERODYNAMICS.

501,879. *Improvements in Aircraft.* Ronand, R. L. M. F., 3, Villa Robert Lindet, Paris, Seine, France. Convention dates (France), May 24th, 1937; May 9th, 1938.

Each wing of an aeroplane is pivoted about an axis which converges rearwardly, so that, as the wing rotates, owing to the action of the aerodynamic overloads to which it is subjected, a variation of the incidence is obtained in a direction which limits such overloads. The maintenance of the wing in the position of equilibrium is ensured by elastic means which may be damped.

504,360. *Improvement in Aeroplanes.* Flight Lieut. H. G. Spearpoint, R.A.F.O., Royal Air Force Station, Henlow, Beds., and W. O. H. Stanway, Royal Air Force Station, Henlow, Beds. Dated Oct. 21st, 1937. No. 28,651.

The lift of the wings of an aircraft is claimed to be increased by an arrangement in which air is collected by one or more intake chambers situated in the airscrew slipstream, the mouths of which chambers are divided into concentric orifices each communicating with the sections of a continuous slot extending along the wing.

506,007. *Improvements in or relating to a Method of and Means for Reducing Surface Friction between a Solid and a Fluid.* Payn, H. J., Monaco, Hersham Road, Walton-on-Thames, Surrey. Dated Nov. 20th, 1937. No. 31,996.

It is proposed to discharge exhaust gas through nozzle orifices of contracting form disposed in a ring round the nacelles as near as possible to the nose, the

nozzles being disposed so that the gas is discharged tangentially over the surface. The gas is discharged at a speed in excess of the normal speed of the air over the surfaces concerned.

#### AIRCRAFT—CONSTRUCTION.

501,281. *Improvements in or connected with the Construction of Wings for Aircraft.* The Supermarine Aviation Works (Vickers), Ltd., and Smith, H. C., both of the Company's Works, Woolston, Southampton, Hants. Dated Aug. 23rd, 1937. No. 23,050.

The proposed wing has a single spar and a hollow stressed skin leading edge attached to the top and bottom of the spar in combination with a wall in the leading edge forward of the spar and permanently attached in a liquid-tight manner to the leading edge to form a complete tank in the leading edge independently of the spar. The combined tank and stressed skin leading edge can be detached.

497,289. *Improvement relating to Means for the Controlling of Trailing Lines, Especially from Aircraft.* Taylor, E., 58, Minley Road, Cove, Farnborough, Hants. Dated June 17th, 1937. No. 16,890.

In order to prevent the trailed line from lashing about while not offering excessive drag when the remote end of the line has its direction changed, as in refuelling, the line has a collapsible drogue closing in one direction but opening in the other. A knife is carried so that the line may be cut when necessary.

497,274. *Improvements in Aeroplanes.* Robertson, J. H., 1, Albemarle Street, Piccadilly, London, W.1. Dated June 15th, 1937. No. 16,599.

The aeroplane proposed is of the all-wing type and has a deep central section, the outer wings being tapered. The inner section of these wings have the same chord as the centre section but tapering to the outer sections, which latter are provided with double ailerons throughout their length. Engines are provided at the junctions between the centre and inner sections and at the junctions between the inner and outer sections.

497,413. *Improvements in or relating to Wing Attaching Hull Superstructure.* United Aircraft Corporation, 400, South Main Street, East Hartford, Connecticut, U.S.A. Convention date (U.S.A.), March 17th, 1936.

The aircraft has the wing situated above the hull and the connecting arrangement consists of bulkheads in the hull with frames extending above the bulkheads and connections between these and the wing spars. A resilient connection is provided between each spar and the bulkhead extension. Diagonal tension members are secured to each bulkhead and extend upwards in the form of an A frame and are connected to the wing spars.

501,947. *Improvements in Thin Sheet Covered Aircraft Bodies, Wings and the Like.* A.T.S. Co., Ltd., 3/4, Clement's Inn, Strand, London, W.C.2, and North, J. D., Hill House, Eaton, Norwich, Norfolk. Dated Sept. 10th, 1937. No. 4,862.

The aircraft component embodies thin sheet covering of metal or other material of high tenacity stiff longitudinal stringers secured to the covering and main transverse frames which extend to and are secured to the covering characterised by this that transverse frames intermediate the main transverse frames are of

such a size that their outer edges or flanges extend only to the inner edges or flanges of the stringers.

502,322. *Improvements in Aircraft Construction.* Kammer, G. S., 50, Quai Gustave Ador, Geneva, Switzerland. Dated July 14th, 1938. No. 20,957.

It is proposed to construct an aeroplane wing by using a number of plate members extending from the upper to the lower surface and running in a zigzag from one edge to the other, each member being bent to constitute substantially straight sections running alternately parallel and perpendicular to the centre line of the aerofoil and adjacent members being connected at the bends between adjacent sections.

504,290. *A Device for Reinforcing Openings in Plywood Structures.* Gaspar, F., XIV Hungarian Korut 93, Budapest, Hungary. Dated Oct. 22nd, 1937. No. 28,904.

It is proposed to sandwich a sheet of metal between plies of this wood and extending inwards from the margin of an opening formed in the wood, the sheet having a corresponding opening with a stiffened edge. The metal sheet may be secured by nails.

507,395. *Improvements in and relating to Cabins for Aircraft.* Junkers, Flugzeug-und-Motoren-werke, Aktiengesellschaft, 39, Junkersstrasse, Dessau, Anhalt, Germany. Convention date (Germany), Oct. 28th, 1937.

In a pressure-tight cabin a number of openings which are normally closed are provided in the walls for admission and egress. Two at least may be provided so as to ensure that escape will always be possible. The openings may be located in directly opposite positions either one on each side or one on the top of the cabin and one on the bottom.

506,528. *Improvements relating to Folding Wing Aircraft.* General Aircraft, Ltd., The London Air Park, Feltham, Middlesex; and Williams, D. L. H., and Crocombe, F. F., both of the Company's address. Dated Nov. 29th, 1937. No. 32,979.

This is a wing folding device for aircraft with a tricycle chassis. In this case the centre of gravity is displaced rearwards, and machines with this type of chassis would tip backwards. It is proposed to use a separate retracting wheel in the rear portion of the fuselage so that the machine will still be approximated horizontal even with the wings folded. The wheel may project sufficiently to protect the tail in a tail down landing when the wings are extended.

506,915. *Improved Aircraft Construction.* Andrews, W. R., 234, Wokingham Road, Reading, Berkshire. Dated Nov. 6th, 1937. No. 30,518.

The aircraft has the centre section of the wing of a greater thickness than the two outer portions, the plan form of the three portions being uniform. The zero lift line of the outer portions is displaced from, but parallel to, the zero lift line of the centre section, so a continuous upper wing surface is precluded.

504,933. *An Improved Metal Section for Use in the Construction of Motor Vehicle Bodies and Other Purposes.* Meltz, M., 43, Ormiston Road, Shepherd's Bush, London, W.12. Dated Oct. 29th, 1937. No. 29,604.

The metal section for constructional purposes is of I form and is built up of two sheet metal channels with their webs intumed and their flanges projecting outwards, the head and foot of the I being constituted by sheet metal strips having their edges bent so as to engage the flanges of the channels and the

channels being slidable relatively to at least one of the head and foot members for the purpose of facilitating flexure of the section.

