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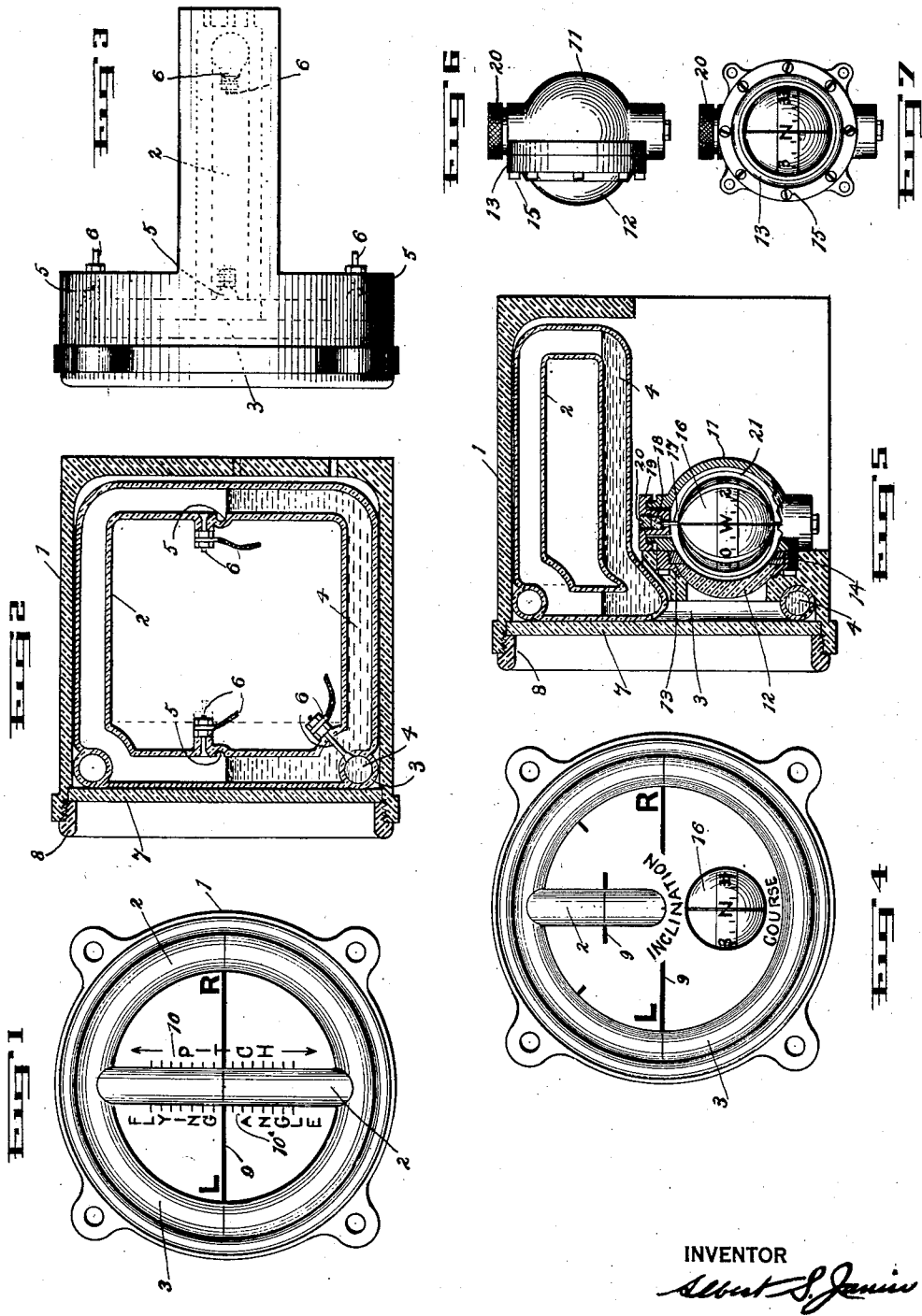
A. S. JANIN

