

ABSTRACTS OF PATENT SPECIFICATIONS.

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

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AERODYNAMICS.

443,903. *Improvements in or relating to the Streamline Formations of Bodies for Land Vehicles, particularly Motor Vehicles.* Communicated by Tatra Works, Ltd., 200, Kartouzka Smichov, Prague, Czecho-Slovakia. Dated September 5th, 1934. No. 25,576.

It is proposed to collect air from the lower part of the front of a motor car body where it is stated to be dammed up, and to pass it by means of ducts to the rear of the body where it is delivered at the points of incipient air disturbance.

AEROPLANES—CONSTRUCTION.

442,252. *Improvements in or relating to the Construction of Aircraft Wings.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Youngman, R. T., Walcot, Church Crookham, Aldershot, Hants. Dated December 14th, 1934. No. 35,935.

In this wing it is proposed to use a system of girders running down the span of the wing so in end view the girders are arranged similarly to warren bracing. The booms are in the form of a T section and the girders are braced by perpendicular and diagonal members. A covering consisting of two plates separated by a corrugated plate, all three being riveted together, may be used.

442,253. *An Improved Method of Covering Aircraft Components.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Pearce, H. L., of 103, Studland Road, Hanwell, London, W.7. Dated January 18th, 1935. No. 1,745.

The wing has a covering of corrugated metal, the corrugations running longitudinally. Out of some of the crests tongues or loops are pressed out, these being longitudinally directed and arranged in a series which runs in a fore and aft direction. A plain sheet of metal, slotted to give passage to the tongues or loops, is disposed over the corrugated sheet metal; textile fabric is stretched over the component and treated with dope. The fabric is cut to give passage to the

tongues or loops and flax cords, tapes, or the like, are bound round the component so as to pass beneath the tongues or loops, tied and covered with frayed edge fabric applied by means of dope.

- 444,609. *Improvements in or relating to Aircraft.* Bleriot Aeronautique, 167, Quai Gallieni, Surasnes (Seine), France. Convention date (Belgium), October 5th, 1934.

The aeroplane described is a monoplane having two fuselages carrying the tail, etc., and having a centre nacelle with two motors in tandem. Each of the fuselages is watertight so as to permit the machine to alight on water and each fuselage also contains a landing chassis, shown as consisting of a number of wheels arranged in line. When it is desired to rise from water a detachable cover, carried in the aeroplane, is fitted to the bottom of the aeroplane so as to cover the wheels; the rear part of this appliance is formed as a step. This cover may be dropped in flight.

- 443,005. *Improvements in or relating to Aircraft.* Ueskomoravska-Kolben-Daner Co., Ltd., 36, Palackero, Prague X, Czecho-Slovakia, and Slechta, 399, Obvada, Prague IX, Czecho-Slovakia. Convention date (Czecho-Slovakia), September 22nd, 1934.

The aeroplane proposed is a high wing cantilever monoplane of normal type having the two occupants seated side by side approximately below the foremost third of the wing, which latter is mounted on the top of the fuselage. In order to permit easy entrance and exit to or from the seats the leading portion of the centre section of the wing is adapted to be folded back.

- 445,437. *Improvement in or relating to Aircraft Structures.* The Bristol Aeroplane Co., Ltd., and Russell, A. E., both of Filton House, Bristol. Dated December 5th, 1934. No. 34,987.

It is proposed to use a wing spar in an aeroplane wing placed in the position of maximum depth of the wing, and strong enough to resist all the bending moments on the wing. At each side of this spar and at some distance from it are placed two vertical walls, these and the spar being connected by a rigid metal skin, hence providing for torsional bracing. In order that the vertical walls may not take bending moment they are attached to the fuselage by a single horizontal hinge.

AEROPLANES—GENERAL.

- 445,829. *Improvement in or relating to Means for Launching Aircraft.* Mayo, R. H., 55, Pall Mall, London, S.W.1. Dated December 20th, 1934.

In the case of aircraft consisting of two components arranged to separate in flight, it is stated that it may be desirable for various reasons to prevent separation taking place until the machine has reached a predetermined height. It is proposed, therefore, to provide an over-riding lock, operated by a capsule of the type used in barometers, so that this lock is released only at the desired height permitting separation to be effected.

