

ABSTRACTS OF PATENT SPECIFICATIONS

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

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Aeroplanes—Construction

418,256. *Improvements in and relating to Frame Structures for Vehicles, Marine Vessels and Aircraft.* Becker, W. A., 49a, Cicerostrasse, Berlin-Halensee, Germany, and Dr. H. Schlisinger, 7, Rue Saulnier, Paris, IXme, France. Convention date (Germany), Oct. 20th, 1932.

This arrangement is described with reference to motor car chassis. The proposal is to construct such chassis of metallic tube with corrugations encircling the tube so that the tubes are slightly resilient, the amount of resilience being controllable by the design so that the resilience presents permanent deformation. A drawing is shown of a car chassis constructed of two such tubes connected at one end by a U-member, and another showing a single tube of this line carrying the motor at one end and the back axle at the other.

417,212. *Improvements in or relating to Joists, Beams, Pillars, Struts, and the Like.* Symes, W., Irlsmore, Irlam Road, Flixton, Manchester. Dated, June 15th, 1933. No. 17,131.

This invention applies more particularly to girders, etc., formed from light alloys. In such girders of, say, H-section, it is usual to pierce the web with holes for lightening purposes. As this may have the effect of making the girder too weak to withstand the shear stresses imposed, it is proposed to strengthen the web with diagonally arranged ties fitted over the weakened portions of the web. These ties may be of material of greater tensile stress than that composing the girder.

- 417,178. *Improvements in Aeroplane Wing Structures.* Welman, F. S., 55, Pinnacle Hill North, Bexley Heath, Kent, and Lovell, A., 31, Chieveley Road, Bexley Heath, Kent. Dated March 1st, 1933. No. 6,175.

This describes a single spar wing in which, in addition to the spar, there are braced longitudinals running parallel with it. Ribs of normal type are fitted at intervals dividing the spar into bays and the bays are diagonally braced top and bottom by members capable of taking tension and compression loads. These members cross in the centre of each bay and run from the front to the rear longitudinally. Fabric covering strips are fitted over the structure. It is claimed that this method of construction is suitable for metal.

- 417,350. *Fuel Jettisoning Valve Arrangement for Aircraft.* The Blackburn Aeroplane and Motor Co., Ltd., and Rennie, J. O., both of Seaplane Base, Brough, Hull, Yorks. Dated, July 11th, 1933.

This specification describes a fuel tank jettisoning valve for aircraft in which the valve is of the mushroom type and can be opened and closed at the will of the pilot. The operating mechanism consists of two pistons in cylinders, the pistons of which carry racks which gear with a pinion. The pinion shaft carries a crank, the connecting rod of which operates the mushroom valve. Hence it follows that fluid pressure in one cylinder opens the valve while fluid pressure in the other cylinder closes it. The working fluid is oil under pneumatic pressure and the valves controlling the mechanism are worked by means of solenoids, controlled by the pilot by means of switches. Alternatively it is proposed to operate the mechanism of the oil pressure of the engine lubricating system.

- 418,776. *Improvements in or relating to Latch Gear for Folding Aircraft.* The Blackburn Aeroplane and Motor Co., Ltd., Seaplane Base, Brough, Yorks, and Petty, G. E., Pantiles, Brough, Yorks. Dated, Aug. 17th, 1933. No. 22,971.

It is proposed to operate hydraulically the locking gear for the folding wings of aircraft, so that there would be no difficulty in operating the gear in the upper wings of a biplane, though the scheme is equally applicable to monoplanes. The locking pins are operated by a hydraulic plunger and are controlled by springs which tend to keep the locking pin in the locked direction. The hydraulic pressure is applied by one or more pumps, fitted on the lower wing of the machine, and there is a safety device applied to the plungers which prevents movement of the pin until hydraulic pressure is applied. The pump or pumps may operate all of the pins together or each of them separately, according to the arrangement used.

- 419,099. *Improvements in or relating to Cellular Structures.* Senutovitch, W., 3, Rue Charles, Lamoureux, Paris, France, and Nobel, E. L., 4, Avenue Malakoff, Paris, France. Convention date (France), July 2nd, 1932.

