

## ABSTRACTS OF PATENT SPECIFICATIONS

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

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### *Aerofoils*

404,270. *Improvements in Aircraft.* Zap Development Corporation, 230, Park Avenue, City and State of New York, U.S.A. Convention date (U.S.A.), April 3rd, 1931.

This specification refers to means for increasing the lift of aeroplane wings by placing a drag producing element at the rear of and on the underside of the wing. Results of tests are given and the best position for the flap is stated. Various forms of the flap are described, including shapes concave or convex in the direction of flight and an arrangement is described for combining these flaps with ailerons.

404,149. *Improvements in or Relating to Aerofoil Surfaces.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Huxley, M. F., 136a, Northfield Avenue, West Ealing, London, W.13. Dated February 2nd, 1933. No. 3,223.

This specification refers to slotted aeroplane wings and has for its object the prevention of the risk of the slat being jammed, due to unequal pressure distribution. The slat is carried by telescopic members which are mounted on the aerofoil so that the angles between their axes and perpendiculars to the longitudinal axis of the slot are greater than the angle of repose. The movement of the slat may be either rectilinear or curvilinear, and the telescopic member may be provided with rollers to reduce friction. An application of the arrangement is described for use with a tapered wing where it is possible to arrange for the movement of the slot away from the wing to vary with the chord.

**Aeroplanes—Construction**

- 403,911. *Improvements in Landing Trains for Aeroplanes.* Societe Francaise de Matériel d'Aviation, 58, Rue Fénélon Montrouge (Seine), France. Convention date (France), July 13th, 1933.

This is an arrangement of a chassis of the axle-less type in which the axle of each wheel is rigidly attached to a member projecting obliquely upwards, this member sliding in an external tube containing shock-absorbing mechanism. In the arrangement described the internal tube is not allowed to touch the external tube, but is guided at the lower end by rollers and at the upper end by a piston attached to it by means of a ball joint, the piston being in its turn attached to the damping mechanism. The object of the arrangement being to prevent binding of the mechanism in the event of any member deflecting under load. The guiding rollers act on projections on the internal tube in such a way as to transmit any torsional loads.

- 401,598. *Improvements in or Relating to Constructional Parts for Aircraft and Watercraft comprising Strengthened Metal Sheet.* Societa Italiana Ernesto Breda per Costruzioni Meccaniche, 9, Via Bordoni, Milan, Italy. Convention date (Italy), June 18th, 1932.

It is proposed to strengthen metal sheet by forming in it elongated raised parts or bosses produced by local stamping, the raised parts being arranged in parallel rows. These bosses may be staggered in respect to each other or they may be aligned in the direction of the minor axes of the bosses. It is pointed out that such a sheet is substantially rigid in one direction, but is flexible in a direction at right angles to this direction. If it is desired to stiffen the sheet in all directions this may be done by attaching a separate bossed sheet or sheets so that the angles of the major axes on the bosses of the latter sheet or sheets cross the same axes of the bosses on the first sheet. The sheets are connected together by riveting, bolting, or welding.

- 406,138. *Improvements in and Relating to Cockpit Windscreens Particularly for Aircraft.* Petters, Ltd., and Davenport, A., both of Westland Works, Yeovil, Somerset. Dated March 27th, 1933. No. 9,152.

This specification describes a windscreen for the rear seat of a two-seated aeroplane in which the two seats are disposed in line. It is proposed to curve this windscreen into the form of a portion of a cone or of a cylinder, and it is stated that this arrangement maintains a comparatively smooth flow of the air deflected by the front windscreen and so conduces to the comfort of the pilot and the occupant of the rear cockpit. Means are described so that the windscreen may be disposed eccentrically to the machine so as to allow for the twist of the slipstream, and an arrangement is shown by means of which the windscreen may be removed in flight, if desired.