AIRSCREWS.

- 441,763. *Improvements in Airscrew Drives.* Tresilian, S. S., Tresidder, Burley Lane, Quarndon, Derby, England; Rubbra, A. A., Red Roofs, Carlton Road, Derby, England; and Gass, E. A., Norimar, Melbourne Road, Chellaston, Derby, England. Dated July 20th, 1934. No. 21,304.

This specification describes a drive claimed to be particularly suitable for cases where the propeller is to be mounted some distance in front of or behind the

engine. There is an extension piece supporting the propeller shaft in roller bearings immediately behind the propeller hub, while the shaft is driven by a gear wheel which is internally toothed fitting to a gear wheel externally toothed, the latter driving the propeller shaft. The arrangement is stated to give necessary flexibility.

443,566. *Improvement in Airscrews*. Johnson, K. C., Asiatic Petroleum Co., Ltd., St. Helen's Court, Great St. Helen's, London, E.C.3. Dated August 1st, 1934. No. 22,420.

It is proposed to construct airscrews so that they have a large angle of incidence near the tips of the blades, and, in order to enable this to be done without stalling the tips each blade is provided with an auxiliary aerofoil extending along the blade and situated a short distance from the blade on the suction side, the position being above the point of maximum thickness of the blade.

AIRSHIPS.

443,554. *Dirigible Airships or Balloons*. Juan Montilla y Cabellos de Oropesa, Calle San Bernardo No. 113, Madrid, Spain. Dated May 29th, 1934. No. 16,024. Specification not accepted.

It is proposed to propel the aircraft by means of a propeller actuated by a number of wind screws driven by the air current.

446,563. *Improvements in Airships*. Goetz, A., 6, Eppendorferstieg, Hamburg 39, Germany. Convention date (Germany), September 10th, 1934.

The airship proposed has an upper half of approximately elliptical section and a lower half of approximately circular section, the upper half projecting beyond the lower. In the upper half are arranged channels for air and it is claimed that the construction increases the safety of airships in flight and minimises the effect of gusts which would normally disturb the flight.

ARMAMENTS.

444,991. *Means for Mounting in an Aircraft the Motor to which a Gun Barrel is Secured*. Knoller, E., Liebenberstrasse 7, Vienna 1, Austria. Convention date (Germany), May 8th, 1934.

In the case of a gun combined with an aircraft motor and firing through the propeller shaft of the motor, or otherwise, it is proposed to attach a recoil-absorbing mechanism between the motor and the aeroplane so as to take advantage of the mass of the motor in absorbing the recoil. In some cases it may also be advisable to mount a recoil-absorbing mechanism between the gun and the motor.

443,997. *Improvements in or connected with Aerial Trailers and the Like*. Irving Air Chute of Great Britain, Ltd., Icknield Way, Letchworth, Hertfordshire. Dated July 15th, 1935. No. 20,201.

This specification describes an apparatus which may be towed by an aircraft so as to provide a target for gunnery practice or for any other desired purpose. It consists of an approximately cylindrical body, the front end of which consists of a bridle arranged to make connection with the tow rope. This bridle has fabric arranged between the ropes so as to form a number of fins which direct the air into the next portion which consists of a number of sleeves, arranged in the circumference of a circle. This is followed by a plain cylindrical portion. The whole construction is carried out in flexible materials so that it can be folded when not in use, and the design is stated to render the apparatus stable in flight and to ensure inflation.

442,973. *Improvements in Apparatus for Dropping Armed Vehicles and other Articles from Aircraft.* Elia, G. E. (Count), 9, Via S. Valentino, Rome, Italy. Convention date (Italy), February 26th, 1934.

The parachute used for this purpose carries two containers, one containing the car and the other the crew. The container carrying the car touches the ground first, reducing the vertical velocity of the parachute and reducing the landing shock of the container carrying the crew. The containers may be so arranged that they can safely float on water and shock-absorbing means are described to reduce landing shock.

446,295. *Improvements in Gun Arrangements for Aircraft.* Smolik, A., Prague, Litnany, Czecho-Slovakia. Dated November 1st, 1934. No. 31,381.