504,980. *Improvements in and relating to Cockpits for Aircraft.* Junkers, Flugzeug-und-Motoren-werke Aktiengesellschaft, 39, Junkersstrasse, Dessau, Anhalt, Germany. Convention date (Germany), June 4th, 1937.

It is proposed to provide the cockpit with domed windows of a size sufficient to accommodate the head of at least one man, and being free from obstructions such as a gun. These domes are disposed laterally in relation to the vertical longitudinal median plane of the cockpits.

505,201. *Improvements in or connected with Wing Construction of Aircraft.* Vickers (Aviation), Ltd., and Wallis, B. N., both of Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated Nov. 6th, 1937. No. 30,482.

A hollow cylindroid nacelle of streamline form is arranged between the in-board and out-board wing portions, the said wing portions having their outer and inner ends respectively shaped to correspond with the nacelle, and having devices for detachably attaching them to the nacelle.

505,208. *A Method of and Means for Determining the Form and Controlling the Production of Geodesies.* Vickers (Aviation), Ltd., and Wallis, B. N., both of Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated Nov. 8th, 1937. No. 30,577.

The method proposed consists in ascertaining the length of the chords of the neutral axis of the required geodesic from each node to the next, and also the angular relationship of the chords to each other when intersected, setting out the nodal points on a plate, forming locating means on the plate to mark the nodal points and form the plate into a template, applying fittings of suitable form, forming necessary holes and slots, and finally removing and assembling the structural elements so formed.

#### AIRSCREWS.

504,162. *Improvements in or relating to Propeller Driving Gear for Aircraft.* Dornier-Werke G.m.b.H. and Dr. Ing. C. Dornier, Friedrichshafen, Lake Constance, Germany. Convention date (Germany), June 8th, 1937.

This specification describes a method by which pusher propellers situated on the wings of aircraft may be raised from their normal position. This is stated to be advantageous in the case of a flying boat taking off. The arrangement proposed consists of bevel wheels which are arranged so that the shaft can swivel vertically from a point at the centre of one of the wheels.

501,467. *Improvements in or relating to Blade-Wheel Propellers.* Voith, W., Voith, H., and Voith, H., trading as the firm of J. M. Voith, Heidenheim an der Brenz, Wurthemberg, Germany. Convention dates (Germany), Dec. 9th, 1936, and March 12th, 1937.

The blades of the proposed propeller oscillate during the rotation of the wheel about axes parallel to the wheel axis. The plane containing the leading edge and the axis of the blade located at either end of the diameter of the wheel perpendicular to the direction of propulsion is perpendicular to the said diameter. The radius vectors of the moving blades, moving opposite to the propulsion direction, intersect the wheel diameter that is perpendicular to the direction of propulsion at points nearer to the centre of the wheel than the radius vectors of the blades in other positions.

507,393. *Improvements in or relating to Blade-Wheel Propellers.* Voith, W., Voith, H., and Voith, H., Heidenheim an der Brenz, Wurthemberg, Germany. Convention date (Germany), Dec. 8th, 1937.

A spindle bearing for blade-wheel propellers with blades oscillating about their longitudinal axes and with roller bearings for the blade spindles. The sleeve of the feathering blade extends throughout the entire length of the blade spindle.

506,722. *Improvements in Swivelling Screw Propellers.* Loth, W. A., 130, Rue Lacourbe, Paris, France, and Guyot, S. M. H., 1, Rue Dante, Paris, France. Dated Aug. 30th, 1937. No. 21,213.

The hub of the propeller is mounted on a driving shaft by means of a universal joint so that the angular position of the propeller can be altered; the joint is so designed that it maintains constant the ratio of the speeds of rotation of the propeller and of the driving shaft at all angles of the propeller shaft to the driving shaft.

505,346. *Device for Mounting Two Aeroplane Propellers Co-Axially and with Reverse Directions of Rotation.* Barbaron, M. J. B., 28, Boulevard d'Argenson, Neuilly-sur-Seine, France. Convention date (France), March 23rd, 1938.

The hub part of the rear propeller is a hollow cylindrical part disposed about a forward extension of the engine casing, the extension carrying a bearing for the shaft of the rear propeller, this bearing being approximately in the plane of rotation of the rear propeller. The front propeller shaft bearing is two concentric rows of balls or rollers with an interposed floating ring serving as a race common to both sets of balls or rollers.

504,877. *Improvements in or relating to Guides for Blade Wheel Propellers.* Voith, W., Voith, H., and Voith, H., Heidenheim an der Brenz, Wurthemberg, Germany. Convention date (Austria), Aug. 6th, 1937.

This relates to a guide beneath a blade wheel provided under a blade wheel propeller mounted on a ship's bottom, the blades of the propeller being arranged in a circle and directed downwards, the propeller rotating about a vertical or inclined axis, the blades oscillating about their own axes. The approximately horizontal guide underneath the propeller is intended to counteract the tendency of the water flow to contract.

#### ARMAMENT.

505,230. *Improvements in or relating to the Mounting of Guns on Aircraft.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex, and Ordidge, F. H., 5, The Meade, Hill Top, Wilmslow. Dated Dec. 30th, 1937. No. 36,106.

A revolvable gun turret, formed with a slot for the gun, conforms substantially with the tail portion of a wing fillet fairing for which it is substituted. Two such turrets may be used, one on each side of the fuselage, each turret being rotatable about an axis which lies substantially on the line of the side of the fuselage.

#### CATAPULTING.

506,680. *Improvements relating to Aircraft for Use in Conjunction with Launching Gear.* General Aircraft, Ltd., The London Air Park, Feltham, Middlesex; Williams, D. L. H., and Crocombe, F. F., of the same address. Dated Dec. 9th, 1937. No. 34,149.

This refers to an aircraft with a tricycle chassis, and describes a method of increasing the acceleration of the aircraft for take-off by means of a pull trans-

mitted by a rope to the nose of the fuselage. The direction of the pull is arranged so as to produce a forward pitching moment and so as to produce an automatic correction to yawing. An automatic release may be provided to a mooring rope so that the machine may be released automatically when a pull occurs in the tow rope.

506,737. *Improvements in or relating to the Launching of Aircraft.* Wasley, T. J. J., Ashgarth, Wallington, Surrey. Dated Nov. 29th, 1937. No. 32,892.

It is proposed to construct a tower with a number of stories or platforms, one above the other. In the centre there is a lift by which the aircraft can be lifted to the desired platform. Each story is equipped with a series of compartments each of which is equipped with a catapult. Parts of the platforms may be rotated and the tower may have a high angle conical roof, changing to a mere obtuse one near its lower edge.

#### CONTROL OF AIRCRAFT.

501,449. *Improvements relating to Means for Rendering Control Systems Irreversible.* Exactor Control Co., Ltd., Exactor Works, Mount Pleasant, Alperton, Middlesex, and Green, O. S., of the Company's address. Dated July 29th, 1937, No. 21,040; and July 6th, 1938, No. 20,034.

