ABSTRACTS OF PATENT SPECIFICATIONS

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

Regular abstracts of Patent Specifications received by the Society will be published in future in the Journal. It should be noted that these abstracts are specially compiled by Mr. W. O. Manning, F.R.Ae.S., for the Journal and are only of those actually received and subsequently bound in volume form for reference in the library. These volumes extend from the earliest aeronautical patents to date, and form a unique collection of the efforts which have been made to conquer the air.

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Aerodynamics, Stability and Controllability

393,074. *Improvements in or Relating to Aeroplanes or the Like.* Nazir, F. P., Ava Mansion, 795, Dadar Colony, Dadar, Bombay, India. May 17th, 1932. No. 13,999.

Method of providing a means whereby the wings of an aeroplane may be prevented from stalling and by which the stability and controllability may be improved. Anti-spinning qualities and increased lift are also referred to.

The wing is provided with an auxiliary plane of thin section, and preferably of a somewhat elongated rectangular shape which normally rests closely on the top of the wing, somewhat forward of the centre of the chord, and with its leading edge some distance to the rear of the leading edge of the wing. Means are provided for enabling this auxiliary plane to be raised a short distance from the wing, either positively or automatically when the stalling angle is reached, so as to leave a gap between it and the wing. An air passage may also be provided through the nose of the wing elongated in the direction of the span. A claim is also made for a folding device for aeroplane wings in which the wing has a central spar, on which, after unlocking, the wing can be rotated into a vertical plane and folded back parallel with the side of the fuselage.

393,436. *Improvements in and Relating to Automatic Steering Gear.* The British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2. (Assignees of Becker, H. I., 1036, Garner Avenue, Schenectady, County of Schenectady, U.S.A.) Convention date (U.S.A.), Aug. 12th, 1931.

A system by means of which the course flown by the aircraft with reference to a stationary point, such as the destinations of the craft, is predetermined by

adjustment of equipment on the craft itself, as by means of a radio beacon. This radio beacon may comprise any convenient broadcasting station which may be located in proximity to the destination of the aircraft. A further object is to provide means by which the directivity of a radio receiver may be controlled in accordance with the direction of the earth's magnetic field.

393,687. *Stabilising and Safety Device for Aircraft.* Oehmichen, 16, Rue de Villiers, Valentigney (Doubs), France. Convention date (Belgium), Jan. 17th, 1931.

A scheme whereby a balloon rigidly fixed to a passenger cabin may be releasably attached to an aeroplane. It is proposed to embody an arrangement by which the separation may be adjustably retarded and to connect the two by elastic couplings. It is claimed that the arrangement acts as a safety device for aircraft.

395,259. *Improvements in or Relating to the Control of Aircraft.* Airspeed, Ltd., and Tiltman, A. H., both of Piccadilly, York, Yorkshire. Dec. 29th, 1932. No. 36,771.

The specification describes a method of applying a bias to the control gear of an aeroplane, such as would be required to the rudder gear of a twin-engined aeroplane with one engine stopped, to relieve the strain on the pilot.

In the case of the rudder, the arrangement consists of a spring connected to a strap, both lying normally immediately over the rudder bar. One end of the strap is connected to the fuselage, and one end of the spring to one end of the rudder bar. A pulley-and-cord arrangement connected to the end of the strap, connected to the spring, enables this point to be displaced in either direction relative to the rudder bar, enabling a controllable bias to be put on the rudder bar in either direction. A modified but generally similar arrangement is proposed to place bias on the other aircraft controls.

395,689. *Improvements in or Relating to Gyroscopic Stabilisation Devices for Rotatable Bodies.* Messgerate Boykow, G.M.B.H., 2a, Fontanestrasse, Berlin-Lichterfelde-West, Germany. Assignees of Boykow, J. M., of the same address. Convention date (Germany), Jan. 8th, 1931.

Gyroscopic stabilising devices for aircraft, etc. The axle of the working gyroscope frame, mounted on the body to be stabilised, is coupled with said body by means of an inelastic damping device which is brought into operation whenever the frame tends to turn relatively to the body, and a reposition motor on the body adopted to be controlled according to the relative position of the axle of the frame and the body, the gyroscope being free to precess within the frame. The claims concern a hydraulic brake, methods of connecting switch gear, etc.