1,866,534

AERONAUTICAL DEVICE

Filed Nov. 23, 1928

9 Sheets-Sheet 1



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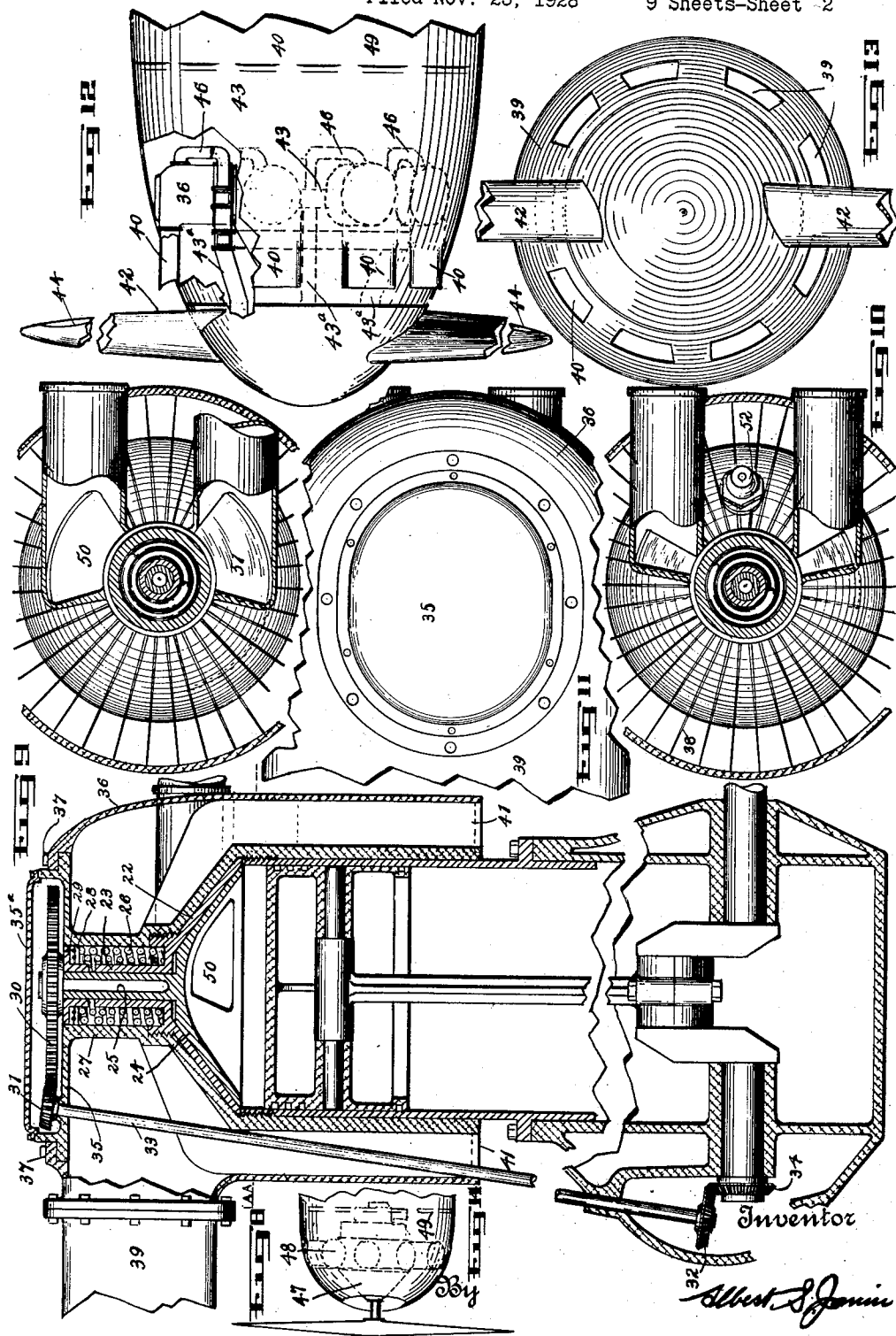
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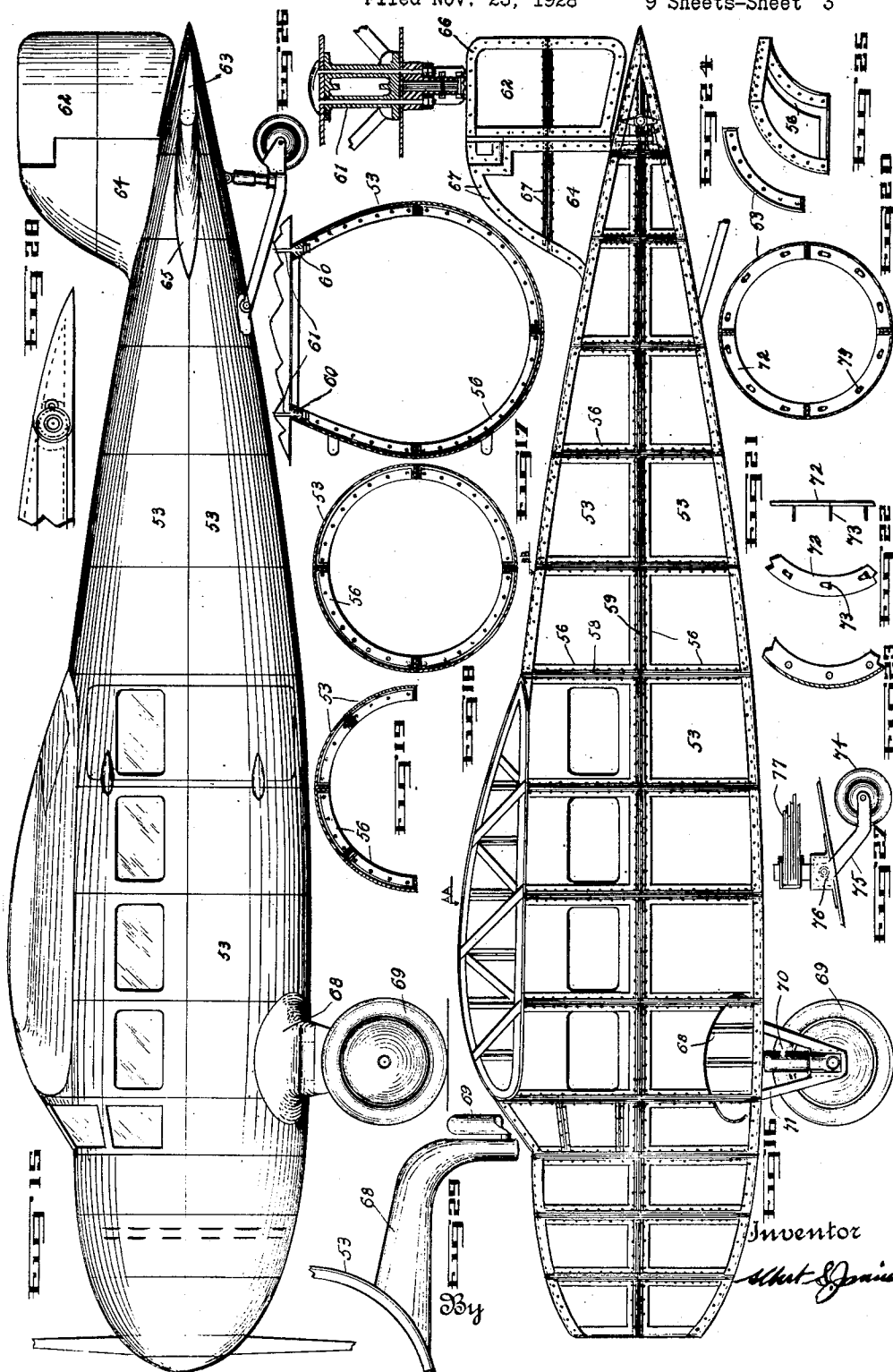
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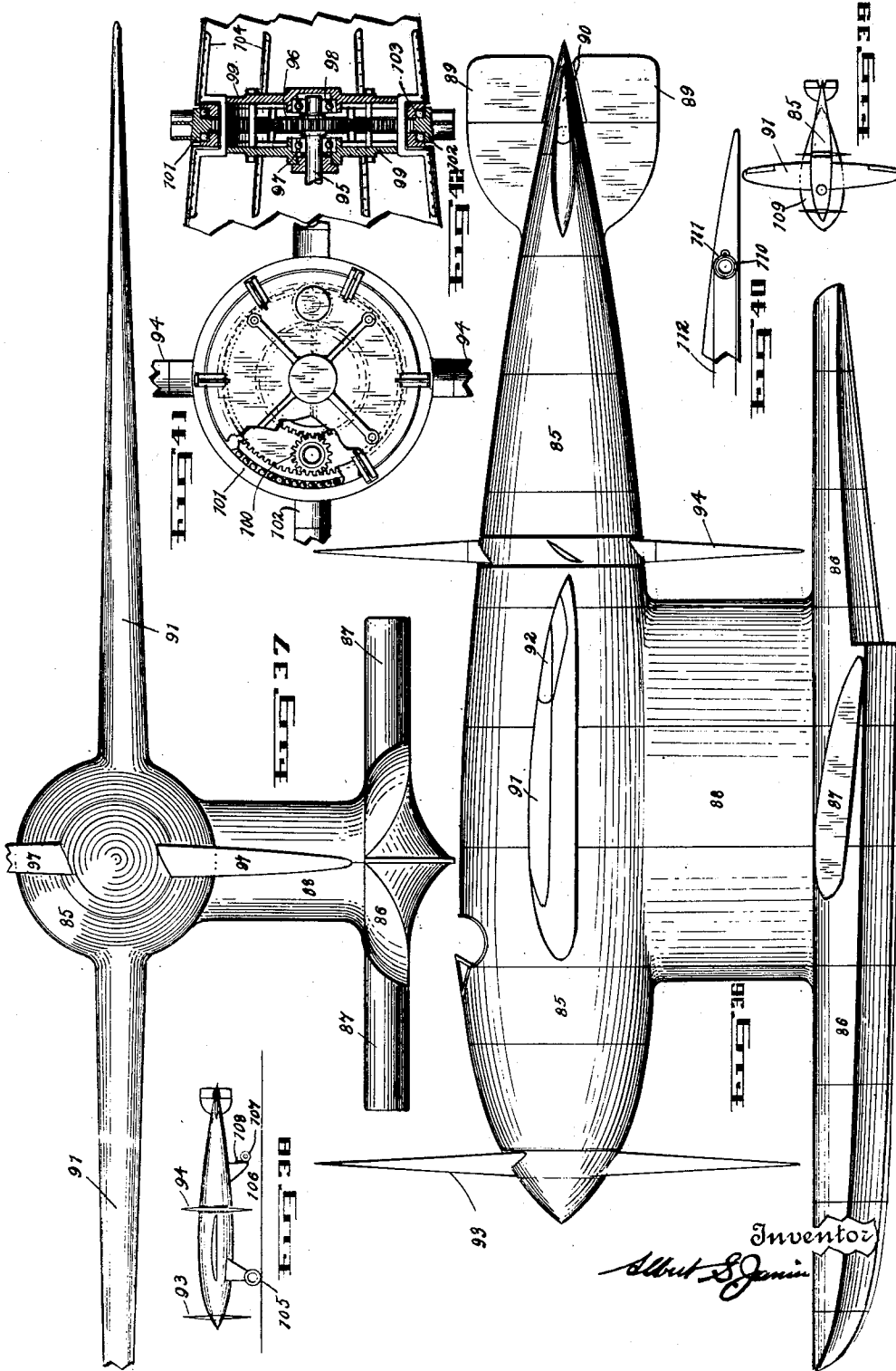