The arrangement described shows an aircraft with guns mounted in the fuselage and the wings. These guns are arranged so that the farther they are away from the centre line of the aircraft, the farther distance in front of the aeroplane does their line of fire intersect. The pilot may rotate them horizontally during firing so as to make their lines of fire parallel or divergent.

446,134. *An Improved Adjustable Hood for Aircraft and the Like.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex; Lobelle, M. J. O., Ludlow, 298, Langley Road, Langley, Bucks; Ordidge, F. H., Soircroft, Croft Gardens, Ruislip, Middlesex; and Holroyd, F., Old Hatch Manor, Ruislip, Middlesex. Dated April 23rd, 1935. No. 12,246.

The proposed aircraft hood consists of a rigid structure covered with panels of a transparent material, some of which may be slidable to permit ingress and egress. It is carried by four legs projecting downwards into the fuselage, which are mounted so as to permit the whole hood to be raised or lowered. This movement is controlled by a rack or pinion gear or any convenient method operated by the pilot. The hood is also provided with a flap hinged on a horizontal axis which may be armoured.

CONTROL OF AIRCRAFT.

445,771. *Improvements in or relating to Vertically Displaceable Rudders for Aircraft.* Teisseyres ul Sandomierska 7, Warsaw, Poland, and Zdaniewski, Biala Podlaska, Poland. Dated October 9th, 1934. No. 28,927.

In order to assist control of an aircraft during a spin and also to keep a clear field of fire for a gun firing above an aeroplane fuselage, it is proposed to arrange that the fin and rudder of an aeroplane, which normally project above the fuselage may, at the will of the pilot, be slid downwards so as to project below the fuselage, leaving the top clear.

443,651. *Improvements relating to Wing Flaps for Aircraft.* Miles, F. G., and Powis, C. O., of Reading Aerodrome, Woodley, Reading, Berks. Dated September 27th, 1934, No. 21,745/34, and October 31st, 1934, No. 31,250.

This specification refers to flaps of the Shrenck type and is concerned mainly with such flaps mounted on a low wing monoplane. The flap is in sections, portions being fitted to the taper part of the wings, portions to the parallel section wing root, and a further section underneath the fuselage, the whole flap extending from aileron to aileron. The portion of the flap fitted under the fuselage works the reverse way to the others and hence acts as a servo-motor. There is also provision for wing folding inasmuch as a coupling device is fitted consisting of a spindle having a diametrical slot mating with another, the end of which is bulbous in section. These are registered when the flap sections are all up or all down, so that the hinged parts may be raised so as to enable the wings to be folded backwards.

- 442,122. *Improvements in or relating to Supporting Surfaces for Aircraft.* Letov Vojenska Tovarno Na Letadla, Letnany No. 65, Prague, Czechoslovakia, and Pekarak, Z., Letnany No. 60, Prague, Czechoslovakia. Dated April 26th, 1934. No. 12,663.

In order to obviate excessive air forces on high speed aircraft in flight, it is proposed to provide the wings with flaps which can be opened, and which, when opened, spoil the aerodynamical properties of the wing. These flaps are opened automatically, preferably by an electrical device which is controlled by a small surface which moves against a spring when the aerodynamical forces become critical, thereby making electrical contact and actuating the flaps.

- 442,027. *Improvements in Servo-Motors for Use on Vehicles.* A communication from Societè des Appareils d'Aviation Marcel Gianoli, 7, Rue d'Artois, Paris. Dated July 30th, 1934. No. 2,226.

The servo-motor proposed consists of a surface which may be set at an angle to the fluid flow in which a tunnel is provided so as to ensure that the direction of the fluid flow is fixed. The surface is mounted on a frame which, by pivoting, actuates the driven member, the pivoting being produced by the forces on the surface caused by this latter being set at an angle to the fluid flow. The tunnel may be orientated.

- 443,516. *Improvements in or connected with Wings for Aircraft.* Short Bros., Ltd., and Gouge, A., both of Seaplane Works, Rochester, Kent. Dated January 7th, 1935. No. 488.