396,264. *Improvements in Aeroplanes.* Apolloniow, P., and Chick, S. L., both of 409, East 70th Street, New York, New York, U.S.A. Convention date (U.S.A.), Dec. 22nd, 1931.

It is proposed to construct a safety aeroplane which may be made to land safely even if it should develop engine or control trouble while in flight. It is also claimed that the aeroplane will be unable to spin or nose dive.

A large flap is hinged to the rear of the top surface of the wing and is arranged to open upwards. Air is collected by pipes from the gap thus formed and is carried round and directed on to points adjacent to the bottom of the rear end of the fuselage or to the botom of the front end of the fuselage, by

which means it is stated that the machine can be righted to a horizontal position when the occasion demands.

396,547. *Improvements in and Relating to Automatic Steering Systems.* The British Thomson-Houston Co., Ltd., Crown House, Aldwych, London, W.C.2. (Assignees of Alexanderson, E. F. W., 8 Adams Road, Schnectady, County of Schnectady, State of New York, U.S.A.) Convention date (U.S.A.), July 15th, 1931.

A method of automatically steering moving craft is described which utilises a combination of indications given by a compass and by received radio waves directly emitted along the course to be followed by the craft and to control the craft, means whereby to cause the craft to deviate from the course determined by the compass in a manner determined by the radio waves.

The patent diagram shows an arrangement operated by electrical means, and the indications given by the compass and by the radio waves result in variations of electro-motive forces the combination of which operate electrical apparatus which controls the rudder.

396,656. *Improvements in Wings for High-Speed Aircraft.* Caproni, G., 15, Lungotevere Arnaldo da Brescia, Rome, Italy. March 15th, 1933. No. 7,817.

A small " air breaking " or pilot wing is placed in front of the ordinary wing of an aircraft flying at very high speeds in order to reduce the resistance to their advancement. The said device is based on the consideration that at the said high speeds the air operates almost in the same manner as a solid substance, so that an auxiliary, wedge-shaped wing placed before the ordinary wing facilitates the penetration of the latter, thus ensuring better general efficiency in very fast machines.

The patent diagram shows a diamond-shaped body in front of and in line with the wing. The streamlines are shown as being separated by this body and as passing above and below the wing.

Aeroplanes, General

393,069. *An Improved Aerial Machine.* McLean, R., 28, Deramore Gardens, Ormeau Road, Belfast, Northern Ireland. May 5th, 1932. No. 12,986.

A flying machine arranged to rise and to be propelled by means of a combined series of suitably constructed collapsible cone-shaped wings or propeller blades which are constructed to expand and contract, or open and close, for propelling purposes at each side of the machine. A large parachute is also incorporated in the device, and elevators and steering mechanism is also provided. Circular and straight fixed planes are arranged so that, when propelled forward, they create a complete vacuum above them.

393,482. *Improvements in or Relating to Flying Machines.* Prosdocimi, G. A., 11/13, Via San Carlo, Bologna, Italy. Nov. 8th, 1932. No. 31,522.

The specification relates to flying machines having louvred wings rotating vertically in opposite directions to each other, the wings being rotated continuously about a common axis composed of two stub shafts rotating in opposite directions, the wings acting as supporting or propelling surfaces. Means are provided by which the spreading and folding of the louvres may be effected as the wing rotates. There is a further claim in which the planes comprise a rigid front zone for support formed by movable elements, and a flexible zone for propulsion, formed by a single surface.

Aeroplanes, Construction

392,905. *Improvements in Fuselage Bodies for Aircraft.* Vickers (Aviation), Ltd., and Wallis, B. N., both of Weybridge Works, Byfleet Road, Weybridge, Surrey. Nov. 23rd, 1931. No. 32,397.

This refers to fuselages in which the skin participates with the structural members in taking the stresses imposed on it in flight. It is pointed out that in the normal fuselage of this type that the stressed skin may fail at a load much under its normal failing stress, owing to the production by the stresses of wave formation in the plating, and that consequently it has been necessary in the past to make the plating excessively thick, causing a serious increase in the weight of the fuselage.