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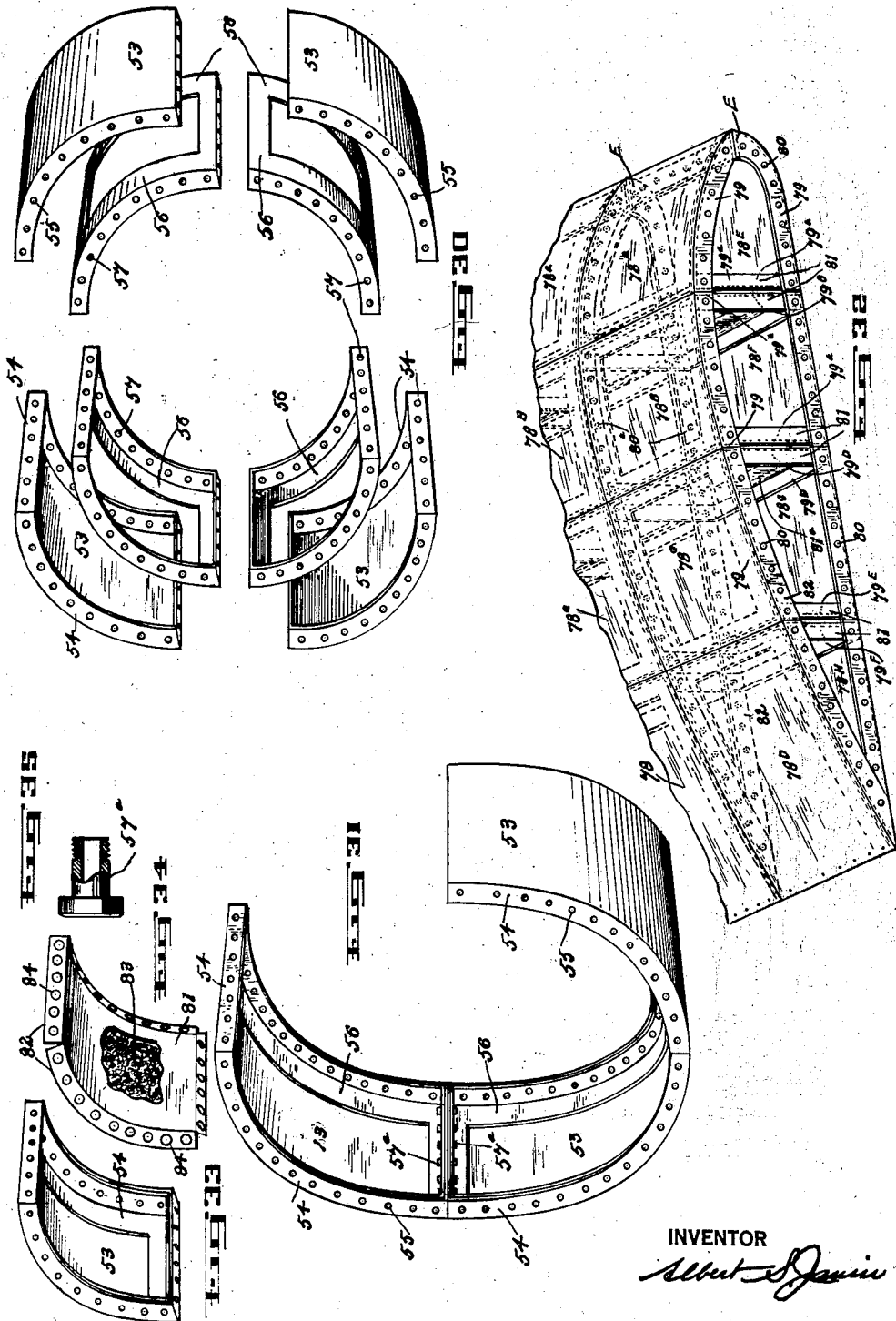
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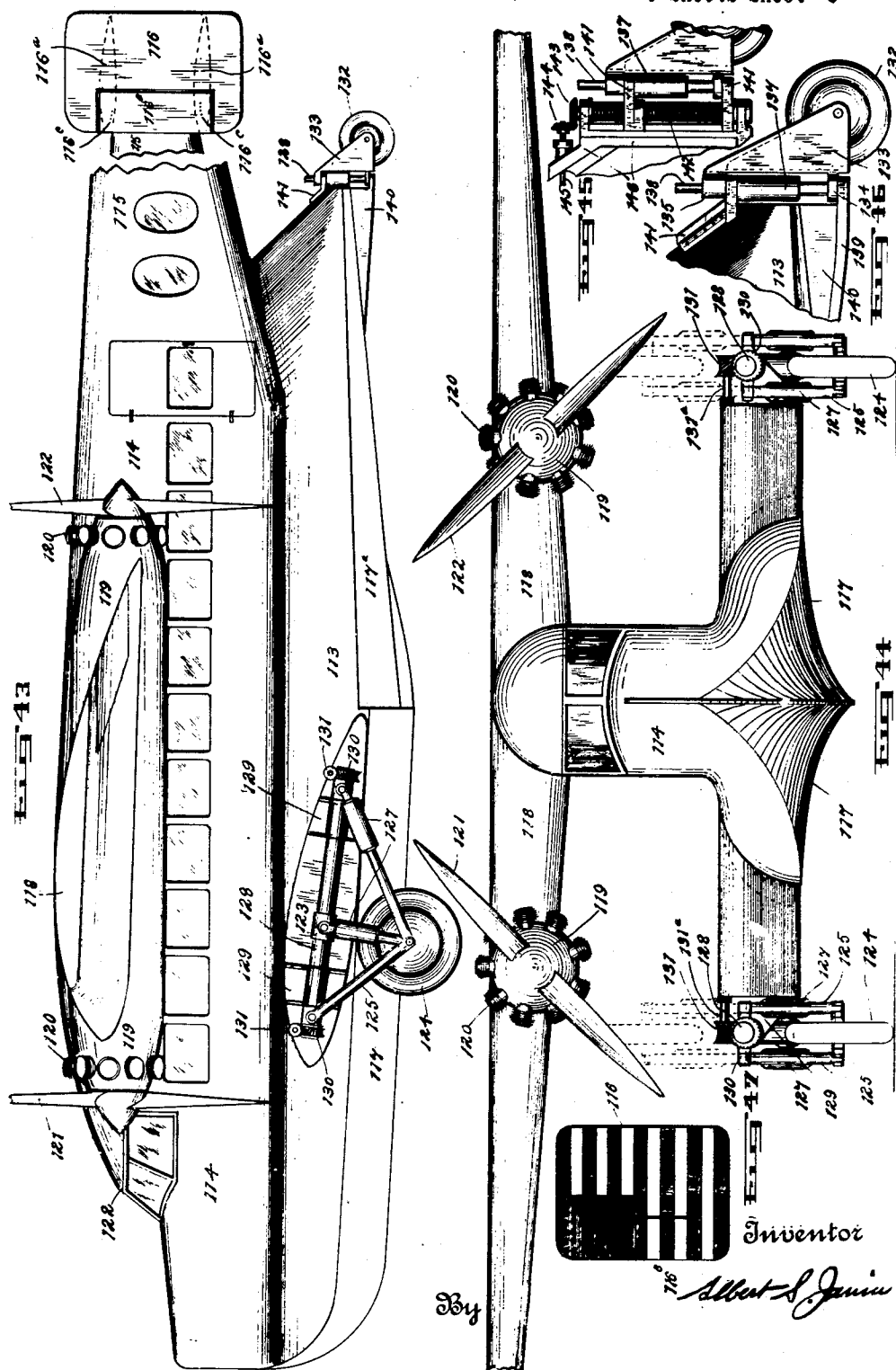
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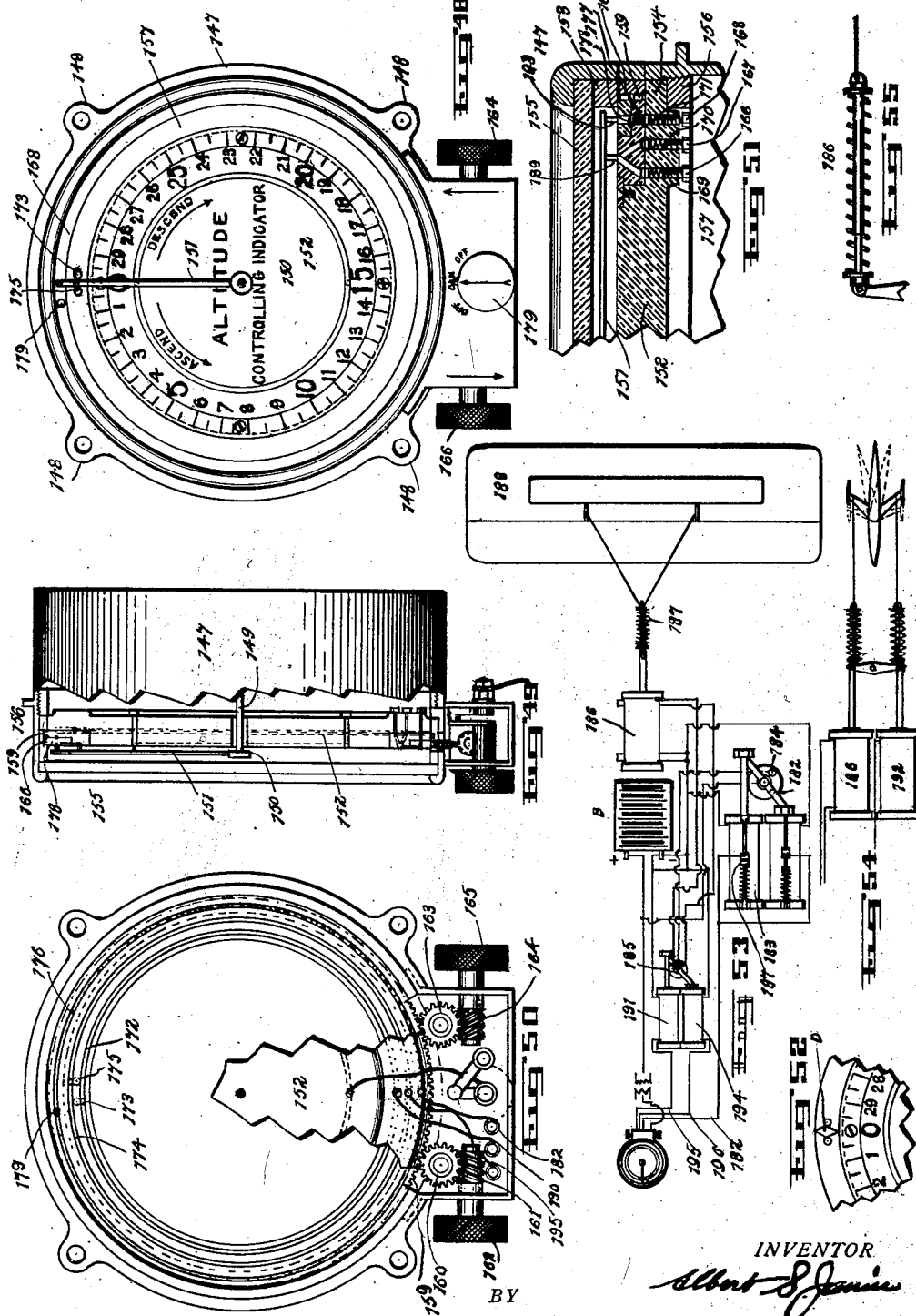
A. S. JANIN