The apparatus described is a form of flap for increasing the lift of the wing. It consists of a surface, the upper portion of which is an arc of a circle which is normally fitted in a recess at the rear of the wing, and in this position does not interfere with the normal camber. When operated, it moves backwards in a path curved to the radius of its upper surface. If used over the full span of the wing the outer sections can be used as ailerons by means of differential control.

- 444,715. *Improvements in or relating to Apparatus for Automatically Stabilising the Speed of Aircraft.* Siemens Apparate und Maschinen Gesellschaft mit Beschränkter Haftung, Askaniischer Platz 4, Berlin, S.W.11, Germany. Convention date (Germany), March 7th, 1934.

It is proposed to stabilise the air speed of aircraft with relation to the ground speed by means of a velocity meter. This apparatus consists of a frame on which is mounted two gyroscopes running in opposite directions and so coupled together by toothed segments that they are constrained to undergo equal and opposite deflections. The precessional axes in the frame lie parallel to the direction of flight while the axes of rotation are vertical. On one precessional axis there is a rotary magnet with an energisation proportional to the directional force acting on the gyroscopes due to the earth's rotation. The apparatus is arranged to act as a gyroscopic pendulum having a period of oscillation corresponding to that of a pendulum of the length of the earth's radius or 84 minutes approximately. Hence the pendulum always maintains a vertical situation independent of horizontal acceleration and the gyroscopes will indicate by their precessional movement the land speed of the craft.

Methods of application of this device are described for the purpose of stabilising speeds.

- 443,178. *Servo Devices for Use in the Control of Watercraft or Aircraft.* Sir W. G. Armstrong Whitworth Aircraft, Ltd., Lloyd, J., Murray, C. V., and Batchell, J. W., all of Whitley, Coventry, Warwickshire. Dated February 8th, 1935. No. 4,089.

This specification describes a method of operating a servo flap connected to a control element such as an elevator or aileron. The flap is controlled by a lever, connected to a rod which in its turn is connected to a member sliding within

the control member in a fore and aft direction. The movement of this latter member relative to the movement of the control member is regulated by a slot in a plate attached to the main plane in the case of an aileron. This slot is shaped to act as a cam, and by regulating the shape of the slot the precise angle of the servo flap with reference to the angle of the control member can be regulated as desired.

445,270. *Improvements relating to Controls, Air Brakes and the Like, for Aeroplanes.* Ayres, W. H., 5, Abbey Road, London, N.W.8, and Tiltman, A. H., The Air Port, Portsmouth, Hants. Dated September 4th, 1934. No. 25,493.

The control referred to is an aileron, though it is stated that a similar arrangement may be used for other controls. The aileron described is hinged to the wing at its upper surface and the large gap thus caused on the underside is covered by a spring flap. This flap is made large enough to act as a split flap and is fitted with controls so that it can be used in this way.

445,992. *Improvements in Aircraft with Transversely Hinged Wings.* Jacquemin, A. F., Sancourt par Doulaincourt (Hte. Marne), France. Convention date (France), September 20th, 1934.

In the proposed aircraft the pilot is provided with a control stick which operates normal elevators in the normal way, but lateral movement of this stick controls the machine laterally by altering the incidence differentially of the wings on either side of the fuselage, the wings being transversely hinged to permit this. In addition, there is a further control which alters the incidence of the wings as a whole, so that the incidence may, for example, be increased for landing, and a spring is provided so that the wing incidence may be automatically returned to normal.

446,094. *Improvements relating to Aeroplane Wings.* Messerschmitt, W., Hannstetterstrasse 118a, Augsburg, Germany. Convention date (Germany), April 14th, 1934.

In order to prevent sudden stalling of the tip of an aeroplane wing, it is proposed to design the wing in such a way that the radius of the leading edge towards the tip is greater than the radius towards the middle of the wing. In addition the leading edge of the middle portion of the wing may be provided with a small angular projection attached to the stagnation point, which, it is claimed, provides the wing with the characteristics of a wing having a sharp leading edge. It is claimed that such a wing is reluctant to drop a wing tip and go into a spin.

ENGINES.

441,823. *Improvements in Mounting and Cooling Engines for Aircraft.* Renault, L., 8, Avenue Emile, Zola, Billancourt (Seine), France. Convention date (France), December 12th, 1934.