- 404,944. *Improvements in or Relating to Light Metal Structures for Aeroplane Wings or the Like.* The Bristol Aeroplane Co., Ltd., and Pollard, H. J., both of Filton House, Bristol. Dated July 23rd, 1932. No. 20,798.

This specification describes a method of constructing metal wings for aircraft in which the spars consist of a web formed of a flat strip of metal and the booms or flanges consist of corrugated and curved plates curving upwards, adapted to be closed by a cover plate. The ribs are shown as made in three parts which consist of channel-shaped stringers connected by zigzag bracing. These rib portions are placed in position with the spars and are then riveted to extensions of the spar complete. In addition, gusset plates riveted both to the spar webs and the rib stringers may be provided if required for strength. The

rib stringers may be riveted to the spar booms and the various metal parts of the construction may be corrugated.

404,963. *Improvements in and Connected with the Construction and Arrangement of Aeroplane Wings.* Marten, J., Marten's Aircraft Works, Higher Benham, Buckinghamshire. Dated July 20th, 1932. No. 20,520.

This specification describes a single spar construction for aeroplane wings. The spar proposed is triangular and generally not unlike the triangular girder used in airships, but it is constructed entirely of steel tube, the tubular longitudinal members being connected by a tubular bracing. The connection between these members is made by introducing into the longitudinal tubes a sleeve carrying internal nuts, brazed or otherwise attached to it, which take bolts or studs introduced through holes in the longitudinal members. The bracing tubes have their ends flattened and drilled for attachment by these bolts. Means for folding the wing are described and the spars may be either connected directly to the fuselage or the fuselage may carry a built-in stub spar to which the outer wing spars may be attached.

405,073. *Improvements in and Relating to Fluid-Pressure Brake Systems.* Avery, W. L., The Blue House, Thorley, Bishop's Stortford, Herts. Dated September 30th, 1932. No. 27,243.

This specification describes a system of fluid operated brakes for aircraft where it is arranged to isolate the brakes from the pump by means of valves after the pressure has been applied so as to prevent leakage, and at the same time permit additional pressure to be given. The pressure is applied directly by a hand-operated pump, the lever of which has a trigger which controls the valves, so arranged that when the lever and trigger are grasped the valves are opened. The valves are automatically closed immediately the lever is released. The additional pressure is applied to each brake by a separate pump fitted in the appropriate pipes. A modification of the arrangement suitable for automobiles is described.

405,132. *Improvements in or Relating to the Chassis or Undercarriages of Aircraft.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Lobelle, M. J. O., Ludlow, Langley Road, Langley, Bucks. Dated March 22nd, 1933.

This specification relates to a method of constructing the chassis of a twin-float seaplane so that the movement of each float is independent of each other with a view to facilitating landing and taking off. The chassis described is, generally, of usual form, but the front transverse member of the chassis is arranged to be flexible while the rear transverse member is rigid. The floats are mounted to the chassis by means of shock absorbers fitted in the floats. The various joints in the chassis which are concerned with the separate movement of the floats are fitted with wires so as to permit the necessary flexibility. With this arrangement the floats are largely independent of each other with respect to their movement forwards, sideways and upwards.

### ***Aeroplanes—General***

404,166. *Improvements in and Relating to Flying Machines.* F. G. Y. Herrera, 12, Calle de Peligros, Madrid, Spain. Convention date (Spain), March 14th, 1932.

A form of flying machine, roughly on aeroplane lines, is described, in which compressed air is conducted to the leading edges of the wings and discharged as a stream passing tangentially over their upper surfaces, the compressed air being produced by an engine mounted in a central nacelle or fuselage. The size

and angle of the slot from which the compressed air issues over the wings can be varied, and it is proposed to use pressures varying from one-twentieth to one-fifth of an atmosphere. A foldable landing chassis is proposed which automatically projects itself at low flying speeds and automatically folds when the speed is high. It is locked in the landing position until the pilot presses a pedal.