This may consist of a push-pull system in which forces in the receiving side cannot reach the transmitting side. A receiver piston rod attached to a double-acting piston extends to one side thereof through one wall of the cylinder, and being connected to the receiver operates in tension and compression to move the receiver, and wherein a transmitter piston rod, extending through the other end of the cylinder, is connected with the transmitter so as to be moved thereby in tension and compression and has lost motion connection with the said piston so as to operate valve means controlling liquid flow through the passage interconnecting the two sides of the piston, whereby movement of the transmitter in either sense can open the valve and move the receiver.

497,077. *Improvements in Aircraft.* Spratt, G. G., c/o Coatesville Airport, Coatesville, Pennsylvania, U.S.A. Convention date (U.S.A.), March 4th, 1936. Application void.

The aircraft has a fuselage and a wing mounted on it above the centre of gravity. The wing can be tilted relatively to the fuselage so as to produce lateral tilting of the aircraft. There is means on the fuselage to produce lateral resistance behind the centre of gravity responsive to lateral displacement in order to change direction. The wing may be tilted longitudinally and laterally for control in both these directions.

497,443. *Improvements in Rudders, Aircraft Wings and Like Fluid Re-acting Planes.* Spurr, E., Fagley Cottage, Dunally Park, Walton Lane, Shepperton, Middlesex. Dated June 30th, 1937. No. 18,220.

The wing or rudder has a modified elliptical shape, having the chord length at any point in the span equal to the chord length at the corresponding point in the span of a basic elliptical plane having the same span principal chord and aerofoil shape, but the locus of points distant a predetermined fraction of the chord from the leading edge is a straight line or two straight lines, the predetermined fraction referred to being the distance of the centre of pressure from the leading edge. The rudder has its turning axis on the straight line referred to and has a contour corresponding to an end portion of the wing shape.

- 502,093. *A New or Improved Means for Operating Flying or Other Controls of Aircraft, Airships, and Other Ships and Vehicles.* Saunders, R., 100, Wood Lane, Kingsbury, London, N.W.9. Dated Sept. 9th, 1937. No. 24,591.

It is proposed to use a control rod which by rotation operates one control and by longitudinal movement operates another, each movement being unaffected by the other.

- 501,463. *Improvements in or relating to Aircraft Wing Flaps.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex, and Lobelle, M. J. O., Ludlow, 298, Langley Road, Langley, Bucks. Dated Oct. 7th, 1937. No. 27,242.

The wing has at its trailing edge lower and upper flaps which can be turned downwards and upwards respectively. The lower flap above may be operated, or both flaps together.

- 501,494. *Improvements in Dual Controls for Aircraft.* Ascanelli, A., and Zambaldi, E., both of Via Andrea Bafile, S. Rome, Italy. Convention date (Italy), May 31st, 1937.

This is a device intended for connecting and disconnecting the dual controls of aircraft. A lever controls a group of toothed couplings for the elevators, the rudder bar and ailerons, all these couplings being engaged in the mid position of the lever, while for each other position a group at least of couplings is engaged, said group of couplings corresponding to one of the two controls of the dual control.

- 501,699. *Improvements in or relating to Control Mechanism for Aircraft.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex; Lobelle, M. J. O., Ludlow, 298, Langley Road, Langley, Bucks; Huxley, M. F., 74, Ellerman Avenue, Twickenham, Middlesex. Dated March 28th, 1938. No. 9,476.

This is a method for operating a control with mechanism comprising a three-armed lever, one arm connected to cockpit operating means, a second arm movable with the first, a third arm movable about the lever axis and connected with the second arm by a radius rod, and by a link with the control element so that oscillation of the lever will move the control element about its axis. A mechanism is provided by an auxiliary means so that an initial angular movement is imparted to the control element so that the ultimate movement is greater or less than that which would result from any given movement of the main mechanism according to the relative direction of the secondary movement.

- 502,336. *Improvements in the Controls of Aircraft.* Arado Flugzeugwerke Gesellschaft mit beschränkter Haftung Brandenburg (Havel), Germany. Convention date (Germany), Dec. 7th, 1937.

It is proposed to couple the throttle control with the control for a landing flap so that when the throttle is opened the flap is moved to the best take-off position. When the flap is retracted the throttle has no effect on it.

- 504,336. *Improvements in and relating to Supporting Surfaces for Aircraft.* Junkers Flugzeug-und-Motoren-werke Aktiengesellschaft, 39, Junkers-strasse, Dessau, Anhalt, Germany. Convention date (Germany), Oct. 28th, 1937.

The wing has an auxiliary wing and mechanism is provided by which the latter is moved to an extended position, and at the same time the angle of incidence is progressively increased. When the auxiliary wing is fully extended while the chord of the wing unit is only slightly modified, the angle of incidence of the auxiliary wing is considerably modified.

504,535. *Improvements in or relating to Controlling Aircraft.* Bayerische Flugzeugwerke A.G. Hannstetters-strasse 118a, Augsburg, Germany. Convention date (Germany), Sept. 20th, 1937.

Arrangements are made for sucking away the boundary layer from the thick profile in the inner part of the wing during high speed flight, and from the outer portion when landing. It is proposed to effect the change over automatically by an auxiliary surface placed in front of the wing which alters its position from low speed flight to high speed and, in doing so, operates appropriate valves.

504,788. *Improvements in Aeroplanes.* A. V. Roe and Co., Ltd., Newton Heath, Manchester 10, and Chadwick, R., of the Company's address. Dated Oct. 27th, 1937, No. 29,321; and Oct. 27th, 1937, No. 29,322.

On pulling down the flap devices on an aeroplane wing it is proposed to move automatically a member on the tailplane which corrects for the alteration in pitching moment. Hinged flaps are fitted on the tailplane ahead of the elevators and are interconnected with the wing flaps.

506,714. *Means for Shifting Flaps on Aircraft.* Arado Flugzeugwerke Gesellschaft mit beschränkter Haftung, Brandenburg (Havel), Germany. Convention date (Germany), Jan. 25th, 1938.

This concerns the type of flap which is projected rearwardly from the main wing and swung downwards at the same time. The flap is connected to the rear of two double armed levers pivotally connected centrally. One lever has, centrally, a pin movable in a guide in the main wing and is connected forwardly with actuating means. The other lever is connected at its rear with the nose of the flap and at its forward end is guided in a second guide in the main wing.

507,103. *An Improved Air Brake for Aircraft.* The Fairey Aviation Co., Ltd., North Hyde Road, Hayes, Middlesex, and Flt. Lieut. L. H. Hilton, Links, Gordon Avenue, Stanmore, Middlesex.

The proposed brake consists of a retractable flat plate to be projected from the upper wing of an aircraft, in other words, a spoiler, so that the raising of the plate is effected by means acting in conjunction with the means for lowering the chassis. The plate may be pivoted to the front spar of the wing by links or it may be raised by the inflation of an air tube.

506,074. *Improvements in Stabilising Devices.* Gianoli, M. L., 17, Rue Chartran, Neuilly-sur-Seine (Seine), France. Dated Nov. 29th, 1937. No. 32,950.

Automatic stabilising device for aerial movable objects, having a main surface pivoted on the movable object having an auxiliary surface pivoted on the main surface, and a kinematic device connecting the two compelling the auxiliary device to modify its position relatively to the main surface when the latter itself modifies its position relatively to the body of the movable object.

