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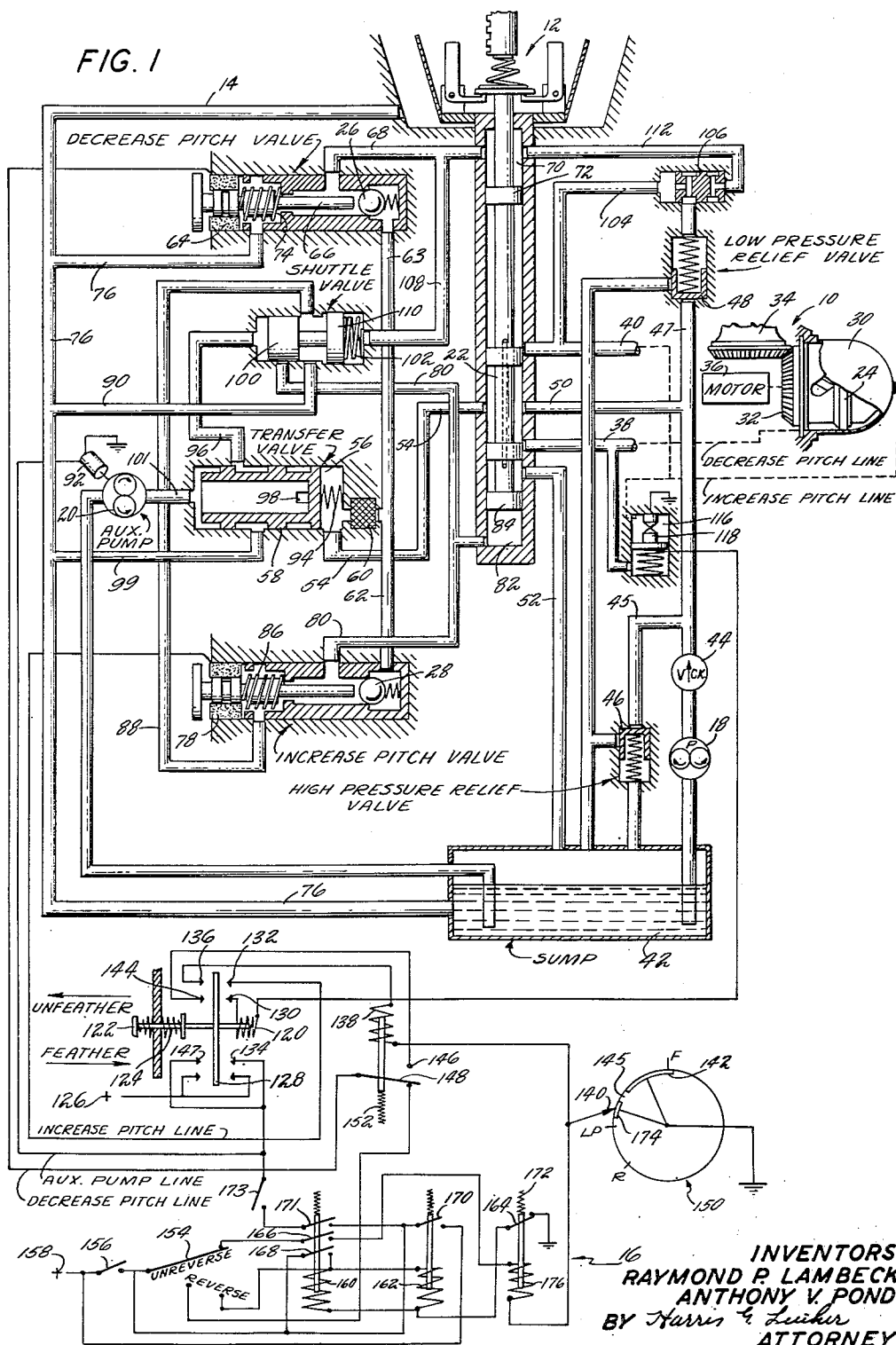
R. P. LAMBECK ET AL