403,613. *Improvements in Multi-Engine Aeroplanes.* Letov, V. T. na T., Praha-Letnany, Czecho-Slovakia. Dated March 22nd, 1932. No. 8,536. Complete not accepted.

It is proposed to compensate for unbalanced propelling forces, such as might occur on multi-engined aircraft with one engine stopped, by providing additional balancing planes which may be mounted on the ends of the wings, the ends of the tail plane, or the end of the fuselage. These balancing planes are rotatable about their vertical axes and it is preferred to place them as far as possible from the axis of the propeller pull.

400,735. *Improvements in or Relating to Aircraft.* Bolas, H., and Goodman Crouch, R. J., both of P.O. Box 375, Pawtucket, Rhode Island, U.S.A. Convention date (U.S.A.), December 31st, 1931.

This specification describes a means by which it is stated that heavier-than-air aircraft can be enabled to hover and to ascend and descend vertically while retaining the usual load carrying and top speed characteristics of aircraft already in use. It is proposed to do this by arranging that the propeller slipstream acts over substantially the whole of the main supporting surfaces so as to produce lift; the arrangement described also enables the controlling surfaces to be always in the region affected by the slipstream. Two general types are described, one in which the entire fuselage is tilted relative to the ground and the other in which the planes and outriggers carrying the control surfaces can be moved independently of the body so that the latter may be always approximately horizontal. The drawings show aircraft with main planes tilted at angles of incidence of over  $45^\circ$  to the horizontal position in the wash of inclined propellers. Claims are also made for means of tilting the engines of such aircraft, for the use of variable pitch propellers in connection with them, etc.

### *Airscrews*

401,425. *Improvements in or Relating to Screw Propellers and Screw Fans.* Richard de Villamil, Lieut.-Col., 18, Priory Road, Kilburn, London, N.W.6. Date, July 7th, 1932. No. 19,228.

It is proposed to place a deflector in front of a screw propeller or fan instead of placing the propeller inside the deflector as is usually proposed. The deflector suggested consists of an annular ring and is shown in the drawings as having a diameter somewhat greater than the propeller. The section of the ring may be curved in the form of a cycloid or paraboloid, etc., and is arranged with its concave side outwards.

405,469. *Auxiliary Tube for Air and Water or Similar Screw Propellers.* Klutschareff, S., No. 2 Karadjordjeva ul 2 Pancevo, Jugo-Slavia. Convention date (Jugo-Slavia), February 27th, 1932.

It is proposed to place the propeller concentrically in a tube, the inner surface of which corresponds to the shape of the flow of the air round a propeller in free air, the outer surface of the tube being cylindrical. The interior of the tube may be cylindrical behind the narrowest point. The object being the artificial filling up of the space of contraction of the flow. It is also proposed to fit inside the tube a longitudinally extended partition slightly twisted at its front end in order to neutralise the rotation of the slipstream.

### **Bombs and Ballistics**

400,575. *Improvements in or Relating to Aircraft.* Vojendka Tovarno na Letadla Letov, Letnany, Prague, Czecho-Slovakia. Date, January 21st, 1932. No. 1,895.

This specification refers to a two-seater fighting aeroplane and describes arrangements to enable the rear gunner to have an improved arc of fire. In order to attain this it is proposed to fit the rudder and fin on the under side of the fuselage instead of the upper, so as to improve the rearward arc of fire, and also to fit a step in the lower part of the fuselage near the gunner's seat which, it is stated, enables the rudder and fin to operate in undisturbed air, and also facilitates the fitting of a gun firing below the fuselage. A claim is also made for a similar tail in which the tail skid is attached to a separate fin, while two separate rudders are provided which are secured from below to the outer edges of the tail plane.

404,224. *Improvements in or Relating to the Arrangement of Fixed Forwardly Firing Guns on Aircraft.* Smolik, A., Strosomayerovo nam Prague VII, Czecho-Slovakia. Dated, July 17th, 1933. No. 20,152.