506,136. *Improvements in or relating to Wings for Aircraft.* Gliwa, M., 3631, South Hermitage Avenue, Chicago, Illinois, U.S.A. Dated Sept. 14th, 1938. No. 26,776.

In an aeroplane of normal form, it is proposed to fit hollow wings open at their trailing edges. Inside each wing there is carried an auxiliary wing formed in sectors pivoted on apices upon a common vertical pivot. When this auxiliary wing is extended it resembles a sector of a circle between the rear of the wing and the fuselage.



503,908. *Means for Actuating Ailerons of Aircraft.* Arado Flugzeugwerke Gesellschaft mit beschränkter Haftung, Brandenburg (Havel), Berlin, Germany. Convention date (Germany), July 11th, 1938.

The ailerons are each movable rearwardly together with a flap, and there is provided a number of pivotally connected links, the first of which is pivotally mounted on the main wing, and the last is pivotally mounted on the outrigger serving for extending the flap, and that at the pivot points rotatable bodies are mounted on pivots at right angles to the plane of movement, which bodies are interconnected by members extending parallel to the links and are connected with the aileron by a push rod connected to a lever, so that the aileron is controllable independently of the position of the outrigger by an actuating lever.

505,937. *Improvements in or relating to Means for Mounting or Supporting Servo Motors.* Askania-Werke Aktiengesellschaft vormals Centralwerkstatt Dessau und Carl Bamberg-Friedman, Kaiserallee 87/88, Berlin-Friedman, Germany. Convention dates (Germany), Feb. 8th, 1937, and Aug. 6th, 1937.

A servo motor for aircraft controls, including a servo motor and a shaft rotated by it, in particular, in connection with a rudder, the servo motor housing is pivotally mounted about a first axis and there being a rod journaled on the servo motor housing about an axis parallel to or co-axial with said first axis and means to secure said rod to the control shaft or the mounting thereof or with a part of the base suitable for taking up thrust and tension forces so that the greatest part of the force reaching on the said housing is taken up by said rod.

503,022. *Improvements relating to the Control Surfaces of Aircraft.* Robinson, P. P., Penhoet, Flaghead Road, Canford Cliffs, Bournemouth, Hampshire, and Foss, J. F., Trentham, Keydell Avenue, Horndean, Portsmouth, Hampshire. Dated Sept. 29th, 1937. No. 26,370.

This refers to flaps in which the flap forms part of a linkage having a rear link pivoted to the rear of the wing and to a point on the flap, the forward end of which is movable fore and aft on the wing. It is proposed to pivot the link to the flap near the trailing edge and to move the flap from the folded position to a position in which it extends rearwardly beyond the wing trailing edge.

#### DE-ICING.

501,201. *Means for Detecting Ice Forming Conditions Encountered by Aircraft.* Langley, T. W., and Tecalemet, Ltd., both of the Company's Works, Great West Road, Brentford, Middlesex. Dated July 22nd, 1937. No. 20,336.

There is a movable member and a means for detecting the presence of ice on it, the member being moved so that part of it passes successively an exposed position where ice may form. The ice detecting means comprises at least one contact member which engages the drum. Both the drum and the contact member may be electrically conducting and the indication may be given by electrical means, as the ice formed will break the contact. Or, alternatively, the ice formed on the drum may be arranged by a device so as to make the electrical contact.

506,843. *Means for Indicating Ice Formation.* Goldschmidt, R., 84, Hillfield Court, Belsize Avenue, London, N.W.3. Dated Jan. 12th, 1938. No. 1,087.

The indicator proposed consists preferably of a member which is caused to vibrate by means of electrical impulses, this vibration being impeded if ice forms

on the member; the member may be a diaphragm and its natural frequency is arranged to be higher than the frequency at which it is normally caused to move. The indicating means comprise electrical contacts which, when closed, short-circuit an indicating device, and they are arranged to remain open when the movement of the diaphragm is impeded by ice.

506,179. *Improved Means for Preventing the Formation of Ice on Aircraft.* Ellor, J. E., Grandell, South Drive, Chain Lane, Mickleover, Derby. Dated Nov. 24th, 1937. No. 32,396.

The cooling air from the engine is led through a conduit or conduits situated along the leading edges of the wing or along other parts and terminating at the trailing edges or other suitable places in order to prevent ice formation.

505,772. *Improvements in or connected with Means for Preventing Ice Formation on Control Surfaces of Aircraft.* Headen, L. A., St. Mary's Works, Frimley Road, Camberley, Surrey. Dated Nov. 16th, 1937. No. 31,461.

An air heater on the engine or exhaust pipe communicates with a blower which forces the heated gas through tubes to parts of the aircraft near the hinge joints, from where they impinge as jets on the hinge joints. This hot gas delivery may be controlled.

505,873. *Improvements in and relating to Arrangements for Preventing the Formation of Ice on Aircraft.* Groves, W. W., 30, Southampton Buildings, London, W.C.2. Dated July 14th, 1938. No. 20,925.

The prevention is to be effected by heat from the engine. A distribution chamber of large cross section is located inside the member to be protected and guide passages for a gaseous or liquid heat carrier are conducted along the inner side of the outer skin of the member to be protected. The walls of the distribution chamber form part at least of the passages which conduct the heat carrier along and in contact with the inner side of the outer skin of the part concerned.

505,433. *Improvements in and relating to De-Icing Equipment for Example for Aircraft.* Goldschmidt, R., 84, Hillfield Court, Belsize Avenue, London, N.W.3. Dated Nov. 5th, 1937, No. 30,436; July 25th, 1938, No. 22,088; and Jan. 12th, 1938, No. 35,445.

It is proposed to arrange that the surface of the part to be de-iced is formed of a skin which can be elastically deformed to a small extent. It is proposed to produce these deformations by impacts or by propagating waves along the surface to be de-iced. It is claimed that these small movements are effective in breaking off forming ice.

505,094. *Method of and Means for Distributing Fluid to Prevent Accretion of Ice on the Wings and Other Exposed Parts or Surfaces of Aircraft.* Dunlop Rubber Co., Ltd., 32, Osnaburgh Street, London, N.W.1; Wright, J., and Trevaskis, H., both of the Company's Works, Fort Dunlop, Erdington, Birmingham, Warwick.

The liquid is fed under pressure to a device incorporating a valve for regulating the quantity flowing. The valve can be by-passed so that full pressure may be used, or an unrestricted flooding flow of liquid delivered to the part or surface or simultaneously to a number of parts or surfaces.

## ENGINES.

497,156. *Controlling Aircraft Engines*. Lusty, I., Caerleon, Monmouthshire. Dated June 15th, 1937. No. 16,568.

Airscrew control mechanism for synchronising aero engines with variable pitch airscrews has one datum speed device for each engine, each working at a pre-determined speed. The speed can be adjusted of all these devices together and there is a device for each engine which varies the pitch-changing mechanism when the engine speed varies from that of the device, so as to bring the engine speed again to that of the device. The datum speed devices consist of A.C. synchronous motors supplied from a single source of current. The airscrew control mechanism consists of a mechanical differential device, one element of which is driven by the engine, another by the electric motor, and a third element is connected with the pitch control gear.