This specification describes a method of making a multi-cellular structure in any metal or non-metallic substance which can be used as a structure for taking applied loads or as a heat or sound insulating medium. The foundation of the structure is a sheet of the material to be used. This sheet is bent into folds so that the end view of the sheet resembles a straight line with a number of cross arms, these cross arms consisting of the doubled material. The top and bottom of the structure may consist of a similar sheet bent so that in end view there are cross arms on one side only, and the folded edges of the first member are slotted so as to permit the folds of the second member interlocking with the folds of the first. By this means, and by the addition, if desired, of further similar members, a structure containing any desired number of rectangular cells may be built up. After assembling, the structure may be covered in any desired manner.

418,066. *Improvements in or connected with Biplane Wing Structures for Aircraft.* Vickers (Aviation), Ltd., and Wallis, B. N., both of Weybridge Works, Byfleet Road, Weybridge, Surrey. Dated, April 18th, 1933. No. 11,308.

This specification refers to biplane wings which are made self-resisting as regards torsion by the geodetic principle described in Spec. No. 36307/32 (Serial No. 412,232) and are provided with a single system of interplane bracing which may be arranged on the Warren girder principle. Hence the wing spars are relieved of much of the vertical load and it becomes possible to make them of uniform depth.

402,895. *Improvements in or Connected with Means for Launching Aircraft.* Mayo, R. H., 39, St. James Street, London, S.W.1. Dated August 19th, 1932. No. 23,286.

This specification relates to the scheme described in Application No. 12,013, 26th April, 1932, for the mounting of one aircraft on another so as to form a composite aircraft, the upper member of the combination being capable of being released in flight, while the combination or either component of it may be used, landed, etc., in the manner of an ordinary aeroplane. It is proposed to place the upper aircraft in a position slightly aft of the centre of gravity of the combination, so that when the lift of the upper component is increased, as previously described, for the purpose of getting off, the effect of this increased lift on the lower component is to reduce the lift of the latter, the purpose of the device being to facilitate separation of the two. A locking device is also described which is arranged to release the upper component when a predetermined excess lift acts on the wings of the upper component.

418,121. *Improvements in or relating to Aircraft.* Dr. Ing. C. Dornier, Friedrichshafen, Lake Constance, Germany.

This specification refers to a combination of rotatable blades with a fixed wing for aircraft, the object being to obtain the greatest possible difference between the flight speed and the landing speed, the fixed wing having an area sufficient only for high speed flight. It is proposed to mount the rotating blades towards the extremities of the fixed plane and to arrange that they can be retracted into the fixed plane in such a manner that a portion of one blade of each rotor extends beyond the fixed plane. The object aimed at is to reduce the area of the fixed plane, thereby saving weight.

400,292. *Improvements in Means for Launching Aircraft.* Mayo, H. M., 39, St. James Street, London, S.W.1. April 26th, 1932. No. 12,013.

This specification describes a method of launching aircraft by which the aircraft to be launched is mounted on or above another aircraft in such a way that it can be released when desired, thereby being in independent flight. It is claimed that there are many advantages to be attained by this method of launching, including the possibility of launching easily and safely aircraft with a high wing loading. Many methods are described for ensuring the safety of the releasing operation, including means for providing that the angle of incidence or the lift coefficient of the upper aircraft is increased to the extent necessary for continued vertical separation of the two aircraft. In order to attain the same end it is proposed also to throttle down the engines of the lower aircraft by automatic means at the moment of release or to provide air brakes. Matters connected with the control of the two aircraft are also provided for. There are many other precautions described to effect separation without affecting safety of operation.

402,951. *Improvements in or Connected with Means for Launching Aircraft.* Mayo, R. H., 39, St. James Street, London, S.W.1. Dated January 14th, 1933. No. 1,311.

This specification refers to composite aircraft of the type described in Specification No. 12,013/32 (Serial No. 400,292), whereby two aircraft, one on top of the other, are normally locked together to form a composite aircraft, and means are provided so that the upper aircraft can be released in flight. The arrangements described in this specification relate to wing arrangements devised to facilitate separation of the two components during flight. It is proposed to use, on the upper aircraft, a wing section possessing a larger angular range of lift than that used on the lower component, and to attach the aircraft to each other so that the wing of the lower component is at the angle of maximum lift while that of the upper component is unstalled. Suitable types of wing are referred to, and reference is made to the effect of slots and flaps on the operation of the device. It is shown that, by the means described, that at the minimum flying speed of the composite aircraft there may be a force tending to prevent separation of the components, while at higher flying speeds the force may be such as to produce separation. Methods are given for calculating an appropriate wing area for each component.

