

Dec. 2, 1941.

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2,264,675

HYDRAULIC ACTUATING MEANS

Original Filed May 7, 1936

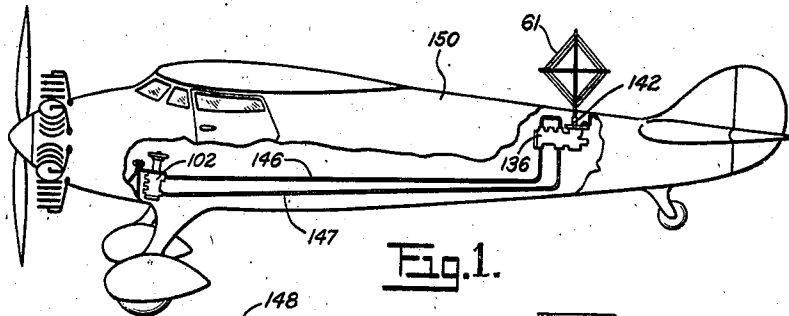


Fig. 1.

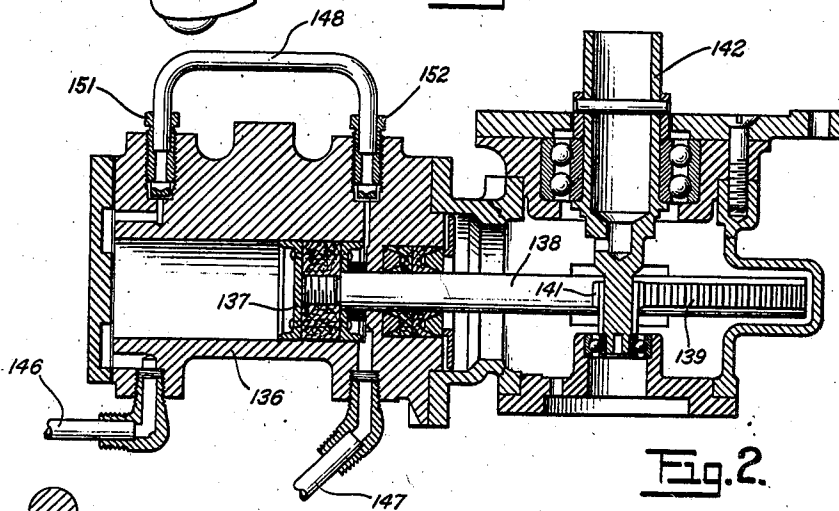


Fig. 2.

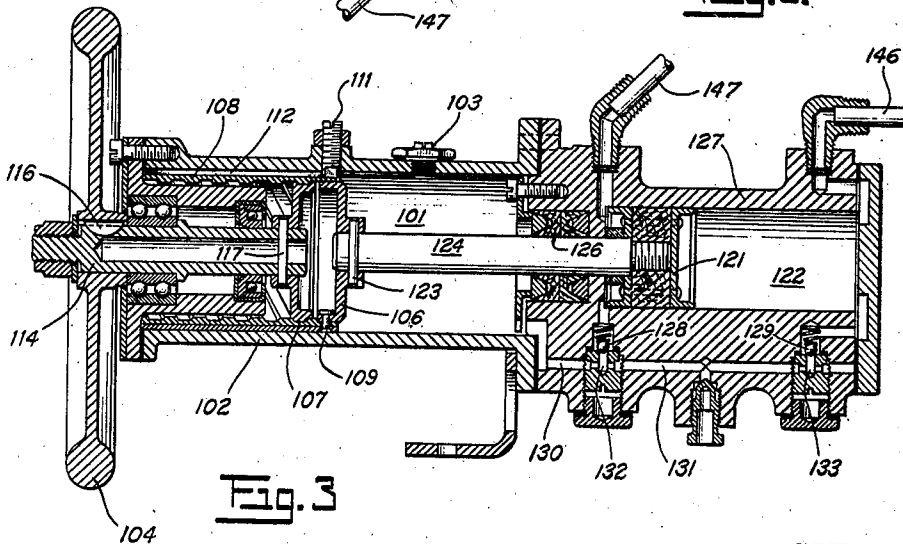


Fig. 3.

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2,264,675

HYDRAULIC ACTUATING MEANS

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Original application May 7, 1936, Serial No.
78,481, now Patent No. 2,205,046, dated June 18,
1940. Divided and this application January 2,
1940, Serial No. 312,167

2 Claims. (Cl. 60—54.6)

This invention relates to aircraft radio, and particularly to means for controlling the position of the radio antenna during flight of the craft.

On an aircraft carrying the "rotatable loop" type of antenna, for reception of directional signals from airports in or at an angle to its path of flight, such a loop type of antenna, being exposed to the air stream, presents considerable difficulty to the operator when it is desired to turn it about its axis in order to "point" it with respect to a particular signal sending station. An object of the present invention is to alleviate such difficulty by the use of power turning means, controllable by the operator with the expenditure of a minimum of effort.