502,317. *Improvements in or relating to the Exhaust Systems of the Internal Combustion Engines on Aircraft*. Schneebeli, H., 52, Rue Armand Sylvestre, Courbevoie, France. Convention date (France), July 2nd, 1937.

The exhaust system employs a streamline cowling which latter is a double-walled casing into which the exhaust gases are discharged, and from which they escape through perforations in spacing members. These latter also form stays and are tubular and lead to the outer air. A separate element may be used for each cylinder of a multi-cylindered engine.

501,750. *Cowling for Aircraft Engines or for Radiators or the Like for Aircraft Engines*. Arado Flugzeugwerke Gesellschaft mit beschränkter Haftung, Brandenburg (Havel), Germany. Convention date (Germany), Aug. 31st, 1937.

This is a cowling for an aircraft engine or for an annular radiator, on the rear edge of the cowling there are arranged air louvres which open outwards. The louvres are coupled with each other by spreading rings, the diameter of which can be positively increased or decreased. The louvres are opened by increasing the diameter and closed by reducing it. The diameter of the ring is increased by arranging that the ends are moved relatively to each other by the swivelling ends of two link bars.

504,539. *Arrangement of Aircraft Engines*. Sir W. G. Armstrong-Whitworth Aircraft, Ltd., and Lloyd, J., of the Company's Works, Whitley, Coventry, Warwickshire. Dated Sept. 30th, 1938. No. 28,412.

One or more air-cooled engines having X-like banks of in-line cylinders are supported in the interior of an aeroplane wing. Each cylinder bank has its own air duct extending from the leading edge of the wing to the rear of the bank, across which the cylinders extend. The duct may continue to the trailing edge or may communicate with a space in the wing at the rear of the engine which has an outlet at the trailing edge.

504,747. *Improvements in or connected with Aircraft Engine Cowlings*. Vickers (Aviation), Ltd., Pierson, R. K., and Ellis, D. L., all of Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated Oct. 30th, 1937, No. 29,726, and Oct. 11th, 1938, No. 29,412.

This is a cowling having a spinner which latter is formed with a concave portion adjacent to its rear edge so as to deflect the air radially outwards. The cowling may have means consisting of a rotor driven at an increased speed relatively to the spinner so as to increase the outflow of air through the gap. The interior of the cowling may have intakes or scoops facing forward.

504,069. *Engine and Change Speed Power Transmission on Both Sides.* Cotal, J., 2, Rue de Saint Marceaux, Paris, Seine, France. Convention date (France), March 11th, 1937.

The engine propeller shaft drives the supercharger on one side and the propeller on the other through variable gear trains of epicycloidal type controlled by the pilot. There is a variable gear for the supercharger with the view of increasing supercharge. The supercharger is driven by a gear to increase its speed. A reduction gear drives the propeller in which is incorporated a two-speed gear electrically controlled.

506,468. *Improvements in and relating to the Cooling of the Compressed Gaseous Charges of Internal Combustion Engines.* Junkers, Flugzeug-und-Motoren-werke Aktiengesellschaft, 39, Junkersstrasse, Dessau, Anhalt, Germany. Convention date (Germany), July 5th, 1937.

This is a proposal for cooling the gaseous charges of internal combustion engines between the engine and the blower. The gas may be passed through the wing, especially parts which are subject to icing, or a fin may be used as a distributing chamber from which the gas is led to cooling passages in the leading edge.

506,491. *Improvements in Means for the Control of the Engines of Multi-Engine Aircraft.* Arado Flugzeugwerke Gesellschaft mit beschränkter Haftung, Brandenburg (Havel), Germany. Convention date (Germany), Feb. 17th, 1938.

In aircraft with engines arranged on opposite sides of the longitudinal axis, for cutting out an engine or engines in order to bring about balance of the aeroplane, a circuit is automatically closed on the stalling of one engine, which circuit includes a relay which effects engine control. There are also two switches, one of which is controlled by a pitot tube and the other is controlled by the difference in the rotational speeds of the engines.

506,645. *Improvements in or relating to the Mounting of Aircraft Engines and Propellers.* Elliot, A. G., Holmwood, Quarndon, Derby. Dated Nov. 30th, 1937. No. 33,087.

In the case of engines mounted in the structure of an aeroplane it is proposed to mount the engine by means of trunnion pins coaxial or parallel with the crankshaft, carried by resilient means in bearings in the aircraft structure, the resilient means resists torque reaction. The propeller and shaft are rigidly mounted in bearings on the aircraft structure independently of the engine, and are driven by a universally jointed transmission shaft. Frictional or hydraulic damping of the engine movements may also be used.

506,699. *Improvements in and relating to the Utilisation of the Exhaust Gas Energy of Aircraft Engines for Propulsion Purposes.* Junkers, Flugzeug-und-Motoren-werke, Aktiengesellschaft, 39, Junkersstrasse, Dessau, Anhalt, Germany. Convention date (Germany), July 1st, 1937.

The gas is discharged into the atmosphere in a direction opposed to that of flight. The exhaust gas from each cylinder discharges into a separate pipe having a nozzle. This has an aperture of such a size as to increase the pressure in the pipe, thereby increasing the emergent velocity and the propulsion force. The taper ratio of the nozzle varies between 0.3 and 1 and the capacity of the exhaust pipe varies between 0.3 and 1 of the swept volume of the working cylinder.

506,146. *Improvements in Radiators for Aeroplanes and the Like.* Belaieff, J. F., Delaney, C. T., and Gallay, Ltd., all of the Company's address, Edgware Road, Cricklewood, London, N.W.2.

In radiators carried inside aeroplane wings it is proposed to use radiators arranged in a V or double V formation. The air inlets on the leading edge are to be controlled, the air outlets being at the trailing edge.

506,333. *Exhaust Pipes for Internal Combustion Engines of Aircraft.* Ellor, J. E., Grandell, South Drive, Chain Lane, Mickleover, Derby. Dated Sept. 24th, 1937. No. 25,944.

The exhaust gases from a group of cylinders are discharged through a number of expansion boxes, the expansion boxes being shaped as a flattened streamline member lying in the airstream. The gases are discharged through tapered and restricted nozzles projecting backwards.

506,702. *Improvements in or relating to Cowlings for Air-Cooled Aircraft Engines.* Mercier, P. E., 11, Rue Jacques Dulud, Neuilly-sur-Seine (Seine), France. Dated Feb. 18th, 1938. No. 5,201.

In this cowling it is proposed to place exhaust members of the engine in front of the rear edge of the outlet aperture so that they may be cooled by the air which has already circulated over the engine. The exhaust members may form part of the forward profile of the cowling or they may be disposed in the outlet aperture, or they may be surrounded by an envelope having an inlet aperture in front of the cowling and an outlet aperture leading into the discharge conduit.

505,967. *Engine Arrangement in Multi-Engined Aircraft.* Blume, W., Ziesser Landstrasse 16, Brandenburg (Havel), Germany; and Arado Flugzeugwerke Gesellschaft mit beschraenkter Haftung, Brandenburg (Havel), Germany. Convention date (Germany), Jan. 6th, 1938.