402,997. *Improvements in or Relating to Composite Aircraft.* Mayo, R. H., 39, St. James Street, London, S.W.1. Dated April 27th, 1933. No. 12,310.

This specification refers to composite aircraft consisting of two components mounted one on top of the other and provided with means by which the components can be separated in flight. The present specification refers to locking means which are arranged so as to prevent separation until the lift of the wings of the upper component reaches a predetermined limit sufficient to ensure safe separation. The locking means may be arranged to be released only by the combined or consecutive operation of controls located on both components, or the locking means may be released automatically. The locking apparatus may be retracted in flight.

Aeroplanes—General

417,813. *Improvements in or relating to Slings Gear for Aircraft.* The Blackburn Aeroplane and Motor Co., Ltd., Seaplane Base, Brough, Yorks, and Petty, G. E., Pantiles, Brough, Hull, East Yorks. Dated, Aug. 17th, 1933. No. 22,970.

In order to reduce the stresses on the aircraft structure caused by the ordinary slinging arrangements, it is proposed, in the case of a normal biplane, to use a rod as a suspension member which passes through the top plane and is attached to a strong bulkhead in the fuselage. Where the suspension member passes through the upper plane a tube is fitted which is braced to the outer section. The suspension member carries a concentric fitting, which is a close fit in this tube.

Airscrews

418,109. *Improvements in or relating to Airscrew Propellers or the Like.* Perrin, E. A., 9, Rue des Charmes, Le Vesinet (Seine and Oise), France. Convention date (France), March 17th, 1933.

This specification refers to what is described as an airscrew propeller or the like mounted on a shaft to which it is capable of being locked so as to be capable of acting as a sustaining plane or from which it can be released so as to permit of its rotation about the said shaft, while the incidence of the blades can be varied when the propeller is adapted to rotate. Detailed claims are made for mechanism devised for the purpose of constructing the propeller.

Control of Aeroplanes

417,161. *Improvements in or relating to Means for Controlling Aircraft.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Hollis Williams, D. L., Hillside, Swakeley's Road, Ickenham, Middlesex. Dated, Nov. 18th, 1933. No. 32,218.

In order to preserve the "feel" on a control operated by a servo flap, the servo flap is operated by a link from a lever pivoted on a member rigidly secured to the control member. The arrangement is such that any load applied by the pilot is applied to the flap and also to the control, while the servo flap has a mechanical advantage in the leverage.

417,487. *Improvements in or relating to the Control Surfaces of Aircraft.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Brown, A. C., 109, Cleveland Road, Ealing, London, W.13. Dated, Nov. 17th, 1933. No. 32,127.

In order to improve the balance of aircraft ailerons of the type where the hinge centre is behind the leading edge, it is proposed to use a type of aileron of which the camber may be varied by making the nose of the aileron movable. When such an aileron is depressed for the purpose of increasing lift the position of the forward part remains substantially unchanged, and when raised for differential action its nose projects into the region below the lower surface of the wing, thus attaining the desired result. The nosepiece of the aileron is moved relative to the ailerons by means of a link controlled by a nut on a threaded rod. This threaded rod is rotated by means of a drum round which is wound a cable which is operated by the control mechanism. Methods of varying the gearing of this cable are described and a means of closing the gap resulting from the relative motion of the nose and tail portions of the aileron by means of sliding members are also referred to.

417,658. *Improvements in Navigational Steering Systems.* Bendix Aviation Corporation, 105, West Adams Street, Chicago, Illinois, U.S.A. Convention date (U.S.A.), April 6th, 1934.