The arrangement of cooling proposed is suitable for an air-cooled radial engine mounted horizontally instead of (as usual) vertically in which the propeller is driven by a bevel gear. The engine is mounted so that it is partially buried in the plane and air is admitted by a scoop placed behind the propeller, passes upwards through the cylinders, and escapes through an opening behind the leading edge of the plane and on its upper surface.

446,702. *Improvements in or relating to Aircraft having Air-Cooled Internal Combustion Engines.* The Bristol Aeroplane Co., Ltd., Fedden, H. R., and Butler, L. F. G., all of Filton House, Bristol. Dated March 9th, 1935. No. 7,439.

The invention is described with reference to a radial air-cooled engine, though it is stated that it is suitable for use with other forms of cowled engines. The

cowl proposed for the radial engine is generally of normal form and has an exhaust ring formed into the leading edge of the cowl. It is stated that in such cowls as normally used the air discharged from the annular opening between the cowl and the body is in a state of turbulence causing an increase of the body drag. In order to obviate this it is proposed to arrange a number of circular rings of light sheet metal within the rear of the cowling, and also a number of curved vanes which give the issuing air a whirl corresponding to the whirl produced by the propeller.

446,371. *Improvements in and relating to Radiators for the Cooling Systems of Internal Combustion Engines, Particularly for Aircraft.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Forsyth, A. G., Venlaw, Burden Lane, Cheam, Surrey. Dated May 29th, 1935. No. 15,649.

The radiator described is intended for use below the fuselage of an aeroplane, and has tubes of approximately the same length from back to front, but the tubes are displaced longitudinally to each other so that the whole radiator is convex forward and concave in the rear. A streamline body projects into the rear concavity. This method may be carried out in the vertical plane as well as in the horizontal, or in both planes simultaneously.

KITES.

443,857. *Improvements in or relating to Kites.* Bias Bindings Co., Ltd., Gorgie Road, Edinburgh, Midlothian, Scotland, and Turner, J., of the same address. Dated November 30th, 1934. No. 34,376.

This specification refers to a kite, particularly of the type referred to in specification No. 422,970, and describes a means of providing an adjustable bridle actuated by a cord additional to the towing cord so that the kite may be made to rise or fall. A similar means may be used to divert the kite sideways.

MISCELLANEOUS.

446,983. *Ice Accretion Indicator for Aircraft and Internal Combustion Engines.* Swan, A., Griffith, A. A., and Helmore, W., Royal Aircraft Establishment, South Farnborough, Hants. Dated December 21st, 1934. No. 36,608.

The apparatus proposed consists of a casing carrying on its forward portion a member containing two tubes facing forward with their leading ends cut off at an angle. In one case the tube is open, in the other the leading end is blocked but pierced with a small hole. It is this hole which, when blocked with ice, gives the indication. These tubes are connected one to each side of a flexible diaphragm, the passages connecting them being provided with bleed holes. It would follow, therefore, that when the hole referred to was blocked with ice the pressures on each side of the diaphragm would no longer be equal. Hence the diaphragm would move to one side and it is then arranged to make an electrical contact whence indication of the presence of ice is given in the cockpit of the aeroplane. Heating and other auxiliary devices are described.

MODEL AIRCRAFT.

445,826. *Improvements in Toy Aeroplanes.* Bochme, G., 39, Humboldtstrasse, Ludenschied, Germany. Dated November 20th, 1935. No. 32,154.

It is proposed to construct a toy aeroplane of metal and to arrange that all parts shall be elastically mounted so as to prevent damage when landing. The wings, for instance, may have resilient and bendable supporting struts and the tail unit may be mounted on springs attached to the fuselage.

443,373. *A Toy Kite Aeroplane.* Dunn, F. H., Grovelands Munbury, Axminster, Devon. Dated August 24th, 1934. No. 24,387.

This apparatus is a kite roughly resembling an ordinary tractor biplane. The body has a large opening in the front and smaller apertures in the rear so that air can enter. There is a stabilising arrangement consisting of two fins which are connected to the rudder and elevators, and there is a free-running propeller in front.

PARACHUTES.