It is proposed to mount the engines partially within the fuselage and partially within the wing, the propellers being driven by transmission mechanism. In the case of a V engine the cylinders may be within the fuselage and the crankcase within the wing. If a flat engine is used the crankcase may be located at the wing root, one set of cylinders being in the fuselage, the other in the wing.

506,047. *Improvements in or relating to the Charging of the Cylinders of Internal Combustion Engines.* Jeyler, H., 10, Stockerstrasse, Zurich, Switzerland. Convention date (Switzerland), Oct. 15th, 1937.

Reference is made to application 499,060 in which the energy in the exhaust gas is used to set up in a tube a rapidly moving column of air, the flow of the column being periodically interrupted by a valve. The kinetic energy in the column is converted into pressure energy, the air in this state being admitted to the engine. This specification claims a value of which the diameter is greater than and may be a multiple of the inlet pipe.

503,690. *Improvements in Cooling Arrangements for Air-Cooled Radial Cylinder Engines of Aircraft.* The Bristol Aeroplane Co., Ltd., Fedden, A. H. R., Copley, J. W., and Fortescue, P., all of Filton House, Bristol. Dated Oct. 27th, 1937, No. 29,375; and May 19th, 1938, No. 14,976.

This specification describes cowling for an air-cooled radial engine in which air enters through the front orifice and is discharged partly through an orifice

near the front of the cowl and partly at the rear of the cowl. An exhaust collector is so arranged that it is cooled by the air passing to the orifice near the front of the cowl, and there is a partition to separate the incoming air from the exhaust collector. The exhaust collector is of ring form and is in front of the cylinders.

504,992. *Oil Cooler for Aircraft Engines.* Bayerische Motoren Werke Aktiengesellschaft, Lerchenauerstrasse 76, Munchen 13, Germany. Convention date (Germany), Aug. 4th, 1937.

The proposed oil cooler for radial engines may be mounted in a hollow space in the front end of the engine cowling, the air for cooling may be withdrawn from a chamber in front of the cylinders or from behind them. The areas of the air supply pipes may be controlled manually or by a thermostat.

502,732. *Shutters for Cowlings of Aircraft.* Cowdrey, C. L., Glen Masson, 6, Temple Drive, Nuthall, Nottinghamshire. Dated Sept. 20th, 1937. No. 25,496.

This is a discharge orifice for air from the cowling of aircraft provided by at least four shutters hinged together, the lines of the hinges meeting about a point in front. In one position the central shutters form a portion of a cone with an opening at the rear, the other shutters lying flush with the cowling; in another position the whole of the shutters form the part of the cone with a larger opening to the rear.

503,073. *Improvements in and relating to Aircraft Motor Cowling.* Theodorsen, T., 3321, Chesapeake Avenue, Hampton, Virginia, U.S.A. Dated July 30th, 1937. No. 21,237.

This radial engine cowling has a circular air inlet in front in the normal position and an annular air outlet also near the front situated at the point of maximum low pressure. Adjusting means are provided to adjust the degree of opening of the air outlet. The cowling may have more than one air outlet, at least one of which is located ahead of the point of maximum negative pressure.

#### FABRIC.

504,565. *Improvements in or connected with Means for Attaching Fabric to Aircraft Members.* Vickers (Aviation), Ltd., and Stevenson, B. E., Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated Oct. 26th, 1937. No. 29,206.

The parts supporting the fabric are formed with grooves into which the fabric is pulled down. It is held in position by needles, the ends of which pass through the fabric and through holes at the bottom of the grooves. One end of the needle may be cranked or joggled.

#### HYDRAULICS.

502,496. *Pipe Joints.* Cowdrey, C. L., Glen Masson, 6, Temple Drive, Nuthall, Nottinghamshire, England. Dated Sept. 20th, 1937, No. 25,497; and June 22nd, 1938, No. 18,576.

One of the pipes to be jointed has an end portion into which the end of the other is adapted to pass. Sandwiched between the pipes is a ring member which is located axially, but free to move radially with reference to one of the pipes, the inner pipe makes a push fit into the said ring (if the ring is carried by the outer pipe) or the inner pipe and ring together make a push fit into the outer pipe (if the ring is carried by the inner pipe) with a rounded portion which

makes contact with the ring or outer pipe as the case may be and allows some universal and telescopic movement to the pipes with reference to each other, the said rounded portion sliding on the surface with which it is in contact.

#### MISCELLANEOUS.

497,289. *Improvements relating to Means for the Controlling of Trailing Lines, especially from Aircraft.* Taylor, E., 58, Minley Road, Cove, Farnborough, Hampshire. Dated June 17th, 1937. No. 16,890.

For the purpose of preventing a trailing line from lashing about in flight the line has a parachute drogue carried in such a way that the drogue will remain open when drawn through the air by the line in one direction, but closes on movement in the reverse direction and re-opens upon return to the original direction. A bulge is formed in the line entraining a pivoted knife so as to cause the knife to cut the wire.

506,067. *Improvements in or relating to Means for Reducing Torsional Oscillations in Transmission Systems.* Scott-Paine, H., The British Power Boat Co., Hythe, Southampton, Hampshire; and Wilson, W. K., Stag Lane Aerodrome, Edgware, Middlesex. Dated Oct. 20th, 1937. No. 28,629.

The transmission drive has flexible connecting members situated between each member and heavy masses such as fly wheels or gears, at the gearbox, and arranged so that the moment of inertia of the masses at the gearbox is sufficiently large compared with the sum of the moments of inertia of the members of the drive, that the higher of the two resulting fundamental frequencies of natural vibration is not greater than twice the lower of the said frequencies, and preferably not 50 per cent. higher.

505,654. *Improvements relating to Valve Arrangements in Fluid Pressure Systems.* Dowty, G. H., Arle Court, Cheltenham, Gloucestershire. Dated Oct. 11th, 1937. No. 27,576.

In a hydraulic system with a circuit which includes a valve and union device for making a temporary branch connection to the circuit so constructed that making the said temporary connection moves the valve so as to open it for flow through said branch against which flow it is normally closed, and to close it against flow through the circuit for which flow it is normally open.

505,431. *Improvements relating to Hinge Mountings for Doors, Panels, Hatchways, or the Like.* Hudson, R. J. H., Yennadon House, Dousland, South Devon. Dated Oct. 7th, 1937, No. 27,298; and Aug. 12th, 1938, No. 23,853.

Provision is made for the hinge line of the door to be displaced relatively to the support. The first part of the hinge arrangement is a movable arm carried by the support on a part axis at right angles to the displacement. The second part is a swivel portion pivoted to the arm about a second axis, the orientation of which is varied by the movements of the arm and also pivoted to the door about a third axis so that the displacement and swinging are independent.

503,458. *Means for Controlling by Fluid the Brakes of Aircraft and Other Vehicles.* Société "Olaer," 118, Avenue des Champ Elysées, Paris, France, and Mercier, J., of the same address. Dated July 5th, 1938. No. 19,877.

This is a pressure reducing valve distributor having a movable supporting body containing expansion chambers, closing valves for these chambers, and pushers for operating these valves may be displaced and may come in contact with an abutment which is tiltable at will.

505,202. *Improvements in or connected with Stowing Tanks in Aircraft Wings.* Vickers (Aviation), Ltd., and Wallis, B. N., Weybridge Works, Brooklands Road, Weybridge, Surrey. Dated Nov. 6th, 1937. No. 30,483.