2,809,702

FEATHERING OVERRIDE FOR VARIABLE PITCH PROPELLER

Filed April 14, 1954

2 Sheets-Sheet 1



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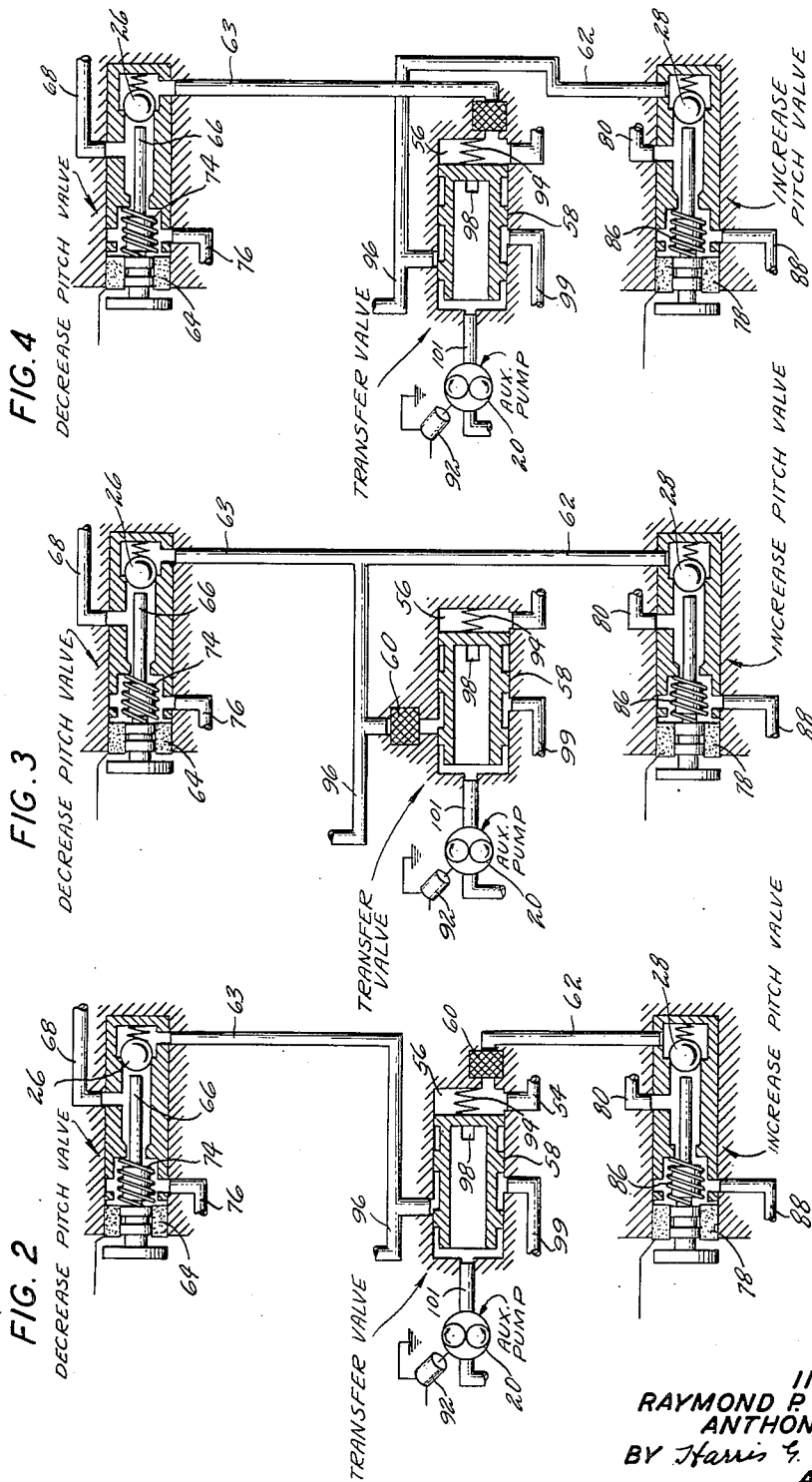
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FEATHERING OVERRIDE FOR VARIABLE PITCH PROPELLER

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18 Claims. (Cl. 170—160.2)

This invention relates to propeller control mechanism and particularly to mechanism which will move the propeller into feathered position, in spite of malfunctioning controls.