443,872. *Improvements in or relating to Parachute Packs.* Irving Air Chute of Great Britain, Ltd., Icknield Way, Letchworth, Hertfordshire. Convention date (U.S.A.), April 8th, 1935.

It is proposed to provide a parachute pack in which manually and automatically actuated controls are provided for effecting release of the fastening means associated with the pack, such fastening means being connected or adapted to be connected to a member slidably mounted with respect to a housing or support disposed on said pack. The manually and automatically actuated controls are also connected or adapted to be connected to the slidable member; characterised in that said slidable member is grooved or channelled for receiving the automatically actuating control in such a manner that, in co-operation with the housing or support, such control is maintained in firm connection with the slidable member when the latter is in a position corresponding to the engaged position of the fastening means, but is permitted to become freed as soon as the slidable member is withdrawn into a position, causing release of the fastening means.

444,808. *A Release Device for Parachute Packs.* Rezler, J., 25, Tusarova, Prague VII, Czecho-Slovakia. Convention date (Czecho-Slovakia), December 11th, 1934.

A stud is mounted on a flap of the pack which engages eyelets on other flaps of the pack, the stud being provided with an aperture to take a securing pin. The case is provided with a cap capable of sliding in a telescopic manner, the two being normally pushed apart by a spring. Hence when the pin is removed the flaps are at once disengaged. The pin may be mounted on a swivel to facilitate disengagement.

ROTOR CRAFT.

443,764. *Improvements in Aircraft Sustaining Rotors.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2. Convention date (U.S.A.), August 18th, 1934.

This specification describes a modified rotor for autogiros which is intended to eliminate bouncing, and also to possess other advantages, such as an improvement in aerodynamical efficiency of about 25 per cent. The blades of the proposed rotor are paddle shaped in plan, the broadened end portion of which is the active portion and it is connected to the hub by a streamlined arm. In addition to the hub hinge another is provided between the arm and the blade itself, and additional hinges may be used.

444,395. *Improvements in and relating to Aircraft Sustaining Rotors.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2; Hodgess, F. L., and Bennett, J. A., Holm Foundry, Cathcart, Glasgow. Dated September 17th, 1934. No. 26,662.

This specification relates to rotors having an even number of blades, each pair of oppositely disposed blades being mounted upon a common flapping centre. A

flapping pivot assembly, common to a pair of oppositely disposed blades, includes a blade interconnecting member rotatable with respect to the hub and constituting a load transmitting connection between the root members of the opposite blades. This blade interconnecting member may take the form of a pin or bush freely rotatable on a bearing member (brass or journal) fixed relatively to the hub, and it may either be floating, both the blade root members being rotatably mounted thereon, or it may be fixed to or integral with one of the blade root members, the root member of the other blade being rotatable thereon so as to allow independent flapping. The blade interconnecting member receives the loads transmitted by both the oppositely disposed blades and the opposed centrifugal loads neutralise one another in the blade interconnecting member which transmits only the unbalanced loads to the member of the pivot assembly which is fixed relatively to the rotor hub, so that substantially only the lift loads can give rise to friction transmitted to the hub at the flapping pivots.

444,485. *Improvements in Aircraft Sustaining Rotors.* The Cierva Autogiro Co., Ltd., Bush House, Aldwych, London, W.C.2, and Bennett, J. A. J., Genista, Newton Mearns, Renfrewshire, Scotland. Dated September 17th, 1934. No. 26,708.

This specification is concerned with autogiro rotors of the type in which the blades are articulated in two planes, one referred to as the lift axis and the other as the drag axis, the two being substantially at right angles to each other, and it describes an improved method of damping the oscillations on the drag axis which has previously been done frictionally. According to this invention the pivot is so arranged that a drag oscillation of the blade has necessarily associated therewith an oscillatory movement of the blade in the flapping plane, whose amplitude is of the same order as that of the drag oscillation.

442,426. *Improvements in and relating to Aircraft with a Rotating Wing System.* Wilkening, F. W. Arlington, of Braeburne Roads, Penn Valley, Montgomery, Pennsylvania, U.S.A. Convention date (U.S.A.), September 20th, 1933.