The proposed means for stowing tanks in the wings, which is removable from the body, or form a stub wing, is to provide a free space or spaces for the tanks and there are devices by which the tank or tanks can be slid into or out of the wing when it is detached. When the tanks are stowed in position and when the wing is attached to the aeroplane the necessary pipes may be connected.

#### MODEL AIRCRAFT.

505,256. *Improvements in Toy Aeroplanes.* Rigby, W. 47, Valleyfield Road, Streatham, London, S.W. Dated Nov. 4th, 1937. No. 30,261.

The toy undercarriage has arms carrying wheels which are pivotally mounted on the body of the aeroplane about a transverse axis, and formed with a lever extended longitudinally of the aeroplane, the said lever being attached to the body by no direct means so that it yields on impact.

505,257. *An Improved Winding Gear for the Driving Rubber of Toy Aeroplanes.* Wallis Rigby, 45, Valleyfield Road, Streatham, London, S.W.16. Dated Nov. 4th, 1937. No. 30,264.

The winding gear has back and front members spaced apart to enable the propeller to rotate, a cradle to support the aeroplane body at its nose, and a winding gear with an external handle with an internal projection to engage the propeller.

#### PARACHUTES.

506,525. *Improvements in or relating to Pack Parachutes.* Eschner, J., 20, Franklinstrasse, Vienna, Austria. Dated Nov. 29th, 1937. No. 32,959.

The canopy fabric of the parachute is symmetrically folded in and rolled into the packing position from the edge towards the inner surface of the apex characterised in that the fabric folded crosswise into a square middle field is rolled into two longitudinal rolls lying on both sides of a diagonal, and from the ends of the said rolls is rolled into two transverse rolls while the shroud line and load lines are placed on the inner surface of the apex with their free ends projecting from the middle of the pack.

497,448. *Improvements in Parachutes.* Evans, J. J., 48, Porchester Terrace, London, W.2; and Quilter, J. R. C., Stadium Works, Woking, Surrey. Dated August 20th, 1937. No. 22,891.

The parachute has webs or gusset pieces of triangular shape acting as individual shroud lines and connected together at or near the axis of the parachute so as to occupy radial planes when the parachute is open, characterised by the fact that the webs or gusset pieces extend inside the canopy, leaving a free space above them for internal air movement.

#### ROTORCRAFT.

501,472. *Improvements in Flying Machines.* Hovland, A. N., Bestun, Oslo, Norway. Dated Jan. 24th, 1938. No. 2,282.

The machine is adapted to ascend and descend under the influence of wings rotatable about a vertical axis after release from their normal transverse position, and tilting of one wing about its longitudinal axis, in combination with a stabilising rotor positioned above the wings and capable of autorotation to stabilise the machine during the transition of the supporting planes from rotational movement into fixed transverse position.



504,493. *Aeroplane*. Laanti, M., Haapasaari, Kotka, Finland. Dated March 21st, 1938.

The flying machine has a lifting and propelling device consisting of two or more vaned wheels rotating about an axis which is at right angles to the direction of flight. A cowling is provided which has an adjustable opening for controlling the propelling force.

504,718. *Improvements in or relating to Rotary Wing Aircraft*. Hutchison, H. H., and Gibson, J. J., 118, Hillside Gardens, Barnet, Herts. Dated Oct. 26th, 1937. No. 29,173.

Air or steam under pressure is conveyed up the centre of the rotor axle, and along the blades. It is expelled from the trailing edge of a tube with the outboard end blocked or sealed, the tube extending out beyond the end of the wings. A frictionless valve is provided at the top of the axle to prevent steam escaping at the joint.

504,894. *Improvements in and relating to Aircraft Sustaining Rotors*. The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2, and Bennett, J. A. J., 67, Grove Way, Esher, Surrey. Dated Nov. 8th, 1937. No. 28,665.

In lifting rotors, the blades are independently articulated to the hub respectively for flapping and combined leading-and-lagging and pitch varying movements, and wherein an intermediate articular member, to which a rotor blade is connected by a flapping pivot is connected to the hub by an inclined pivot permitting the combined leading-and-lagging and pitch varying movement.

504,942. *Improvements in and relating to Aircraft Sustaining and/or Lifting Rotors*. Josselyn, J., 376, Strand, London, W.C.2; and Blake, R., Bush House, Aldwych, London, W.C.2. Dated Nov. 2nd, 1937. No. 30,011.

The rotor has a rotary hub member, a single blade radially disposed pivotal means connecting the hub to the blade and providing for flapping in a path transverse to the rotational path, and a non-lifting counterweight counterbalancing the blade and means controllable in flight for varying the position relative to the aircraft of the path swept by the rotor blade. The counterweight may be rigidly or pivotally connected to the hub.

506,404. *Improvements in and relating to Helicopters and Gyroplanes*. The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2; and Bennett, J. A. J., 67, Grove Way, Esher, Surrey. Dated Nov. 26th, 1937, No. 32,731; and March 9th, 1938, No. 7,367.

The rotors of the proposed machine have two or more blades each which are co-axial or spaced and non-intermeshing, characterised in that paired rotors are so geared together that when a blade of one of the rotors lies in a direction making an angle with the first named direction equal or approximately equal to half the blade-spacing angle. The paired rotors have each a single counterweighted blade, both the blade and the counterweight being free to flap.

#### TESTING.

507,477. *Methods and Means for Testing Rotary Bodies, especially Wheels and/or Tyres*. Dunlop Rubber Co., Ltd., 32, Osnauburg Street, London, N.W.1; Williams, J. I., and Broadbent, F. G., of the Company's Works at Fort Dunlop, Erdington, Birmingham, Warwick. Dated Nov. 10th, 1937, No. 30,814; and Aug. 31st, 1938, No. 25,491.

For testing tyres a rotary drum is used which may be of elliptical section mounted on an oblique axis. The tyre is rotated and thrust may be applied to

it acting on parts of it spaced to one side of its median plan, corresponding parts on the other side being free from thrust. The applied thrust may be intermittent.

#### UNDERCARRIAGES.

505,263. *Improvements relating to Landing Gear Arrangements of Aircraft.* General Aircraft, Ltd., The London Air Park, Feltham, Middlesex, Williams, D. L. H., and Crocombe, F. F., both of the Company's address. Dated Nov. 4th, 1937, No. 34,409, and Dec. 9th, 1937, No. 34,148.

In the case of three-wheeled chassis for aeroplanes having the single wheel in front, it is proposed that this front wheel shall be supported in a manner allowing its retraction into the body of the fuselage for the purpose of reducing drag loads in flight. The wheel may take up a number of positions between retraction and extension and in each position is capable of taking landing loads.

506,527. *Improvements relating to Aircraft Undercarriages.* General Aircraft, Ltd., London Air Park, Feltham, Middlesex; and Williams, D. L. H., and Crocombe, F. F., of the Company's address. Dated Nov. 29th, 1937, No. 32,978; and Dec. 31st, 1937, No. 36,254.

This refers to a folding nose wheel chassis for a tricycle undercarriage. The wheel is carried by a strut pivoted transversely and the mounting can be swung forward about the axis so as to move the wheel into its retracted position inside the nose of the fuselage.