It is proposed, in the case of fighting aircraft carrying more than one pair of machine guns, to arrange that the points of intersection of the fire of the guns of each pair do not lie in a single point, so that each pair has its own point of intersection. It is stated that this arrangement makes the fire more effective when the range is wrongly estimated.

### **Control of Aircraft**

404,269. *Improvements in Aircraft and Control Thereof.* Zap Development Corporation, 230, Park Avenue, City and State of New York, U.S.A. Convention date (U.S.A.), April 3rd, 1931.

It is stated that introducing a variable drag producing element at the under-side of an aerofoil and near the trailing edge enables the lift of the wing to be greatly increased and also that the lift will be maintained at high angles of attack. It is also stated that an aeroplane fitted with the arrangement is more stable than usual. Various methods are described for carrying out the scheme. A flap of the normal type hinged to the trailing edge may be used, or a curved plate embedded normally in the wing may be caused to project by rotating a shaft at its centre of curvature. Plates held normal to the airflow may be rotated through 90°, or a sliding plate may be used arranged to slide through guides. Means for controlling the drag producing element are also described.

### **Engines**

403,889. *Improvements in or Relating to Turbines or the Like.* Societe Anonyme des Brevets Leon, 37, Rue du Commerce, Tours (Indre et Loire), France. Convention date, July 6th, 1932.

This arrangement comprises a central rotor with a number of vanes arranged round it, roughly in the manner of a paddle wheel, the vanes themselves are pivoted about their centres and rotate in the opposite direction to the main mechanism at half the speed. Under these conditions it is stated that the vanes will lift for the greater part of their path, but this action may be assisted by an external deflector plate. The arrangement is stated to be suitable for lifting and propelling and also as an air or hydraulic motor, for example, in a windmill.

405,812. *Improvements in or Relating to the Cooling Systems of Internal Combustion Engines on Aircraft.* The Fairey Aviation Co., Ltd., of Cranford Lane, Hayes, Middlesex, and Hollis Williams, D. L., of Hillside, Swakeleys Road, Ickenham, Middlesex. Dated February 27th, 1933. No. 5,955.

It is proposed to utilise the slat used for the formation of a slot in a slotted wing as the cooling system or part of the cooling system for the internal combustion engines used on aircraft. For this purpose the slat is made hollow and arrangements are shown by means of which the cooling fluid, either steam or water, etc., may be circulated through it and condensed steam may be led away, the arrangements consisting of telescopic pipes, etc., so as not to interfere with the normal operation of the slat. The hollow slat may be double-walled so that steam is exposed to the cooling surfaces in thin layers.

### ***Flying Boats***

404,952. *Improvements in the Construction of Boats, Pontoons, Aeroplanes, or Other Streamline Bodies.* Edward G. Budd Mfg. Co., 2500, Hunting Park Avenue, Philadelphia, Pennsylvania, U.S.A. Convention date (U.S.A.), June 25th, 1931.

This specification describes a method of construction for streamline bodies, floats, hulls, etc., in which the sides and top and bottom of the body are pre-formed and are then assembled together with transverse frames. The transverse frames have their curves strongly reinforced by gussets. These frames consist of channel sections with their open sides inwards, which channel sections are flanged so that a cover plate can be fitted. The covers between the longitudinal sections are formed with similar channels. In the case of the frames the cover plate is carried over the gusset and a triangular corner piece is built in. These corner pieces being connected by a cover strip which is attached to out-turned flanges. The whole construction is assembled by, preferably, spot welding.

404,959. *Improvements in the Construction of Boats, Pontoons, Aeroplanes and Other Streamline Bodies.*

This specification describes a method of manufacturing boat hulls, etc., of approximately rectangular section by pre-assembling the sides, top and bottom, and then joining these parts by jointing the sheathing of adjacent sections along abutting edges, and by connecting the internal transverse frames. The connecting and joining is preferably done by welding. The sides, top and bottom have outside stringers of channel section fitted longitudinally. The transverse frames are constructed of flanged channel sections, are strongly gusseted on the corners and may be reinforced by diagonal struts internally. The chines are constructed by channel or Z sections arranged so as to form a square section when assembled, and an arrangement is described whereby an opening can be left in the body for the making of internal joints, this opening being eventually closed by a flanged cover plate.