The aircraft proposed is to be supported by a rotor whose pitch is variable and which may be tilted relative to the fuselage. The rotor is power-driven through a free wheel so as to be capable of autorotation. There are also one or more aerofoil surfaces substantially parallel to the rotor axis and also with the direction of flight. These are cambered so as to produce a torque on the fuselage opposite in direction to that produced by the rotor when power-driven. Means are provided for varying the effective camber of the surfaces which may be fitted with flaps.

444,095. *Gyroplane Apparatus adapted for Road Travel.* Thaon, A., 20, Boulevard Jules Peltier, Saint Cloud, Seine et Oise, France. Convention dates (Luxembourg), June 25th, 1934, and June 17th, 1935.

This apparatus is a combined aircraft and road vehicle, the aircraft being of the autogiro type. It has a motor in front which can be connected with the propeller and a rear drive is taken from the motor through a gearbox to drive the single rear wheel when the appliance is on the road. There are two front wheels which can be steered for road work and which can be extended for use as a landing chassis when the appliance is used as an aircraft. The rotor has blades which can be shortened and the pylon carrier can be folded on to the top of the vehicle. Arrangements are described by which the various movements must be carried out in the proper order and to ensure that the propeller is stopped in the proper position, the controls are changed from road to air, etc.

442,016. *Improvements relating to Aircraft.* Kay Gyroplanes, Ltd., Kay, D., and Dyer, J. W., all of 18, Atholl Crescent, Edinburgh, Scotland. Dated July 27th, 1934. No. 22,022.

This specification describes a method of mounting the rotors of aircraft of the autogiro type so that the rotor supporting member is capable of tilting laterally and in a fore and aft direction by being mounted for such movements upon a single turnable member integral with or mounted upon an axle or equivalent, the arrangement being such that the axis about which lateral tilting takes place and the axis about which tilting in the fore and aft direction takes place both intersect the angle of rotation of the axle or equivalent.

442,137. *Improvements relating to Aircraft.* Kay Gyroplanes, Ltd., Kay, D., and Dyer, J. W., all of 18, Atholl Crescent, Edinburgh, Scotland. Dated July 27th, 1934. No. 22,018.

This specification relates to the type of aircraft fitted with a rotor and is intended to provide means by which automatic compensation is obtained for maintaining the trim of the machine when the rotor is tilted laterally. A rotor supporting member is provided which can be tilted laterally and also longitudinally of the aircraft in combination with means for causing a simultaneous fore-and-aft movement of the said supporting member to take place when the means upon which the latter is carried is operated to tilt the rotor supporting member laterally.

444,572. *Improvements in and relating to Aircraft with a Rotating Wing System.* Wilkening, F. W., Arlington and Braeburne Roads, Penn Valley, Montgomery, Pennsylvania, U.S.A. Convention date (U.S.A.), September 20th, 1933.

The proposed aircraft is approximately of the autogiro type and is arranged so that both the lifting rotor and the propeller can be driven from the engine. Anti-torque surfaces, consisting of laterally extending surfaces similar to fixed wings which may be placed in either of two positions, one approximately horizontal and one approximately upright, so as to be affected by the slipstream of either the propeller or the rotor. The pitch of the rotor blades is alterable at the will of the pilot, as is the pitch of the propeller, and there is a clutch between the engine and the propeller and a free wheel device between the engine and the rotor. By varying the setting of these pitch angles and operating the clutch the engine power may be divided between the lifting and propelling members in any proportion desired.

441,946. *Aircraft Controls.* Dunlop Rubber Co., Ltd., 32, Osna burg Street, London, N.W.1, and Goodyear, E. F., of the Company's Works, Foleshill, Coventry, and Wright, J., and Trevaskis, H., both of the Company's Works, Fort Dunlop, Erdington, Birmingham. Dated October 4th, 1934. No. 28,400.

This method of control applies mainly to giroplanes defined as a type of aircraft possessing a wind-driven rotor on engine-driven propeller to the engine, which is connected to the rotor through a clutch and brakes operating on the rotor and on the landing wheels. The clutch and the two brakes are operated hydraulically, the hydraulic controls being placed on the segment of a circle so that by the movement of a lever they are all operated in the desired sequence, either when being put on or taken off.