506,719. *Improvements relating to Aircraft Undercarriages.* General Aircraft, Ltd., The London Air Park, Feltham, Middlesex; Williams, D. L. H., and Crocombe, F. F. Dated Nov. 29th, 1937. No. 11,795.

This is a method of folding the nose wheel of a tricycle undercarriage. The wheel is supported by a type of rectangular framework with hinged joints so that the wheel is lifted vertically into the fuselage when folding by a sort of parallel action. The shock absorber spans the framework diagonally.

506,633. *Improvements relating to Aircraft Undercarriages.* General Aircraft, Ltd., The London Air Park, Feltham, Middlesex; Williams, D. L. H., and Crocombe, F. F., of the same address. Dated Nov. 29th, 1937. No. 11,794.

This is an arrangement for folding the front wheel of a tricycle chassis, in which the strut and wheel are folded sideways, being pivoted on the upper part of the strut. Two front wheels may be used, one folding to port and the other to starboard. A worm and wheel arrangement may be used for folding.

505,109. *Improvements relating to Landing Gear Arrangements of Aircraft.* General Aircraft, Ltd., The London Air Park, Feltham, Middlesex; Williams, D. L. H., and Crocombe, F. F., both of the Company's address. Dated Nov. 4th, 1937. No. 30,282.

This specification refers to three-wheel chassis arrangements in which the single wheel is in front. The front wheel is supported in a manner which permits swivelling, but a mechanism is provided for restraining this swivelling as it has been found that there is a tendency for the front wheel to oscillate.

502,970. *Improvements relating to Aircraft Landing Gear.* Dowty, G. H., Arle Court, Cheltenham, Gloucestershire. Dated Sept. 28th, 1937. No. 26,248.

A landing gear is proposed comprising a number of wheels mounted for castoring through  $360^\circ$  and means are provided interconnecting their mountings so as to ensure parallelism in regard to track. Preferably each wheel is carried by a

telescopic strut, the lower part of which is rotatable to allow castoring. The castoring rotation of the wheel may be transmitted to a sleeve mounted on the fixed part of the strut, the sleeves may carry chain wheels which may be connected together by a chain. A twin-wheel unit may be retractable by swinging as a whole on a single axis.

505,375. *Improvements in or relating to Fluid Pressure Brakes.* Bendix Aviation Corp., 105, West Adams Street, Chicago, Illinois, U.S.A. Convention date (U.S.A.), Nov. 11th, 1936.

A fluid pressure braking system comprising a slave unit fed with fluid through a manually operable control valve, which latter is provided with a member which is moved in opening the valve and is subject to the fluid pressure on the slave unit side of the control valve whereby the resistance offered to the movement of the valve varies in accordance with the pressure in the slave unit, and a constricted relief passage provided in connection with the slave unit to release fluid therefrom all the while the brake is being applied, the fluid so released being replaced continuously from the source by way of the control valve.

503,807. *Improvements in or relating to Landing Gear for Aircraft.* The Ribbesford Co., Ltd., Brock House, Langham Street, London, W.1, and Thornhill, P. W., of the Company's address. Dated March 30th, 1937, No. 33,125, and March 23rd, 1938, No. 8,968.

A proposed shock absorber has a pair of tubular members arranged to move relatively in a telescopic sense for shock absorption, rotationally to permit castoring. It has resilient means to resist shortening, a piston which displaces liquid as the two members are rotated away from a predetermined angular position, resilient centring means, and damping means to damp the rotational movement away from said angular position.

503,658. *Means for Controlling by Fluid Under Pressure the Brakes of Aircraft and Other Vehicles.* Mercier, J., 118, Avenue des Champs d'Elysees, Paris, France. Dated April 27th, 1938. No. 12,526.

It is proposed to obtain the progressive action of brakes without the assistance of expansion chambers by acting on the outlet of the distributor, preferably on the closing member. This distributor has an outlet passage for exhausting the brakes characterised by the use of additional means which allow the pilot to influence the flow through this passage so as to render progressive the releasing action of the brakes.

503,789. *Improvements relating to Retractable Undercarriages for Aircraft.* Dowty, G. H., Arle Court, Cheltenham, Gloucestershire. Dated Oct. 13th, 1937. No. 27,867.

This undercarriage has a leg and landing element retractable by swinging backwards and upwards. Resilient means such as a spring connected to the leg arranged to accumulate energy during retraction throughout a substantial portion of the retraction movement and to expend this energy during the last part of the retraction movement, so that energy accumulates while the retraction is assisted by aerodynamical forces, and is given out while retraction is opposed by gravitational forces.

502,567. *Improvements in or relating to Tail Supporting Wheels or Their Equivalents for Aircraft.* Cowey, L. E., 4, High Park Road, Kew Gardens, Surrey. Dated Aug. 17th, 1937. No. 22,610.

This is a mounting for a retractable tail wheel having a telescopic compression strut pivotally connected at its lower end with the fork and at its upper end with

a link, which projects forwards of the tail wheel and is pivotally connected with the fuselage at its forward end. Radius rods are connected with the tail wheel and fuselage. The link being movable upwards and forwards about the attachment point to the fuselage, the radius rods, compression strut, tail wheel, etc., may be raised into a position in which they lie wholly or partially within the contour of the fuselage.

507,162. *Improvements in or relating to Fluid Pressure Apparatus for Controlling the Operation of Brakes for Aircraft.* Dunlop Rubber Co., Ltd., 32, Osnaburgh Street, London, N.W.1; Beharrell, G. E., Wright, J., and Trevaskis, H., all of the Company's Works at Fort Dunlop, Erdington, Birmingham, Warwickshire.

The means for operating each pair of inlet and exhaust valves consists of a tiltable lever having at one end a plug to close the exhaust orifice to fulcrum thereon and then to open the inlet valve. Actuating mechanism tilts the lever acting at a point near the exhaust plug and there are means for opening the inlet valve located between the two ends of the lever at a point nearer to the said actuating mechanism than to the exhaust closure plug.

#### VIBRATION.

506,687. *Improvements relating to Hydraulic Vibration Dampers.* Avimo, Ltd., Rowbarton; Stevens, H. C. M., Lyndale, Galmington; Foster, F., Osborne Grove House, Haines Hill, Taunton, Somerset. Dated Dec. 30th, 1937. No. 36,074.

This arrangement is proposed for preventing vibration on the controls of aircraft. It consists of a cylinder filled with oil and a piston and piston rod. There is a fluid leak round the piston and another rod which can be used for imparting intentional motion to the piston by hand or otherwise. A fluid leak is produced by relative movement between this rod and the piston.

501,887. *Improvements in or relating to Rubber Surfaced Structural Elements.* International Latex Processes, Ltd., 10, Lefebvre Street, St. Peter Port, Guernsey, Channel Islands. Convention date (U.S.A.), Jan. 4th, 1938.

In order to reduce the transmission of vibration and sound waves in aircraft structures, the structural element is provided with a coating presenting a rough uneven outer surface of irregularly spaced protruding soft rubber particles comprising the *in situ* solids deposit of a latex composition. The soft rubber is intended to include products vulcanised with up to 8 per cent. of sulphur.