It is stated that the value of an efficient automatic steering system depends on its capacity to anticipate the deviation of a craft from its course and to check the rudder at the right moment so as to prevent swing. The angular moment is a function of two factors, the angle of departure and the rate of departure. The former is determined by a compass and the latter by a gyro turn indicator. The desired effect can be obtained by combining these two factors. The compass proposed is of the electrically-operated repeating type and the servo unit comprises a pair of bellows operatively connected to the control member or rudder of the craft which is to be steered, and the interior of said bellows is connected to a suction supply and arranged so that normally the atmosphere tends to compress both bellows equally, thus keeping the rudder in a central position, and upon operation of the turn indicator and/or the compass, due to deviation off the course, a leak in one or the other of the bellows is opened to the atmosphere thereby causing its associated bellows to collapse and thus operating the rudder.

417,898. *Improvements in or relating to the Controlling Mechanism of Aeroplanes.* Fairey, C. R., Cranford Lane, Hayes, Middlesex. Dated Oct. 26th, 1933. No. 29,733.

It is proposed that the trailing portions of the ailerons of an aeroplane being variable camber gear shall be split into upper and lower parts and each of the lower parts is arranged to be depressed at will relatively to and simultaneously with the depression of the aileron of which it forms part without interfering with the capability of depressing said lower parts independently of movement of the

ailerons of which they form parts. The lower parts of the ailerons may be interconnected with means for forming slots in the wing. The operating means, which consists of pulleys and cords operated by nuts moved by threaded rods, is described in detail.

418,542. *Device for Automatically Regulating the Altitude of Aircraft.* Siemens and Halske Aktiengesellschaft, Berlin-Siemensstadt, Germany. Convention dates (Germany), Nov. 26th, 1932, March 18th, 1933, and April 7th, 1933.

It is proposed to control the flying altitude of aircraft by altering the propelling force. For this purpose it is proposed to use a combination of an altimeter control with a hand control and to damp the apparatus so as to prevent hunting, and it is stated that the damping can be well effected by means of a rate of climb indicator. The instrument measuring the rate of change of the altitude of the aircraft may be a so-called variometer or any other measuring instrument not having the slowness of response of the variometer, for example, a pendulum, measuring the vertical accelerations and having a very long oscillation period. A pendulum measuring the true vertical accelerations may be used additionally to the above named instruments measuring the rate of change of altitude.

418,499. *Improvements in or relating to Automatic or Semi-Automatic Pilot for Aircraft.* Sperry Gyroscope Co., Inc., Manhattan Bridge Plaza, Brooklyn, New York, U.S.A. Convention date (U.S.A.), July 21st, 1933.

It is stated that it has been found that the gyro vertical or artificial horizon will not maintain uniform level flight on account of the fact that rising and descending air currents may change the course of the aeroplane in elevation without affecting its fore and aft level. It is therefore proposed to employ a gyro vertical and an expansible container which can be closed to the atmosphere at will, and including means originated by the expansion or contraction of the chamber in accordance with any change in atmospheric pressure for altering the relation between said gyro vertical and the craft to maintain level flight. The proposed device resembles a statoscope and may operate through a differential link in the follow up system leading to the gyroscope. Preferably a novel differential air link means is used to operate the variable link.

418,540. *Improvements in or relating to the Control Surfaces of Aircraft.* The Fairey Aviation Co., Ltd., Cranford Lane, Hayes, Middlesex, and Hollis Williams, D. L., Hillside, Swakeley's Court, Ickenham, Middlesex. Dated Nov. 23rd, 1933. No. 32,812.

It is proposed to employ, in connection with the elevator control of aircraft, two servo flaps mounted one on each side of the elevator. One flap, which is smaller than the other, is used to assist the aircraft to maintain trim and is actuated by the pilot through a screw and link gear. The other and larger flap is used for normal control purposes in the usual way for reducing the moment required for operating control surfaces.

Engines

417,334. *Improvements in Liquid Coolers for Aircraft or other Vehicles.* The Bristol Aeroplane Co., Ltd., Fedden, A. H. R., and Mayer, F., all of Filton House, Bristol, Gloucester. Dated, April 7th, 1933. No. 10,456.

This invention refers primarily to the cooling of the lubricating oil of an air-cooled radial aeroplane engine, and the cooler proposed forms the front portion of a circumferential cowling of the type known as a Townend ring. The front portion of the ring is formed by a number of oval tubes with their least diameter radial and the oil to be cooled is pumped through these tubes. The

specification describes in detail a method of applying the invention and methods of feeding the oil to the tubes, and a pressure release valve is also described. It is proposed to support the apparatus by plates attached to the cylinders of the engine.