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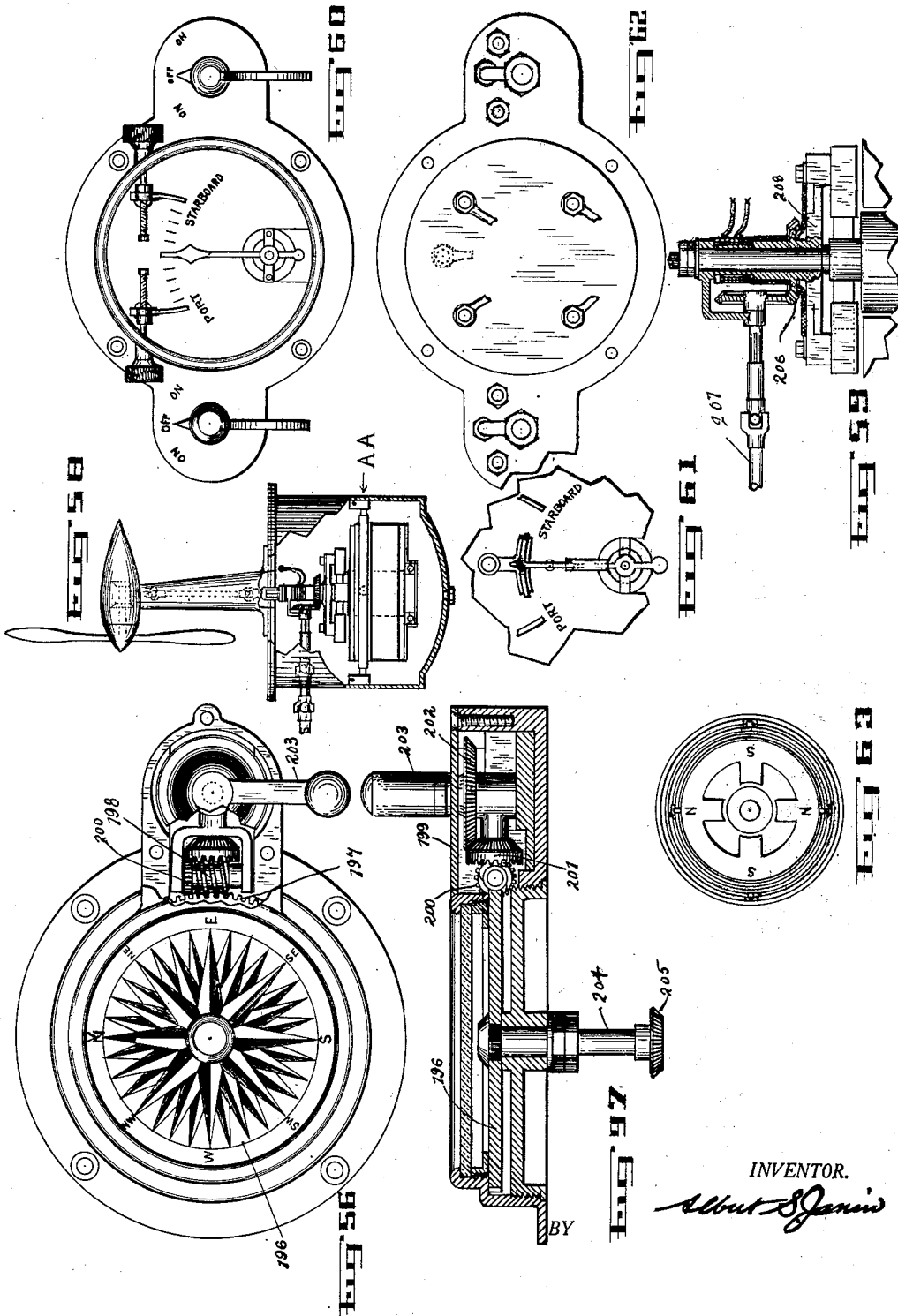
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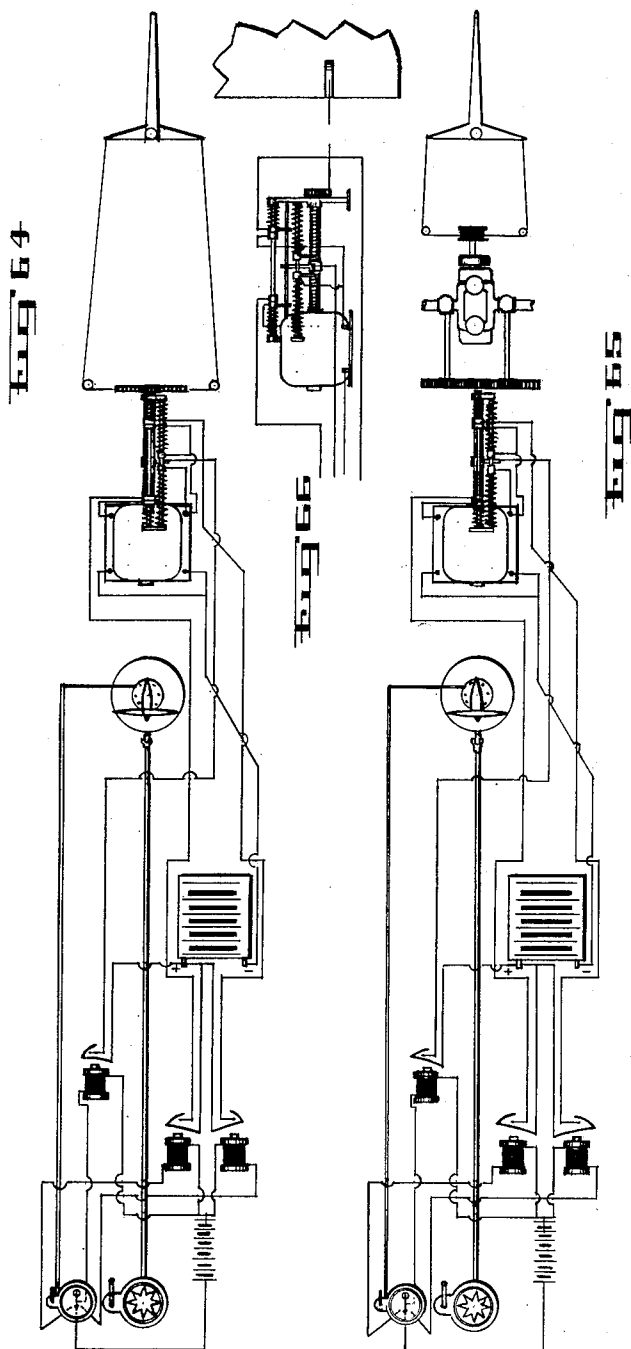
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AERONAUTICAL DEVICE