The invention refers to stressed skin fuselages comprising a series of polygonal transverse frames spaced at intervals apart along the length of the fuselage, longitudinal members connected to the corners of the frames and a skin secured to the exterior of the longitudinal members and arranged in a series of flat panels bounded by adjacent longitudinal panels. This construction is claimed to produce a fuselage in which the skin can be highly stressed, leading to a saving of weight. It is claimed that this construction makes it unnecessary for the skin to be thick enough to be stable under wave-making compressive forces, and that tensile forces need only be considered and also that, in certain cases of loading, the forces acting in the tension field of one panel are balanced by those acting in tension fields of adjacent panels.

The patent drawing shows a fuselage constructed in this manner with the longitudinal members increased in number in the foremost panel, and there are also drawings of appropriate lattice transverse frames constructed in accordance with the specification.

396,025. *Improvements in Airplane Fuselages.* Rumbowicz, W., Mokotow, Lotnisko, Warsaw, Poland. Convention date (Poland), March 11th, 1931.

It is proposed to eliminate the blind area behind and below the fuselage in military aircraft by bifurcating the fuselage behind the rear gunner's station. The drawing shows a tractor type two-seater fighter constructed in this manner. The two bifurcations are shown as continuations of the side members of the fuselage and are continued straight back to carry the tail members, leaving a space between them through which the rear gunner could fire.

395,194. *Improvements in or Relating to Aircraft Bodies and the Like.* E. G. Budd Manufacturing Co., 2500 Hunting Park Avenue, Philadelphia, Pennsylvania, U.S.A. Sept. 15th, 1932. No. 25,686.

This refers to monocoque fuselages covered with skins of corrugated material and it is proposed to construct such fuselages with corrugations only on the top and bottom surfaces, leaving the side surfaces smooth. The drawing shows a fuselage constructed in this way with partial corrugation. The corrugations are shown as being concave.

395,533. *Improvements in or Relating to Girders, Beams, Spars and Like Structural Members.* Dornier Metallbauten, G.M.B.H., and Dr. C. Dornier, both of Friedrichshafen, Lake Constance, Germany. Convention date (Germany), Oct. 28th, 1931.

A method of constructing aircraft spars. The spar consists of two bars or flanges of approximately rectangular cross-sections, connected by webs connected to two or more ridges projecting from the adjacent surfaces of the flanges. These webs may be more than two in number, each connected to its own ridges. The

webs may decrease in number from the fixed to the free end of the spar. The beam may be tapered by milling off the surplus metal projecting beyond the webs, the innermost webs being continued throughout the length of the beam. If the distance between the top and bottom boom is decreased from the fixed to the free end, it is stated that the method of construction enables a cantilever wing spar to be made with approximately uniform strength.

The drawings show spars possessing inside ridges on the flanges to which the webs may be attached, the outer webs being cut off at suitable points and the flange being milled away accordingly. This milling is shown either as a continuous taper or as being done in steps.

396,347. *Undercarriage for Flying Machines.* Messerschmitt, 24, Gentnerstrasse, Augsburg, Germany. Convention date (Germany), April 19th, 1932.

Suspended undercarriage, intended to offer very little resistance to the air. The patent consists in providing for each wheel a single spring stay projecting out of the machine only to the extent necessary for resilience, the wheels being mounted on stub axles attached direct to the spring struts, and, together with the lower portions of the struts, enclosed in a streamline casing. It is suggested that the struts be fitted with guides to take the rotational moments set up while landing, and that the sprung portions of the strut be located inside the casing of the flying machine.

Multiple wheels are referred to, and claims are made with regard to methods of attachment of the struts to the aeroplane.

394,452. *Improvements in Control Surfaces of Aircraft.* A.T.S. Co., Ltd., 5 and 6, Clement's Inn, Strand, W.C.2, and Martin, B. L., St. Wulstan's, Warlingham, Surrey. March 31st, 1932. No. 9,250.

This describes a special construction of ailerons and other aircraft control surfaces, the object being to obtain the necessary torsional stiffness and, at the same time, to reduce weight. Instead of fitting additional spars or other members on the control member to obtain stiffness, it is proposed to use a special front spar which may be of triangular or polygonal form in section, each of the faces of the spar being braced diagonally, or by sheet metal. In the drawing, a triangular spar is shown suitable for an aileron and a quadrilateral type for an elevator.