### ***Helicopters***

404,257. *Helicopter.* Gretscher, E. W., 41, Wilhelmshavener Strasse, Berlin, N.W.21, Germany. Dated April 4th, 1932. Complete not accepted.

The drawing shows a man operating a helicopter with two rotors by means of pedal gear. The helicopter possesses ascending and descending propeller surfaces comprising pivoted plates, rotating in opposite directions each comprised of a rim of air driving cells. It is stated that the machine requires little power, is safe against falling, is easily steered, can stand still in the air and fly backwards or forwards.

405,539. *Improvements in Arrangements for Starting Flight Requiring no Gliding.* Hirohisa Nishi, 878, Oaza-Kimüdera, Kimüdera-Mura Kaiso-Gun, Wakayama-Ken, Japan. Convention dates, July 4th, 1932; March 4th, 1933; May 3rd, 1933.

This specification describes an aeroplane with which is incorporated an arrangement intended to produce direct lift. This latter arrangement consists of a horizontal propeller collecting air from a duct opening upwards and driving the air downwards. This air is then caused to flow over a wing of crescent shape in plan form and the direct lift is produced by the reaction of the air on this wing. Two superimposed horizontal propellers may be used, rotating in opposite directions.

### **Model Aircraft**

401,400. *Improvements in or Relating to Model Aeroplanes.* Childe, H. N., 41, Alexandra Road, Reading, England. Date, June 13th, 1932. No. 16,686.

A toy monoplane is described in which the longitudinal framework or fuselage comprises two spars connected together at the front and back. The wings are supported by one spar and stayed by struts to the other. It is possible to construct the machine so that it can readily be converted from a high wing monoplane to a low wing, and vice-versa. An application of the method of construction to biplane models is described.

### **Ornithopters**

404,356. *Ornithopter.* Masow, Hindenburgstrasse 5, Neisse, Upper Silesia, Germany. Dated July 15th, 1932. No. 20,062.

The specification describes an engineless glider on which the wings are oscillated by human power. Inner wings flexibly secured to outer wings are connected with the body by means of springs. On operation by a pedal or pedals the wing can be caused to oscillate. The outer planes are flexibly mounted so that their movement is elastic.

### **Parachutes**

405,693. *Improvements in or Relating to Parachutes.* Quilter, R. C., Bawdsey Manor, Woodbridge, Suffolk, and Gregory, J., 77, Musard Road, Hammer-smith, London, W.6. Dated, August 11th, 1932, No. 22,541, and December 16th, 1932, No. 35,680.

It is stated that in the ordinary pack parachute it is usual to pack the pilot parachute beneath the stud-carrying flap or flaps and to rely on elastics or the equivalent to open the flaps and release the parachute when the rip cord is pulled. This arrangement, it is stated, is disadvantageous inasmuch as there is a danger that the tendency of the spring to keep the studs in position may overcome the tendency of the elastics to separate the flaps with the result that the pack will fail to open. It is proposed, to overcome this difficulty, to pack the pilot parachute between the closure flap or flaps of the pack on which the studs are carried and the co-operating flap or flaps carrying the eyelets. The spring of the pilot parachute may consist of a butterfly wire frame adopted to fold with its wings overlying one another when the pilot parachute is packed. Preferably the wire frame consists of an endless wire twisted into a spiral surrounding a tape attached to the canopy of the pilot parachute at the junction of the wings of the frame.

The preferred form of parachute is provided with a skirt portion which is stated to reduce the tendency of the parachute to roll, and the construction and packing of the proposed parachute are described in detail.