An object of this invention is a propeller control which will feather the propeller upon actuation of the feathering control and the auxiliary pump even if the reversing control is calling for reverse pitch.

A further object of this invention is a propeller control by which the propeller may be feathered by auxiliary pressure alone with the feathering valve closed.

A still further object is a propeller which can be feathered by auxiliary pressure alone and which cannot be reversed by inadvertent actuation of the decrease pitch control.

These and additional objects and advantages will be apparent from the following specification and the attached drawings in which:

Fig. 1 is a schematic diagram showing the propeller and its control mechanism including the wiring diagram for the several controls.

Fig. 2 is a schematic view showing a portion of the structure of Fig. 1 but showing a modified form.

Fig. 3 is a schematic view of a portion of Fig. 1 showing a still further modified form and

Fig. 4 is a schematic view of a portion of Fig. 1 showing another modified form.

One of the problems which has plagued airplane operators has been the possibility of malfunctioning of the propeller controls or inadvertent operation of some of the controls causing an operation called inadvertent reversing. If the reversing controls should malfunction or if they should be inadvertently actuated the propeller pitch changing motor might be actuated to place the propeller in a reverse pitch position at a time when the operator would want the propeller in some other position. With some controls, once the propeller has started toward or reached the reverse pitch position due to the malfunctioning or inadvertent operation of the reversing controls the reversing controls cannot be disabled and the propeller taken out of the reverse pitch position by actuation of the pitch increasing control alone. This is particularly true where the inadvertent reversing is due to malfunctioning of the reversing controls.

The invention described herein relates to mechanism by which the propeller may be taken out of the reverse pitch position and even placed in the feathered position although the reverse pitch controls may still be trying to hold the propeller in a reverse pitch. The invention has been illustrated as an improvement on two general types of propellers, one of which is shown in Patent No. 2,653,668 to which reference may be made for additional propeller details. In this patent structure, while actuation of the feathering control and, if desired, the auxiliary pump also, will be sufficient to take the propeller out of reverse pitch even if the reversing control is stuck open, if both the feathering control and reversing control should not be operable, the propeller cannot be feathered on the auxiliary

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pump alone. Applicants have improved the controls of the device shown in Patent No. 2,653,668 so that in the event the feathering control will not open the propeller may be feathered with the auxiliary pump alone with the reverse control closed while retaining the feature of overriding the reversing control with the feathering control.

The other type of propeller with which applicants' controls may be used is the type shown in Patent No. 2,643,077 and Patent No. 2,663,373. In the propeller of these patents, if the decrease pitch valve 156 is held open for any reason, the governor pilot valve will be forced downward and the propeller held in reverse pitch even if the feathering controls are actuated to endeavor to take the propeller out of reverse pitch. Applicants have improved on the structure shown in these two last mentioned patents by providing means for overriding the effect of the decrease pitch valve so as to permit feathering with the decrease pitch valve open while retaining the feature of feathering on the high pressure pump alone if the decrease pitch valve is closed.

In the improved control mechanism which is shown schematically in Fig. 1 the propeller is indicated generally at 10. The governor is indicated generally at 12 and hydraulic control mechanism is indicated generally at 14 and the electrical control mechanism is indicated generally at 16. In general, hydraulic fluid such as oil is supplied from a source of pressure such as pump 18 or pump 20 to a governor controlled valve 22 which will direct the pressure fluid to one side or the other of the pitch changing motor 24 of the propeller 10. A portion of the oil under pressure may be led to a decrease pitch valve 26 from where it may be directed to one side of the valve 22 to force it downwardly. A portion of the pressure fluid is also led to increase pitch valve 28 from where it may be directed to the under side of the valve 22 to force it upwardly. The decrease pitch valve and the increase pitch valve are electrically controlled and the auxiliary pump is also electrically controlled by the feather, unfeather, reverse and unreverse electrical controls 16 which will be described hereinafter. Actuation of the decrease pitch valve will cause the valve 22 to direct pressure fluid to the pitch changing motor 24 to decrease propeller pitch even to the point of reversing the propeller. Actuation of the increase pitch valve will cause valve 22 to direct fluid to the pitch changing motor 24 to increase the propeller pitch even to the point of feathering the propeller. The increase pitch mechanism is more powerful than the decrease pitch mechanism and will dominate to increase the propeller pitch in the event they are operated simultaneously. The auxiliary pump is connected in a manner which will be described hereinafter so as to by-pass or parallel the increase pitch valve and cause an increase in pitch without actuation of either the increase or decrease pitch valve.