396,609. *Improvements in or Relating to Aircraft Landing Gear.* Dornier Metallbauten, G.M.B.H., and Dr. Ing. Claude Dornier, both of Friedrichshafen, Lake Constance, Germany. Convention date (Germany), Feb. 19th, 1932.

A form of folding chassis for aircraft. The first type described shows a chassis mounted on a monoplane wing and folding inwards. The folding is carried out by means of cords and pulleys and there is an inwardly directed diagonal strut to take lateral loads which is folded by means of a separate system of cords and pulleys. Means are provided for locking the chassis when in landing position, and the chassis carries a shield which covers the hole in the wing when the chassis is folded.

A modification is described in which there are additional fore and aft diagonal struts arranged to be folded, and there is a further claim for locking the chassis in the landing position by means of notches in pivotally-mounted beams or bars which may be acted upon by springs.

393,445. *Improvements in or Relating to Aircraft Landing Gear.* Dornier Metallbauten, G.M.B.H., and Dr. C. Dornier, Friedrichshafen, Lake Constance, Germany. Convention date, Oct. 28th, 1931.

In the type of landing chassis described, the wheels are carried on struts which project downwardly and outwardly from the fuselage, the struts being arranged to pivot on a member at or near the outer skin of the fuselage, the shock-absorbing device being mounted inside the fuselage. This arrangement is stated to overcome the usual disadvantage of this type of chassis when the internal mechanism hampers the interior of the fuselage. The drawing shows a chassis when the wheel struts are attached to horizontal levers lying across the bottom of the fuselage and connected to shock-absorbing devices carried up the sides of the fuselage. It is stated that when there is a shaped cover for fairing surrounding a box-shaped fuselage, the shock-absorbing mechanism can be accommodated in the space between the two.

394,289. *Improvements in and Relating to the Manufacture of Force-Transmitting Constructional Parts for Aircraft, More Particularly for Aeroplanes.* Shevlin, J. T., 15, South Street, London, E.C.2. Feb. 23rd, 1933. No. 5,613.

This specification is concerned with the joining of the members of the structural portions of steel aircraft by soft soldered joints. Means are described by which it is stated bending moment stresses can be avoided on such joints so that the main force on the soldered joint is mainly shear. Where very thin sheet is used, this may be reinforced with paper or cardboard—the latter being removed when the construction is complete. It is proposed to use a solder having a relatively low fusing temperature, but when a plurality of joints lie in close proximity to each other the joints may be soldered progressively with solders having varying fusing temperatures from high to low.

Aeroplanes, Military

393,504. *Disappearing Nacelle for Aircraft.* Potez, H. C. A., Meaulte (Somme), France. Convention date (France), Dec. 21st, 1931.

The specification describes an arrangement for enabling a gunner to fire underneath the body of an aeroplane. A body, normally housed inside the fuselage, is arranged below the fuselage, is pivoted at its front end, and is controlled below the fuselage by two arms which enter forked brackets inside the fuselage—space is allowed so that the gunner can fire in the horizontal plane. The body is controlled by springs, in addition to a locking device, so that when the gunner enters the body, having released the locking device, the gunner's weight overcomes the springs and the body descends automatically to the firing position. On the gunner leaving the body, the latter returns automatically to the housed position and can be relocked in place.

Autogiros

393,976. *Improvements in or Relating to Aircraft having Freely Rotative Wings.* de la Cierva, J., Bush House, Aldwych, London, W.C.2. Dec. 16th, 1931, No. 34,867, and July 30th, 1932, No. 21,551.

This specification refers to autogiros of the type in which the rotor is used for the control of the aircraft in its normal flight manœuvres, as well as for sustentation. Control is effected by varying the inclination or the position of the rotor axis with respect to the aircraft body. Specification No. 264,282 is referred to. Means are provided for obtaining stability, whether the controls are locked or free. The controlling movements of the rotor may be damped or may be biassed by means of springs. Methods of speeding up the rotor by means

of a drive from the engine are described, and there are 47 claims concerning these devices.