418,721. *Improvements in Aeroplanes Driven by Constant Pressure Gas Turbines.* Aktiebolaget Milo, Kungsgatan 32, Stockholm, Sweden. Convention date (Germany), Feb. 15th, 1933.

This invention relates to an aeroplane propelled by a constant pressure gas turbine, the exhaust gases of which are exhausted towards the rear at so high a velocity that their recoiling effect sustains or wholly replaces the propeller. The gas turbine described consists of a turbine compressor followed by a combustion chamber in which the compressed air is heated, which is followed by a power generating turbine, the exhaust of which is directed rearwards. If no propeller is fitted the turbine will only perform the compressor work, all the propulsion being effected by the rearward ejection of the gases. This arrangement is preferred for high-speed aircraft. For slow-speed aircraft the turbine may drive a propeller, the ejection of the gases rearward producing an additional thrust.

Helicopters

417,093. *Improvements in Aircraft.* Rigby, F. G., and Rigby, P. N. R., 25, Stubb's Gate, Newcastle, Staffs. Dated, Jan. 11th, 1934. No. 1,045.

This specification describes an aircraft adapted for forward motion, direct lift and hovering, comprising two tractor screws on longitudinal axes on opposite sides of a fuselage, two fans adapted to be coupled to the tractor screws when direct lift is required, and a third fan at the forward end of the machine to check forward motion when hovering.

417,581. *Improvements in Aircraft.* N.V. Instituut voor Aero and Hydro-Dynamick, 19, Regubersgracht, Amsterdam, Holland. Dated, Feb. 2nd, 1933. No. 27,152. (Patent of addition to No. 417,504. Convention date (Germany), Feb. 2nd, 1932.)

This specification describes a flying machine with rotary wings which are articulated for free oscillatory movement to a swash member connected with the fuselage for rotating and free tumbling motion characterised by the fact that means are provided for preventing oscillatory movements of said wings in planes other than the planes containing the axis of rotation of said swash member. The swash member is mounted for rotation on a vertical shaft and the wings are articulated to radially extending journals connected with said shaft by links which prevent rotation of the journals about their axes.

418,212. *Improvements in or relating to Helicopter and Rotating Wing Aircraft.* Coats, A. G., Gloucester House, Park Lane, London, W.1; Rutherford, W. V. d'A., of the same address; Hafner, R., Mantlergasse 47, Vienna 13, Austria; and Nagler, Rennweg 59, Vienna 3, Austria. Dated March 21st, 1933. No. 8,555.

The main objects of this invention is to increase the stability and manoeuvrability of helicopter machines, to improve the controllability of rotary wing aircraft to reduce the drag of such aircraft and to enable helicopter machines to be transformed instantly at will into auto-rotative wing aircraft and vice-versa. The blades of the lifting screw are rotatably mounted about their individual axes and a control column is universally mounted at the centre of the windmill. There is also a spider which is connected by radius rods to the blades for the purpose of controlling incidence. The blades are braced against centrifugal force by

means of a triangular bracing and they are normally free to take up a position in which centrifugal force balances the lift. It is proposed that the machine shall rise from the ground as a helicopter and that when height has been attained it is to be propelled horizontally either by inclining the lifting propeller or by clutching in a traction propeller. When the speed is sufficiently great the lifting propeller may be disengaged from the engine and allowed to turn by autorotation.

418,674. *Improvements in or relating to Rotating Wing Aircraft.* Coats, A. G., Gloucester House, Park Lane, London, and Hafner, R., Mantlergasse 47, Vienna 13, Austria. Dated, April 25th, 1933. No. 11,991.

This specification refers to aircraft which are supported in the air either by helicopter lifting screws or by rotors of the autogiro type in which the blades are flexibly connected to the hub. It is proposed to arrange that the angle of inclination of the blades is variable and under the control of the pilot of the aircraft. The blades carry, near their root, a lateral arm which is connected flexibly to a separate arm attached to the hub, so that when this arm is moved up and down the shaft the incidence can be varied. The hub can also be inclined axially by the pilot.