Filed Nov. 23, 1928

9 Sheets-Sheet 9



INVENTOR

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AERONAUTICAL DEVICE

Application filed November 23, 1928. Serial No. 321,457.

My invention relates to aeronautical devices to be universally used for a number of purposes.

One of the objects of this invention as shown in Figures 1 to 7 inclusive of the drawings, represents an indicating means for showing when the craft loses its lateral balance and banking same. Also means for showing what angle the craft is flying from and what the pitch is during same operation. Another means showing what courses or direction the craft is traveling and whereby can be kept in a straight direction.

Another object of these devices as shown are Figures 8 to 14 inclusive of the drawings, represent an air cooled engine provided with a valve in the head, comprising substantially the explosive chamber and means of operating the same, also means for cooling same.

Another object is shown where as the engine is entirely enclosed in the cowl and means for admitting the air to and from said engine for cooling same during its operation.

Another feature is shown whereby the propelling means may be used for operating the air entering the ports or inlets and by the centrifugal force of the propeller causes the air to be drawn in around the engine and exhausted at the ends of the propeller blades.

The exhaust of the engine may also be conveyed to the propeller blades and exhausted at the ports at the ends of the blades.

A further object of this invention as shown in Figures 15 to 29 inclusive, represents a method for the manufacturing of aircraft by stamping out the sections to the contour of said machine and securing said sections together by bolting or securing same by a locking means or ring; also a webbed frame for holding or securing the plates or sections. The ring section may be constructed likewise.

A still further feature of the invention as shown in the drawings in Figures 30 to 35 inclusive, represents a method for constructing aircraft by the stamping out of metal. This section which comprises the sides and the reinforcing or locking rings whereby the entire craft can be stamped out of metal and

assembled by bolting or unbolting the sections. If in case of accident to the craft, the damaged parts can be replaced without rebuilding the entire aircraft.

Still another feature as shown in Figures 36 to 42 inclusive, discloses a stream lined airplane to operate from land or water designed for speed and having a dual propelling means in tandem operating in the stream line body or fuselage.

A still further feature of the invention as shown in the drawings from Figures 43 to 47 inclusive, is a type of flying machine known as an amphibian which can operate in the air from land or water.

Another feature of the invention shown in the drawings from Figures 48 to 55 inclusive is an altitude controlling indicator. The altitude desired to fly at, can be set and when the aircraft acquires the height set, it will maintain and keep said height until the pilot desires its descent. A still further feature of the invention as shown in the drawings in Figures 55 to 67 inclusive, is an automatic means for automatically controlling the lateral direction of the aircraft during its operation.

Figure 1 is a plan view of the indicator means.

Figure 2 is a sectional view of the indicating means showing the glass tubes and the liquid in said tubes, also the electrical connections connecting same.

Figure 3 is a plan view of the indicating means.

Figure 4 is a plan or front view or another form of the indicating means showing the inclination of the craft when flying a straight course or direction.

Figure 5 is a sectional view of Figure 4, showing the arrangement of the parts.

Figure 6 shows a side elevation of the compass or direction indicating device to indicate the line of travel.

Figure 7 is a front view of Figure 6.

Figure 8 is a sectional view of an engine, showing a head or chamber valve and means for operating same.

Figure 9 is a sectional view of Figure 8.

Figure 10 is a plan view of another form of placing the valve in said head.

Figure 11 is a plan view of Figures 9 and 10.

Figure 12 is shown for housing the engine in the cowling therefore providing a stream line and eliminating head resistance; also showing means for cooling the engine.

Figure 13 is a front view of Figure 12.

Figure 14 is a sectional side elevation of another form of cowling for housing the engine and also means for cooling same.

Figure 15 is a view showing a side elevation of an aircraft construction from stamped out metal.

Figure 16 is a side sectional view of Figure 15.

Figure 16 also shows a form of chassis supporting said aircraft when on the ground.

Figure 17 shows a sectional view taken substantially at A A.

Figure 18 is a sectional view taken at B B.

Figure 19 is a sectional view showing more sections to constitute a union.

Figure 20 is a sectional view showing a lock ring with lugs securing same to the sections.

Figure 21 is a side view of the locking ring showing lugs protruding.

Figure 22 is a plan view of the locking ring.

Figure 23 is a view of the section provided with a flange.

Figure 24 is a form of a part of the sections.

Figure 25 is a view of the flange member to which the plates or sections are secured.

Figure 26 is a form of double bolt for securing the rings to said aircraft.

Figure 27 is a form of caster for operating the tail part of the airplane when on the ground.

Figure 28 is a view of an aileron.

Figure 29 is a view showing the chassis.

Figure 30 is a view showing the stamped out sections of the aileron comprising the outer and inner shell sections.

Figure 31 is a view showing the section partly assembled.

Figure 32 is a partly assembled airplane wing or aerofoil showing the stamped or punched members assembled.

Figure 33 is a part of a stamped section complete.

Figure 34 is a view of a metal holder supporting a composition.

Figure 35 is a view of a better bolt to secure the sections together.

Figure 36 is a view showing a stream line by an airplane provided with a dual propelling means for operating in tandem in the fuselage.

Figure 37 is a front view of Figure 36.

Figure 38 is a side elevation of the air-

plane designed to operate from and alight on the land.

Figure 39 is a plan view of an airplane, capable of floating and balancing on the water.

Figure 40 is a view of a form of aileron to balance the aircraft during its operation.

Figure 41 is a rear view of the operating means for operating the rear propeller.

Figure 42 is a side section view of Figure 41.

Figure 43 is a side elevation of a flying machine known as an amphibian type for flying from water or land and alighting thereon.

Figure 44 is a front view of the amphibian machine showing other retractable chassis.

Figure 45 is a view showing a tail retractable chassis.

Figure 46 is a side view of the shock absorbing means for the tail.

Figure 47 is a view of the rudder or steering means for the aircraft; also representing a flag.

Figure 48 is a front view of an altitude controlling and indicating means.

Figure 49 is a sectional side elevation of Figure 48.

Figure 50 is a sectional rear view of Figure 48.

Figure 51 is a sectional view of the altitude operating means.

Figure 52 is a sectional view of the dial of the indicating means.

Figure 53 is a view showing the indicating means for controlling the electrical operating means for operating the rear controlling means to vary the altitude.

Figure 54 is a side view of parts of the operating means shown in Figure 53.

Figure 55 is a view of the shock absorbing means of the controlling means.

Figure 56 is a plan view of a course setting compass.

Figure 57 is a sectional side view of Figure 56.

Figure 58 is a sectional side elevation of the inductor compass.