Balloons

396,277. *Improvements in Balloons.* Antoni, U., 31, Old Compton Street, London, W.1. Convention date (France), Dec. 22nd, 1931.

Balloons for use for advertising purposes. The balloon is of the elongated form, and has laterally projecting wings and a flexible tail. The balloon carries a box-shaped frame secured to its underside. To the underside of this frame there are attached illuminated signs by means of which letters or figures may be shown. The balloon is tethered to the ground when in use.

Engines and their Accessories

392,940. *Improvements in Engine Mountings.* Trott, R. S., 704, Equitable Building, Denver, Colorado, U.S.A. Nov. 16th, 1931. No. 31,670.

The specification deals with the type of engine mounting in which a resilient support is introduced for the purpose of absorbing the variation of the torque reaction in an internal combustion engine. Various means are described for carrying this out, and there are a number of claims concerning different arrangements of the mounting. Although principally concerned with automobile practice, an aero engine mounting on this principle is described.

394,643. *Improvements in Cooling Radiators for Heat Motors.* Societe Anonyme de Representation et de Commission, 33, Rue des Dames, Paris, France. Convention date (France), Sept. 22nd, 1930. Void.

The radiator described is characterised by elements consisting of concentric tubes leaving between them an annular space for the passage of the fluid to be cooled, the air passing both inside and outside the tubes. The tubes may be ribbed spirally both inside and outside so that a helical path may be given to the cooling fluid or to the air. Various methods of forming such tubes into complete radiators are described and also various methods of adopting them to, and mounting them on, the fuselage of an aeroplane.

396,622. *Improved Systems for Driving Propellers.* Aktiebolaget Milo, Kungsgatan 32, Stockholm, Sweden. Convention date (Germany), Jan. 20th, 1932.

This describes a method of connecting gas turbines and propellers and has particular reference to marine propulsion. The description first refers to double rotation turbines in which one shaft drives the compressor and the other shaft the propeller by means of a speed reduction gear, but various methods of driving these components by differing combinations are described and illustrated in the diagram.

Helicopters

394,402. *Improvements in Propellers of Helicopters.* Trojani, P., 11b, Via Ruggiero Bonghi, Rome, Italy. Convention date (Germany), Jan. 8th, 1931.

This concerns the arranging of a pitch-controlling device to helicopter blades so as to compel the blades to take up an equal pitch so that all the blades always rotate automatically through equal angles round their axes and on their joints, which consist of a ball or universal joint. It is assumed that the blades have stabilising planes or like automatic incidence controlling gear, and a limiting and damping arrangement is provided for the horizontal rotation of the blades.

An arrangement of linkages is claimed by which the pitch controlling gear on one propeller can be made to control another propeller without duplicating the gear.

Kites

396,459. *Improvements in Kites.* Pemberton, T. J., 25, Blenheim Gardens, N.W.2, London. Feb. 12th, 1932. No. 4,211.

The kite described is of the tailless type and belongs particularly to that class in which the fabric is shaped so as to produce an apex, or its approximation, at a point some distance forward of the frame with the point of the apex nearer to the top of the kite than the bottom. The kite is shaped to form a five-sided figure with a frame consisting of one central rod and two others forming a cross.

Piloting

396,378. *Apparatus for Training Air Pilots on the Ground.* Whiting, J. R. S., Bevers Hill, Farnham, Surrey. Jan. 22nd, 1932. No. 1,941.

An apparatus consisting of a dummy aircraft fuselage mounted inside a hollow sphere. The dummy fuselage is fitted with a pilot's seat and controls as in an actual aircraft, while the interior of the sphere is painted with scenery such as might be seen in flight. This scenery may be reproduced photographically. This hollow sphere is connected to, and is moved by, the controls in such a way that movement of the controls produces the illusion that the craft is responding to the controls substantially as in flight.

396,537. *Mechanism for the Ground-Training of Air Pilots.* Air Service Training, Ltd., Flight Lieut. H. F. Jenkins and Berlyn, R. C., all of Hamble, near Southampton, Hampshire. June 25th, 1932. No. 17,975.