418,698. *Improvements in or relating to Rotative Wing Aircraft.* Coats, A. G., Gloucester House, Park Lane, London, W.1, and Hafner, R., Mantlergasse 47, Vienna 13, Austria. Dated, Aug. 25th, 1933. No. 23,645.

The object of this invention is to enable the angle of the blades of the lifting screw of a helicopter or autogiro aircraft to be easily and quickly changed by the pilot from a positive or negative value or vice-versa without losing the speed of rotation so that a helicopter may be flown as an autogiro. The blades may be connected to the hub by a torsionally flexible radial member which may be mounted inside the arm of the blade, and there is also a universal joint which permits the blade to flap up and down and also to have a limited motion in the plane of rotation. There is also provided means by which the pilot can vary from the cockpit the incidence of the blades. Several different arrangements are shown and described in which the torsionally flexible member which resists the centrifugal pull of the blades may be either inside the blade, external to it, or in duplicate.

Instruments

418,377. *A New or Improved Gyroscopic Instrument for Aircraft and the Like.* Dove, J. S., Hale House, Ockley, Surrey. Dated, April 24th, 1933, No. 11,924, and Dec. 11th, 1933, No. 34,829.

This invention consists of a gyroscopic instrument which gives an indication of the amount of turn and is capable of giving this indication in respect of either or both of any two axes. It may also be used to control servomotor devices which, in their turn, may act on the controls of the aircraft. It consists of a gyroscopic rotor with two axes of freedom or partial restraint and is drawn by the direct exposure to the air through which the aircraft is moving. Changes in the direction of this air flow will affect the rotor gyroscopically. The rotor may be provided with a rim to facilitate indications from direct observation or remote reading mechanism may be used. A mechanism is provided to enable the rotor to be re-erected or to be held if desired. Two or more rotors may be used together. Assuming that the aeroplane yaws to the right, the rotor, by virtue of its gyroscopic action, will remain in the plane of the original direction of flight and that the ring is displaced in regard to the fixed portions of the mechanism. If the aeroplane drops a wing the ring remains edge on to the pilot, but indicates the angle of bank. An indication of course is also given, due to the effect of a side wind on the exposed portion of the rotor. There is

also an aerofoil surface angularly moving with the rotor, but not rotating, which applies aerodynamical forces so as to modify gyroscopic influences.

Miscellaneous

418,258. *Improvements in or relating to Locking Devices for Boards or Similar Structural Elements.* Aktiebolaget Batpatent, Upsala, Sweden, and Engman, K. V., Borgegatan 45, Upsala, Sweden. Dated, Nov. 10th, 1933. No. 31,349.

This invention describes a method of attaching together members such as the slats of a vat with tensional wires and it is stated to be a suitable method of forming an aeroplane fuselage. The tensioning wires run through the members to be attached and are tensioned by nuts at one or both ends of the wire, thus squeezing the slats closely together. Locking methods for preventing the slacking off of the nut are described.

418,221. *Improvements in Hydraulic Control Apparatus.* Boothby, F. L. M., Capt., R.N. (ret.), of 4, Woodvale, Cowes, and Thompson, J. A., of Pangani, Egypt Battery, Cowes. Dated, April 19th, 1933. No. 11,482.

This is a method of operating aircraft controls by means of two double acting hydraulic cylinders interconnected by pipes so that manual movement of the piston in one produces a corresponding movement in the other. In the pipeline between these cylinders is fitted a device for making up loss of fluid, consisting of a reservoir under slight pressure produced by a spring-weighted piston and also a special cock which can be used for locking the controls in any desired position.

418,396. *Improvements in or relating to Tail Supports for Aircraft.* The Blackburn Aeroplane and Motor Co., Ltd., Seaplane Base, Brough, Yorks, and Petty, G. E., Pantiles, Brough, Yorks. Dated, Aug. 2nd, 1933. No. 21,692.

This specification describes a tail support for aircraft which is intended to take the place of the usual trestles when the aeroplane is to be adjusted or repaired. The tail support may be permanently attached to the fuselage of the aeroplane and consists of two tubes in V formation, folding when required under the fuselage. The tail support is completed by a third tube, also arranged to fold, the three tubes when in use forming a pyramid. The height of the tail of the machine from the ground may be varied and various locking devices are described.