Figure 59 is a sectional view showing the arrangement of the brushes and the operating means.

Figure 60 is a plan view of the current indicating and controlling means.

Figure 61 is a sectional view of the indicating and controlling means.

Figure 62 is a rear view of the indicating and controlling means.

Figure 63 is a plan view of the inductor compass taken at the point A A.

Figure 64 is a plan view of the electrical controlling means for steering the aircraft.

Figure 65 is another plan view of the electric controlling means operating a steam operating means for steering the craft.

Figure 66 is a side elevation of the elec-

trical operating means showing in the Figures 64 and 65.

In Figure 1, of the drawings is shown an indicating means to indicate the operation of the aircraft or other vehicles having a case 1 shaped somewhat like the letter T, made preferable of an insulating material such as bakelite, etc. provided with a flange to secure it to the instrument board. In the case 1 are two glass tubes, 2 and 3 connecting each other at right angles and provided with a nonfreezing colored liquid 4 to operate in said tubes 2 and 3. Said tubes are provided with recess 5 to receive the expansion of the liquid and to prevent same from rising along the line.

The glass tubes 2 and 3 are also provided with electrical connections 6 which are molded in the glass and caused to operate by the changing of the position of the liquid and operates an electrical operating means to operate this airplane controlling means. The tubes are set in the case 1 and held in place by a glass cap 7 which is secured in place by the screw ring 8 preventing dust water etc. from entering therein.

The front face of the case 1 is provided with a horizontal line 9 showing when the aircraft is in normal position laterally, longitudinally or when banking and inclination 10 and 10a to show what angle the air craft is flying at, or what pitch the craft is operating in.

In Figure 4, the structure is similar with the exception that the case 1 is cut away at the bottom and the tube 2 is somewhat narrowed to make space for the compass or course indicating device.

The compass or direction device 11 comprises a spherical or ball shape with shell 11 filled with a nonfreezing liquid and provided at the front with a concave magnifying glass 12 and secured in the metal ring 13 by the lock ring 14. The ring 13 is secured to the shell 11 by the bolt 15 and made liquid tight.

The compass 16 is preferably ball or spherical shaped and made of suitable material and provided with the necessary magnets and radium illuminated numerations and provided with pivots 17 at top and bottom which is supported by the jewel 18 at both ends and secured in the thumb screw 19 by the set screw 20; the ball is liquid damp from spinning by the ribs 21. The ball compass may be used in the spherical metal shell 11 without being pivoted.

In Figure 8 of the drawings is shown an engine of the reciprocating and air cooled type provided at the head or combustion chamber with a valve seat 22 and guide 23 made integral with said valve seat screwed in said head and a valve 24 substanting spherical shaped operating in said seat 22 provided with a hollow stem 25 operating in said guide 23 held in place by any suitable means such

as springs or tension devices 26 which operate in the housing 27 which is made part of the cylinder heads of the engines. The tension device 26 operates against the thrust bearing 28 which rotates and held against end movement by the member 29 which is held in place by the gear 30 which is secured to the valve stem 25 and operates the valves through the gear 31 and 32 on the hollow shaft 33 which in turn is operated by the gear 34 of the crank shaft of the engine. The lubrication of the gears and valves are forced up through the hollow shaft 33 in the gear housing 35 and filters to the valve 24.

The engine is provided with a metal air cooling jacket 36 which is slipped over the cylinder head and secured to the gear housing 35 by screws 37 or any common means; also provided with fins 38 made integral with the cylinder and provided with an air inlet member 39 secured jacket 36 to allow the air to enter and circulate around the cylinder of this engine and to cool same.

The engine can be cooled by several methods when enclosed in the cowling. One way is shown in Figure 8. The air can come in through the air inlet member 40 and forced out at the bottom of the air cooling jacket 36 or the air cooling jacket 36 can be seated at the bottom as shown by the dotted lines 41 as shown in Figures 8 and 12 and connected with the propeller 42 by the pipes connecting 43 and 43a which are connected to the air cooling jacket 36 which are in communication with the space between the jackets 36 and the cylinder heads. By the centripital force caused by the operation of the propeller the air is drawn in at the air inlet member 39 and circulated around the cylinder and drawn out by the member 43 and the pipes 43a through the propeller 42 and exhausted at the ends through the ports 44. The exhaust may be connected to the said air cooling means by the pipes 46 and which may be regulated by a valve at any practical means and which may be operated and controlled by a thermostatic means.

In Figure 14, there is another form of cooling the engine when enclosed in the cowling 39 for protecting the engine and causing less resistance while traveling through the air. The front air inlet or opening surrounds the engine shaft and the crank case 47 of the engine 48 may be flared towards the propeller as shown to throw the inrush of air toward the cylinder head 48 and pass out at the slots 49 of the cowling or there may be a piece of metal flared out or shaped like a funnel as shown in Figure 14. It will be observed by the structure which shows that by having the engine in the cowling, cut down the head resistance and enables the craft to travel faster and also as a protection of the motor from the weather conditions etc.

In Figure 9, is shown a plan view of the

engine broken away at the point A A as shown in Figure 8 which shows the parts or valve openings 50 and 51 for inlet and exhaust.

In Figure 10 is shown another form of operation of the valves 50 and 51 whereby the engine crankshaft operates about 4 to 1 of the valves, whereas in Figure 9, the valves make a complete revolution, to two of the crankshaft. It is obvious that the valve can be situated to the best advantage; also the inlet and exhaust ports.

In Figure 11 is shown a plan view of the gear housing 35 and means 35a for inspection etc.

The spark plugs 52 may be located so as to fire at the openings of the valves and be protected from the burning of the gases while the valves cover the spark plug 52 during its operation.

In Figure 13 is a front view of figures showing the cowlings 39 having the engine and the air inlets 40 to allow the number to cool the engine.

In Figure 16 of the drawings is shown a method for the manufacturing of aircraft in production whereas during hostilities these aircraft can be produced in great numbers and assembled behind the firing line in very short periods of time which are very essential whereas the view shown is a sectional view of the airplane whereby the parts which are portable and stamped from sheet metal in sections to conform with the shape or contour of the body or fuselage and which eliminates interior and exterior bracing and make when constructed a light and very strong structure to stand lateral and longitudinal strains.

The section comprising the units are so designed that they are interchangeable in building of said units.

The section when packed fit in each other take very little space.

By this method of manufacturing, it is possible to replace a damaged craft by removing the damaged sections and replace same without disassembling the entire craft.

The wing or aerofoil of the aircraft is also designed so as to be made up of units comprising sections that are stamped from sheet metal.

The units of the aircraft as shown in Figures 16, 30 and 31 comprise four sections but may be designed to have more sections as shown in Figure 19.

The sections 53 which comprises the main shell and contour of the fuselage are formed with flanges on all sides as shown during the stamping and provided with hole 55.

The inner made section 56 fits snugly in the main section 53 and comprise a rectangular section provided with holes 57 registering with the holes 55 of the section 53.

The sections 53 and 56 are secured together by hollow bolts 57 as for any practical means

as shown in Figure 35 and as shown in the fully assembled section in Figure 31.

It is obvious that this method of design and construction when the sections are completely built up when bolted together forming the units from both lateral and longitudinal webs 58 and 59 which give great rigidity and strength to the body of said aircraft.

In Figure 17 is shown a mid section of the body portion or fuselage and means for connecting the wing to the body comprising a metal lug 60 made integral with the flange section 53 and receiving a double drift bolt 61 as shown in Figure 26 or any practical means may be used.

The empennage or rear control comprising the vertical rudder 62, the horizontal rudder 63 and balance fins 64 and 65 are stamped and provided with the flanges 66 and bolted together in a similar manner as the body shown by the dotted lines 67.

The units of the aircraft as shown in Figures 16, 30 and 31 comprises four sections but may be designed to have more sections as shown in Figure 19.

The sections 53 which comprises the main shell and contour of the fuselage are formed with flanges 54 on all sides as shown during the stamping and provided with holes 55.

The inner or male sections 56 fits snugly in the main shell or section 53 and comprising a rectangular section provided with holes 57 registering with the interior and exterior bracing and make when constructed a light and very strong structure to stand lateral and longitudinal strain.