446,509. *Improvements in or relating to Aircraft.* Pemberton Billing, N., Royal Court Chambers, Sloane Square, London, S.W.1. Dated October 25th, 1934, No. 30,670, and November 27th, 1934, No. 34,102.

The proposed aircraft is fitted with two rotating wings situated on each side of the machine and rotating in opposite directions. The arms of these rotors

are each hinged at the root in two places, the movement permitted being limited by flat springs. Each arm carries at its extremity a small vertical streamlined plane the incidence of which can be varied during rotation in an appropriate manner so that when the rotors are rotated by the engine the machine may be propelled either forwards or backwards by appropriate incidence variation of the streamline planes. Provision is made to alter the incidence of the rotor blades, and the position of the engine may be varied by the pilot in order to adjust the centre of gravity.

442,015. *Improvements relating to Aircraft.* Kay Gyroplanes, Ltd., Kay, D., and Dyer, J. W., all of 18, Atholl Crescent, Edinburgh, Scotland. Dated July 27th, 1934. No. 22,021.

In the case of rotating wing aircraft, in which the rotor is initially spun up by the motor, it is proposed to arrange that when the machine is on the ground the rotor blades are at a zero or negative angle of incidence and to cause the machine to rise by increasing this incidence. The mechanism proposed includes a control member within the rotor hub which actuates levers which in turn actuate a spindle carrying the rotor blade, this spindle being displaced angularly forming a type of Z crank. Springs are used which tend to hold the blades at positive angles, and there is an automatic arrangement for disengaging the clutch.

UNDERCARRIAGES.

443,616. *Aircraft Brake Controls.* Dunlop Rubber Co., Ltd., 32, Osnaburgh Street, London, N.W.1; Goodyear, of the Company's Works, Foleshill, Coventry; Wright, J., and Trevaskis, H., of the Company's Works, Fort Dunlop, Erdington, Birmingham. Dated December 6th, 1934. No. 35,027.

Reference is made to the prior specification 397,897 in which the application of the brakes is effected by a connection to the rudder bar. It is stated, however, that in large aeroplanes the size of the rudder is apt to result in the forces transmitted to the pilot being greater than he can control and in consequence there may result an involuntary misapplication of the brakes. It is proposed, therefore, to control the brakes independently of the rudder and bar by manual means such that equalised or differential application of the brakes may be effected with ease, whatever the size of the aircraft. According to this invention aircraft brake controls, of the kind having a plurality of fluid pressure relays positioned for actuation by a common actuating link displaceable symmetrically or asymmetrically in relation to the axes of the relays, are characterised in that the displacement of the said link is controlled by a plurality of operative connections to means displaceable in two directions at right angles to one another.

442,133. *Improvements in or relating to Aircraft Undercarriages.* Dowty, G. H., 17, Lansdowne Crescent, Cheltenham, Gloucester. Dated July 2nd, 1934. No. 19,457.

The appliance described consists of a strut designed to break about its centre and intended to form part of a retractable chassis for aircraft. The strut preferably contains two double acting hydraulic jacks, one in each half of the struts. The piston rods of these jacks each carry a fixed gear wheel, each of which gear into two other gear wheels which gear into each other. The gears are carried by a triangular frame and the effect of introducing fluid pressure into the jack is to cause the strut to break or to recover according to the side of the jack pistons to which the fluid is admitted.

445,202. *Aircraft Controls*. Dunlop Rubber Co., Ltd., Osna burg Street, London, N.W.1, Goodyear, E. F., of the Company's Works, Foleshill, Coventry, Wright, J., and Trevaskis, H., of the Company's Works, Fort Dunlop, Erdington, Birmingham. Dated October 4th, 1934, No. 28,399, and April 13th, 1935, No. 11,488.

The wheel brakes described are intended for use with aircraft of the autogiro type and are arranged so that, when starting, the wheel brakes are released simultaneously with the rotor clutch, and also come into action with the latter when preparing to start. There are a number of valves controlling fluid pressure collectively or selectively operated and which, when actuated in the first instance before flight, bring the aircraft into readiness for flight by applying the wheel brakes and engaging the rotor clutch, and when actuated in the second instance for taking off release the wheel brakes and prevent the re-engagement of the rotor clutch.