419,310. *Hydraulic Control Gear.* Hele-Shaw, H. S., and Beacham, T. E., both of 64, Victoria Street, Westminster, S.W.1. Dated May 13th, 1933. No. 13,926.

This specification describes a hydraulic control mechanism which may be used for the remote operation of carburettor controls in aircraft or for either purposes such as steam valves or ships' telegraphs. It is characterised inasmuch as there is only one pipe containing liquid connecting the controlling and controlled element, the return motion of the controlled element being performed by springs. Both elements consist of pistons in cylinders, the latter being connected by the pipe and being filled with non-freezing fluid. The operating levers which move, or are moved by the pistons, carry cams which are acted on by springs, the cams being designed so that the spring load is constant. The spring load is equal for both cylinders. A special valve operated by the controlling piston is provided for the replenishment of fluid in the system; this valve communicates with a reservoir.

418,486. *Improvements in or relating to Blade Wheel Propellers with Oscillating Blades.* Voith, W., Voith, H., and Voith, H., of J. M. Voith, Heidenheim, Brenz, Wurttemberg, Germany. Convention date (Germany), March 18th, 1933.

The blade wheel propeller described has oscillating blades which are made to oscillate by means of a motion communicated by a fixed pivot which is located out of centre with the rotating centre. The motion is communicated by means of rocking levers and shafts connected to cranks on the blades themselves so that the blades oscillate when the apparatus is rotated.

Model Aircraft

418,464. *Improvements in or relating to Model Watercraft and Aircraft.* Gordon, C. B., Monach, Rockcliffe, Dalbeattie, Kirkcudbrightshire, Scotland. Dated, May 10th, 1933. No. 14,472.

This specification describes a method of constructing a model boat in which V-section forms are combined with suitably shaped longitudinal members and are afterwards covered by a plastic material or in any other suitable way. The construction of the fuselages of model aircraft in a similar manner is referred to.

Parachutes

419,218. *Parachute Closure.* Popelák, J., 68, Kralovska, Prague X, Czechoslovakia. Dated, May 10th, 1933. No. 13,653.

This specification refers to an opening device for parachutes and can be so arranged to provide for automatic opening by means of a cord attached to the aircraft and also for manual opening by means of a further cord. The parachute closure is effected by means of two angle plates which tend to fly apart by means of a load applied by rubber in tension, but which are normally held in approximate contact by two studs which are retained in position by pins at each end. The pins at one end of the two studs are arranged to be withdrawn simultaneously automatically, and the pins of the other end of the two studs can be withdrawn manually. Either can then, when withdrawn, cause the opening of the parachute.

418,209. *Improvements in or connected with Parachute Equipment.* Irvin, L. L., Kingsweir, Broadway, Letchworth, Herts. Dated March 21st, 1933. No. 8,539.

This invention is concerned with a method of locating the release device of parachutes to be arranged so that it may be conveniently operated. A wide supporting member is provided for the release device or spring which is secured to the harness, preferably about the wearer's waistline. This supporting member is provided with a pocket for the ring which is tapered so that a slight resistance is offered to the ring being pulled out, so as to prevent accidental release. Such an arrangement prevents interference with the release device by the airman's clothes.

Undercarriages

418,468. *Aeroplane Undercarriages.* Sir W. G. Armstrong Whitworth Aircraft Co., Ltd., and Lloyd, J., both of the Company's Works, Whitley, near Coventry, Warwickshire. Dated Nov. 8th, 1933. No. 31,066.

This invention consists of a retractable undercarriage for aircraft in which each wheel of the undercarriage is fitted on a shock-absorbing strut, the top end of which is hinged to, say, the front spar of a monoplane wing and arranged to swing backward. When the undercarriage is in use it is prevented from

swinging backwards by a radius rod extending rearwards to the wing. This rod carries at its upper end a trunnion block carried by a threaded shaft extending to the support of the front strut, and on turning this shaft the radius rod is moved to a position closely parallel to the main strut, when the latter and the wheel can be drawn up into the wing.