The section comprising the units are so designed that they are interchangeable in building of said units.

In Figure 13 is a front view of Figure 12 showing the cowlings 39 having the engine and the air inlets 40 to allow the members to cool the engine.

The drawing 29 shows a method of chassis built up of webs 68 stamped out of metal reinforced and bolted together as shown comprising when finished a strong stream line curved structure supporting the shock absorbing means as shown in Figures 15 and 16 of the drawings.

The tail or rear portion of the aircraft is supporting a wheel 69 and shock absorbing means 70 supported by the support 71.

In Figures 21 and 22 are shown a section of a lock rim 72 with the lug 73 punched, that may be used to lock the section together and clinching the lugs 73 as shown in Figure 20.

In Figure 24 is shown an end view of one of the sections 53 and the inner angle frame 56.

In Figure 27 is a tail support comprising a wheel caster 74 supported and operating in a curved member 75 operating in a gimbal joint 76 and held in operative position by the tension means or rubber 77.

In Figure 32 of the drawings is shown a wing or aerofoil comprising a member of the sections 78a, 78b, 78c, and 78d constituting the upper section stamped from metal and provided with flanges 79 formed on all ends and provided with holes 80 to receive the bolts to secure same together.

The sections 78e, 78f, 78g and 78h, constituting the lower or under surface of the wing or aerofoil.

The front section 78a and 78e are provided with flanges and are joined and bolted together at the entering edge E.

The upper section 78a, 78b, 78c and 78d are secured to each other and to the bottom sections 78e, 78f, 78g and 78h, by the section 79a, 79b, 79c, 79d, 79e and 79f which are stamped and provided with web sections having flanges 81 formed to give strength as shown.

The upper and lower sections as heretofore stated are provided with flanges 82 in sections 82 as in number 56 as shown in Figure 30 which fit snugly in said upper and lower section and having holes 80 registering with the holes 80a of said section to secure the bolts for securing same. The sections as heretofore mentioned when bolted together constitute a unit providing the cord of the wing from front or entering edge back to the trailing edge and connecting to the other unit until the wing is completely built up.

In Figure 33 is shown one of the sections 53 and 56 of the unit bolted up and ready to receive a metal shell 81 having the same contour or shape as the section in Figure 33 and provided with flanges 82 turned in reverse direction as the section 53 and 56.

A light bullet proof composition or filling 83 which is fireproof and secured in said shell or section 53 and 56 which is bolted up together and the shell 81 is provided with flanges 82 flaring outwardly and which is constructed from tempered metal giving the flanges 82 a springing effect and provided with holes 84 large enough so when the section or shell 81 with its filling is pushed in place the flanges 82 are sprung in place and the holes 84 register with the nuts or bolts and hold the shell 81 in place therefore makes a smooth surface and finish on the inside of said aircraft and also makes it bullet proof, fireproof and sound proof, and protects it from the weather conditions and may act as a thermoid member and also makes a smooth inside surface.

When bolting the sections and units together as shown in the drawings a plastic waterproof cement can be used between said sections and units which make a bouyant body when on the water; also makes a smooth clean surface without any bracing as the bolting is done inside.

In Figure 36 of the drawings is shown a side view of a type of hydro-airplane pro-

vided with exceptional stream lines and particularly adapted for very high speed but may be used for other purposes.

The body or fuselage 85 preferably constructed by the unit system as heretofore stated and provided with a stream line floating means 86 provided with a balancing member or float 87 extending opposite sides of the floating means substantially at the center of gravity and 86 supported by said floating means and having surfaces extending downwardly and rearwardly to be acted upon during contact with the water.

The body portion or fuselage 85 is supported from the floating means 86 by the stream line section 88, the airplane is controlled by a rear control having the vertical and horizontal control 89 and 90 substantially shaped alike and supported at the tapered tail portion of the fuselage. The airplane is supported in the air by the airplane surface or aerofoil 91 and balanced laterally by the ailerons 92 which are operated from inside as well as the rear control eliminating head resistance or friction.

The airplane can be powered with one engine operating the dual propellers 93 and 94 or may be operated by two separate engines each driving a propelling means.

The front or rear engine can be connected to the rear drive by the drive shaft 95 which is provided with a drive gear 96 which is supported by the bearings 97 and 98 which is supported by the gear case 99. The drive gear 96 of the drive shaft 95 is in mesh with and drives the gear 100 which is in mesh with and drives the propeller race gear 101 which operates on the ball bearing 102 which is supported by the ball race 103.

The propeller race gear 101 is provided with sockets 102 which hold and support the propeller blades 94 to operate said craft.

The ball race 103 is supported and secured by the member 104 which also supports the rear or tail portion of said airplane; also the rear control.

In Figure 38 is shown an airplane stream lined and substantially the same as in Figure 36 instead of having the floating means 86 for supporting the craft in the water. The airplane is provided with a chassis comprising main landing wheels 105, located substantially at the center edge of the wing 91 and provided with a tail support 106, provided with a pivotally operated wheel 107 operating in a pneumatic shock absorbing means 108. The propulsion means are the same as in Figure 36.

In Figure 39 is shown a form of floating means 109 comprising a wide float tapered at the bow and stern or tail and forming a stream line and giving automatic stability both laterally and longitudinally while on the water.

In Figure 40 as shown is an aileron of the stream line type and supported at its bearing

by a tubular shell 110 which is provided with a groove collar 111 and operated by a cable 112 or any practical means from the inside of the wing so as to eliminate any outside friction.

In Figure 43 is shown an aircraft known as an amphibian type which can rise from the land and water and alight thereon and comprises a substructure 113 and superstructure 114 having a tail portion 115 extending beyond said substructure and supporting a rear control 116 and 116a for operating and controlling the craft during its operation in the air and on the water.

The substructure 113 which tapers to the front and stern is provided with a flared out bottom portion 117 as shown in Figure 44 and extending downwardly toward the center both laterally and longitudinally toward the center and forming a step and upwardly to the rear or stern 117a of said craft.

The wing 118 is to support the craft when in the air and partly during its operation on the water; also the stream line engine nacelle 119 which supports two engines 120 at each end operating a propeller 121 and 122, one pulling and the other pushing.

The substructure 113 and superstructure 114 comprise a stream line rounded hunched back fish shaped body having the hunch at the top substantially at the center or pressure and provided with a pilot's cabin 122 in front as shown.

The substructure 113 is provided with a stream line member 123 provided with a surface extending downwardly and rearwardly and supporting a retractable chassis comprising a wheel 124 pivotally supported by the rods 125 at the front and the rods 126 and shock absorbers 127 which are pivotally mounted on the hollow shaft 128 which operates and is held by the bearings 129. The hollow shaft 128 is provided at the ends with a worm gear 130 which is in mesh with and operated by the worm 130 which is operated from the pilot's cabin by shafts and gearing or any other common means to raise and lower the chassis and means for locking same in an adjusted position.

The aircraft is provided at the rear or stern of the substructure with a pivotally mounted wheel 132 mounted in the flange 133, better shown in Figure 46 and provided with collars 134 and 135 made integral therewith one collar 134 secured to a hollow tube 136 operating a pneumatic plunger in the shock absorbing means 137 and the collar 135 operating on the shaft 138 which extends to the bottom of and secured to a metal strap 139 to the skid 140; also supported at the top by the bracket 141 which is secured to the structure 113.

In Figure 45 is shown another form of retractive chassis.

The structure shown is similar to the one

shown in Figure 46 with the exception with the method for raising the wheels 132. The shock absorbing means or structure referred to is supported from the worm rod 142 by the brackets 141 which operates up and down by the operation of the worm rod 142 which is operated by the gear 143 which is secured to said worm rod and in mesh with and operated by the gear 144 on the shaft 145, which is operated from inside of said aircraft. The worm rods are supported from the hull by the bracket 146.

In Figure 47 is shown the vertical rudder or control 116 pivotally mounted on the vertical fin 116B, which is rigid and secured to the horizontal fin 116A and which is painted to represent a flag which may be of a country as shown.