The device described is one by which the compass or its indication may be changed by the instructor so as to teach the pupil how and when to correct his course. This object may be attained by using a movable magnet affecting the reading of the compass and operated by the instructor. An apparatus simulating an actual compass may be used, and various magnet combinations are described.

396,538. *Mechanism for the Ground-Training of Air Pilots.* Air Service Training, Ltd., Flight Lieut. H. F. Jenkins and Berlyn, R. C., all of Hamble, near Southampton, Hampshire. June 25th, 1932. No. 17,976.

It has been found that with the aircraft headed on certain courses the movable portion of a magnetic compass swings slightly as the speed of the aircraft is varied. Owing to the wrong indication thus given, the pupil is liable to think he has deviated from his course and consequently has to be taught the effects of speed changes on his compass. This is especially important when blind flying.

The specification describes means for temporarily deflecting the movable element of a compass-like indicator and for allowing it to return slowly to its normal position, such means being connected differentially with a lever resembling an engine throttle lever actuated by the pupil, and a control column to be operated by the pupil.

The bowl of the compass-like indicator is filled with a damping liquid which can be given a rotary motion in one or the other direction, hence deflecting the movable portion of the indicator This action is produced by a double-acting piston in a cylinder adapted so as to produce the rotary movement of the liquid by forcing liquid into and out of the indicator bowl in the appropriate direction. This double-acting piston is connected suitably to the driving throttle lever and control column by a system of leverage, and is arranged so that the flow can be varied, reversed, or stopped as desired.

396,539. *Mechanism for Controlling Pitch Indicators for the Instruction of Aircraft Pilots.* Air Service Training, Ltd., Flight Lieut. H. F. Jenkins and Berlyn, R. C., all of Hamble, near Southampton, Hampshire. June 25th, 1932. No. 17,977.

Mechanism for controlling pitch indicators for use in the ground training of aircraft pilots. The patent describes an apparatus by means of which an instructor may move a control column backwards or forwards to bring about a dive or climb of the imaginary aeroplane. This movement would be shown on a pitch indicator and the pupil should perform the necessary movements of his control column to restore the imaginary aeroplane to the horizontal, the restoration being shown on the pitch indicator.

The diagram shows a pitch indicator connected by a V tube to a reservoir, the position of the level of the liquid in the tube of the pitch indicator being capable of being varied by an alteration of the height of the reservoir. The height of the reservoir is capable of being varied by either of two control columns which are connected to the movable reservoir by a system of pulleys, cords, and a weight. There is also a connection to an imitation throttle lever by means of which the movable element can be temporarily disturbed.

396,540. *Mechanism for Controlling an Indicator Device for the Instruction of Aircraft Pilots.* Air Service Training, Ltd., Flight Lieut. H. F. Jenkins and Berlyn, R. C., all of Hamble, near Southampton, Hampshire. June 25th, 1932; No. 17,978. June 25th, 1932; No. 17,979. June 25th, 1932; No. 17,980.

This specification describes an apparatus by means of which ground instruction may be given to a pupil in regard to diving and climbing or to turning and/or sideslip. The apparatus consisting generally of an indicator, the movable element of which is differentially connected to two controls, so that movement of either control in one or another direction can effect movement of the element without the other control being disturbed. Reference is made to Specification 378,172. One control would be operated by the instructor and the other by the pupil.

The diagrams show two control columns connected differentially to the indicator by means either of a lever system or of a system of cords and pulleys, in addition to a weight or spring, for the purpose of biassing the movable element in one direction.

A further diagram shows the application of the principle to two rudder bars.

REVIEWS

The Stresses in Aeroplane Structures

By H. B. Howard, B.A., B.Sc., F.R.Ae.S. Sir Isaac Pitman and Sons. Price 20s.

This treatise is of considerable importance. Mr. Howard has been engaged for many years in the investigation of stresses on aeroplane structures and is recognised as an authority on the subject, and his book will be found to contain a full account of the modern methods of calculating the strength of aircraft.

The first two chapters are introductory and contain the ordinary matter on stresses and strains and on the bending of beams, the third chapter deals with struts and is followed by chapters dealing with the cases of laterally loaded struts that occur so commonly in aircraft. The method, devised by the author, of the