Another object is to provide instantly responsive turning means, adapted for precise control of the setting of the antenna, and free from the errors and inaccuracies to which the setting of a manually turned antenna is subject.

These and other objects of the invention will become apparent from inspection of the following specification when read with reference to the accompanying drawing wherein is illustrated the preferred embodiment of the invention. It is to be expressly understood, however, that the drawing is for the purpose of illustration only, and is not designed as a definition of the limits of the invention, reference being had to the appended claims for this purpose.

In the drawing:

Fig. 1 is a diagrammatic view of an aircraft equipped with the antenna control of the present invention; and

Figs. 2 and 3 are sectional views of the receiving and transmitting units, respectively.

In the drawing reference character 61 designates a radio antenna extending vertically above the fuselage of a craft 150 in which are two hydraulic units 102 and 136, the former having a chamber 101 serving as the reservoir for the supply of operating fluid, the said supply being replenishable by way of the opening normally covered by plug 103. The volume of this chamber 101 varies in response to turning of the actuating wheel 104 corresponding to wheel 30 of Fig. 2 of my Patent No. 2,205,046, granted on application No. 78,481, filed May 7, 1936, of which application the present one is a division, the rotation of the wheel 104 being converted into a rectilinear movement of piston 106 by the action of screw 107 upon the threads of sleeve 108, the latter being riveted to piston 106 as indicated at 109. A set-screw 111 extends

through the cylindrical wall of the unit 102 and has a flat-sided end portion engaging a key-way or spline 112 in the sleeve 108, to hold the latter against rotation as it is screwed back and forth by the rotation of handwheel 104 and its drivably connected screw 107, said parts being secured to connecting shaft 114 by suitable means 116 and 117, respectively.

Rectilinear movement of piston 106 is communicated to piston 121 slidable in a second chamber 122 of unit 102, the connecting links including pin 123 and piston rod 124, the latter being movable through a fluid-tight stuffing box 126 housed in the right-hand section 127 of unit 102. Also in section 127 of unit 102 are valves 128 and 129 controlling flow of oil into the chambers on opposite sides of the piston 121, there being a longitudinally extending passage 130, 131 connecting the reservoir 101 with the valve ports 132 and 133, respectively. These passages 130 and 131, and the ports 132 and 133 of valves 128 and 129, respectively, constitute the means by which fluid flows from reservoir 101 to cylinder 127 in the event of a pressure drop for any reason, such as leakage, contraction of the fluid in response to temperature change, or other cause.

Cylinder 136 contains a piston 137 and piston rod 138 having a rack portion 139 meshing with pinion 141 formed on the lower end of the antenna receiving socketed shaft 142. It will be seen from inspection of the drawing that pistons 137 and 121 are of equal diameters, as are also their respective rods 138 and 124; also that piston 137 divides cylinder 136 into two chambers 135 connecting with the two chambers of cylinder 127, by way of conduits 146 and 147, respectively, so that movement of piston 121 to the left causes a flow of oil through conduit 147 into the right-hand chamber of cylinder 136, thereby forcing piston 137 a corresponding distance to the left, and resulting in a corresponding turning of antenna shaft 142. Valves 151 and 152 of conduit 148 serve as a means for "bleeding" air or surplus liquid from the system, should any air become entrained with the operating liquid or should there be an expansion of the volume of liquid due to temperature rise or other cause. No claim of novelty is made for these normally closed valves 151 and 152, or for conduit 148; and as these do not constitute a necessary part of the unit 136, they may be omitted if not desired.

This application is a division of application No. 78,481 filed May 7, 1936, now Patent No. 2,205,046 above referred to.

What I claim is:

1. In an aircraft of the type carrying a rotating loop antenna, a piston reciprocable to cause rotation of said antenna, a cylinder enclosing said piston, and manually operable means for causing movement of said piston, said manually operable means including an internally threaded cylinder reciprocable with said piston, a manually rotatable element threadedly engaged with said threaded cylinder to cause rectilinear movement thereof in response to rotation of said manually rotatable element, a housing for said internally threaded cylindrical element, and means for establishing flow between said housing and said first-named cylinder, to replenish loss of fluid in said second cylinder. 15
2. In an aircraft of the type carrying a rotating loop antenna, a piston reciprocable to cause rotation of said antenna, and manually operable means for causing movement of said piston, said manually operable means including a cylinder reciprocable with said piston, a manually rotatable element operatively engaged with said cylinder to cause rectilinear movement thereof in response to rotation of said manually rotatable element, and an oil reservoir disposed in the path of movement of said cylinder, whereby the volume thereof is varied in accordance with the movement of said cylinder.

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