In Figure 48 of the drawings as shown is the altitude controlling indicator comprising a flat round case 147 made from bakelite or any suited material provided with flanges 148 to secure it to the instrument board.

The indicator is provided with the ordinary altitude indicating mechanism provided a stern 149 with an insulated member 150 with an indicating board 151 received therein.

The indicator is provided with a fixed insulated dial 152 mounted therein and held in position by the rings 153 and 154 and the glass cap 155 all of which are kept in place by the screw ring 156. The dial 152 is provided with two movable dial rings 157 and 158 provided with tooth segments 159 and 160. The tooth segment 159 is in mesh with and operated by the gears 160 which are operated and in mesh with the worms 161 and operated by the thumb screw 162 for setting the ring 157 for the altitude designed.

The ring 158 is provided with tooth segments which is in mesh with and operated by the gear 163 which is in mesh and operated by the worms 164 which is operated by the thumb screw 165 to operate the ring 158 to set the altitude for the altitude operating means to start or stop operating as a controlling indicating means for operating the craft.

The dial 152 is provided with three screws 166, 167 and 168 and provided with springs 169, 170 and 171. The spring 169 makes contact with the screw 166 and the metal rim 172 which is pressed in the ring 152 and having a contact point 173 extending through to the face of the rim 157 as shown in Figure 48. The spring 170 is in contact with the metal ring 174 having a contact point 175 extending through to the face of the rim as shown in Figure 48.

The screw 168 is in contact with the spring 171 which is in contact with the metal rim 176 of the ring 157 and which is in contact with another spring 177 which is in contact with another metal rim 158 and which is provided with a contact point 178 extending

through to the point better shown in Figure 48.

In Figure 53 is a diagram of the wing and electric controlling and operating means.

5 The operation of the altitude controlling indicating means is as follows:

Assume the altitude to fly at, be 10,000 feet. The altitude indicated may be operated electrically by first turning the current on by
10 operating the switch 179 and then setting the altitude desired by operating the thumb screw 164 toward the way the arrow is pointing thereby turning the worm 165 which is in mesh with the gear 163a which is in mesh
15 with the tooth segment 159 thereby operating the rim 157 until the diamond shaped marker D which is radium illuminated, registers 10,000 feet and then by turning the thumb screw 166, the way the arrow is pointing,
20 thereby turning the worm 165 which is in mesh with the gear 165a which is in mesh with and operates the rim 158 until the contact points 178 register in line with the numeration indicating the number of thousands of
25 feet of altitude that the altitude controlling means may start or stop operating same.

By turning on the switch 79 the current from the battery B enters the electric feed ring 180 by the worm 181 which charges the
30 indicating hand 151.

As the indicating heights as 173 and 179 are set, as the craft rises from the land or water the charged indicating hand moves to the left and makes contact with the point
35 179, causing the current to flow from the point 179 through the wires 182 to the solenoid 183 which is in contact as shown causing a circuit in Figure 53 and throwing the switch 182 and making contact with the point
40 184 thus causing a current to flow from the battery to the switch 185 and during the operation the current to the solenoid 183 is automatically cut off by the automatic tripper 186 which is secured to the solenoid shaft,
45 and brakes the current at 187.

As the craft is gaining altitude until it reaches the 10,000 feet set, the current is automatically cut off and the switch 185 is set thereby causing the current to flow to the
50 solenoid 186 causing a circuit and pulling in the shock absorbing means 187 which is in contact with the rear control air surface 188 and causing it to lift upward to climb or continue its altitude.

When the craft reaches the 10,000 feet altitude or the point set the current is automatically cut off and the rear control automatically is brought to its normal position. The indicating hand 150 which is provided with
60 lug 189 make contact with the point 175 thereby causing a circuit to flow through wires 190 to the solenoid 191 thereby energizing the solenoid 191 and causing solenoid to operate and switch the current to the solenoid 192 to pull the rear control downward-
65

ly to cause the craft to lower its altitude and if it lowers till the point 173 is in contact with the lug 193 of the indicating line 151. The air circuit is formed with the solenoid 194 which being energized and pulls the
70 switch in till it makes a current flow through the solenoid 194 and thereby causes the current to run through the solenoid 192 and causes the operation of the rear control to move upward and causing the aircraft to
75 gain altitude and etc.; until the craft reaches the point 175 and the current flows through the wire 195 to the solenoid 191 therefore energizing the solenoid 186 thereby pulling down the rear control and causing the air-
80 craft to lower its altitude.

When the craft is brought down and when the hand passes or makes contact with the point 179, this electric current is automatically cut off.
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In Figure 56 as shown in the drawings constitutes a direction or course setting device particularly adapted for aircraft which consists of a flat round case provided with a dial
90 196 with enumerations to indicate the course or direction the craft is to travel.

The dial is provided at its inside edge with tooth segments 197 operated by a worm 198 operating in the housing 199 and provided with a gear 200 in mesh with the gear
95 201 which is secured to a shaft and which is in mesh and operated by 202 and operated by the handle 203 to adjust the dial to a desired position.

The shaft 204 which is secured and turns the dial as shown and provided with a gear 205 with one end in gear with another gear 206 to operate the shaft 207 to operate the brushes 208 in the inductor compass.
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It is obvious that when the dial of the direction or course setting device is operated, the shaft and brushes are also operated.
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In Figure 58 is shown a broken section view of the inductor compass.

In Figure 63 is a sectional plan view of the inductor compass taken at the point A A.
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In Figure 59 is shown the location and the means for operating the brushes.

In Figure 60 is shown the course indicating, controlling means which is electrically operated by the operation of the inductor compass.
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When the course is set by the course setting device, the brushes are also set and takes the current off or if generated when the aircraft turns to the left the revolving coils of the generator would cut the magnetic line more or less and the indicating needle would swing to the left because the magnetic lines are cut to send the current through the coils of the generator from front to back. If the craft goes to the right, the magnetic lines would be cut in such a way to send the current from the back to the front and shows that the craft turns to the right as the in-
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indicator hand would turn to the right and the automatic electrical controlling device automatically brings the craft back to its normal or proper course.

I claim:

1. An airplane fuselage metal body unit comprising a plurality of preformed sections having flanges on all edges, and means for uniting the sections at the flanges to form a continuous unit having continuous flanges at its edges.

2. An airplane fuselage metal body unit comprising a plurality of preformed sections having flanges on all edges, flanged reinforcing members shaped to fit snugly into said sections with the flanges of each overlying, and means for uniting the sections and members together.

3. An airplane fuselage metal body unit comprising a plurality of preformed sections having flanges on all edges, flanged reinforcing members shaped to fit within the flanged edges of the sections, hollow bolts for uniting the sections and members together to form compound elements, and means to unite said elements into units.

4. A metal section member for an airplane body unit comprising a preformed section having flanges, a flanged reinforcing member fitting within said section, means for uniting said section and member at the flanges, and a cover plate adapted to be secured to said united section and member so as to lie flush flange edges.

5. A metal section member for an airplane body unit comprising a preformed section having flanges, a flanged reinforcing member fitting within said section, means for uniting said section and member at the flanges, and a cover plate having apertured flanges telescoped with the flanges of said section and member so that the apertures engage said means to hold the cover in place.

6. A metal section member for an airplane body unit comprising a preformed section having flanges, a flanged reinforcing member fitting within said section, means for uniting said section and member at the flanges, a cover plate having apertured flanges telescoped with the flanges of said section and member so that the apertures engage said means to hold the cover in place, and a filling composition between said sections and cover.

7. In an airplane fuselage, a metal body comprising a plurality of preformed units secured end to end, each unit comprising a plurality of flanged sections united together, a cover plate secured to the inner surface of each section to give the interior of the unit a smooth surface, and a filling material between the wall and cover plate of each section.

8. In an airplane fuselage, a metal body comprising a plurality of fabricated units

forming a closed compartment when united together, several of the intermediate units opening upwardly, and a fabricated metal wing, comprising a plurality of united sections, secured to said body so as to close the open units of the body.

Signed at Tompkinsville, in the county of Richmond and State of New York, this 8th day of October, A. D. 1928.

ALBERT S. JANIN. 75

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