Coming now to the details of the construction and operation of the controls the propeller, which is described in more detail in the patents above referred to and to which reference may be made for further propeller details, comprises a dome or cylinder 30 of the pitch changing motor 24 which may be a reciprocable piston operating through cams in a well-known manner to rotate gear 32 geared to propeller blade 34 and thus change the pitch of propeller blade 34. Although only one blade has been indicated it will be understood that as many blades as desired are spaced around the central gear 32. The propeller may be driven in a well-known manner by an engine 36. Hydraulic fluid is directed to one side of the propeller by a line 38 to move the propeller in a decrease pitch direction and fluid is led to the other side of the propeller by line 40 to move the propeller in an increase pitch direction.

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Pressure fluid is taken from a sump 42 by a governor or engine driven pump 18 and after passing through a check valve 44 is directed through line 45 to a high pressure relief valve 46, through line 47 to a low pressure relief valve 48, and through line 50 to a governor control valve 22. The governor which is indicated generally at 12 is the well-known type of flyball governor which may be driven from the motor 36 in a well-known manner, not disclosed for simplicity of disclosure, and controls the position of valve 22 directing fluid from line 50, connected with the output of pump 18, to either lines 38 or 40 to decrease or increase the propeller pitch to vary the load on the motor and thus maintain the motor speed substantially constant. A line 52 connects valve 22 with drain so that when one of the lines 38, 40 is connected with pressure line 50 the other of the lines 38, 40 is connected to drain line 52. Line 50 is permanently connected with line 54 leading from valve 22 to transfer valve housing 56. Pump 18 is connected through lines 50, 54 and strainer 60 with line 63 which connects to the intake side of decrease pitch valve 26 and with line 62 which connects with intake side of increase pitch valve 28. Decrease pitch valve 26 is normally closed as shown in Figure 1 but may be opened by energization of a solenoid 64 which will force rod 66 into contact with valve 26 and force valve 26 off of its seat. Line 63 will then be connected through valve 26 with line 68 leading to a chamber 70 above a land 72 forming a part of valve 22. Connecting pump 18 with chamber 70 will force valve 22 downward against any opposition of the governor 12 and connect line 50 with decrease pitch line 38 and pitch changing motor 24, and line 40 with drain line 52 through the hollow stem of valve 22, to urge the propeller towards a reduced pitch position. The pressure applied in chamber 70 is also transmitted through line 112 to position shuttle valve 106 to the left and is then further transmitted to the region behind low pressure relief valve 106 so as to prevent that valve from opening. Energization of solenoid 64 in addition to forcing valve 26 off of its seat will close valve 74 to block line 68 and chamber 70 from the drain line 76 to which they are normally connected.

Increase pitch valve 28 is normally closed but may be opened by energization of solenoid 78 in the manner described for the decrease pitch valve to connect pump 18 through line 62 with line 80 leading to chamber 82 under the land 84 forming a part of valve 22. Energization of solenoid 78 will close valve 86 thus blocking chamber 82 and line 80 from drain lines 88, 90 and 76 to which it is normally connected. Application of pressure from the pump 18 to the chamber 82 will force valve 22 upwardly thus connecting line 50 and pump 18 with increase pitch line 40 to increase the propeller pitch. Line 38 is simultaneously connected with drain line 52.

It will be noted that the area of valve 22 exposed to pressure in chamber 82 is much greater than the effective area exposed to chamber 70 so that equal pressure applied in the two chambers would still leave sufficient pressure to force valve 22 upwardly against any opposition of either the governor 12 or the pressure fluid in chamber 70.

Auxiliary pump 20 which is driven by an electric motor 92 draws fluid from the sump 42 and delivers it to transfer valve 58 which is normally spring pressed to the left as viewed in Fig. 1 by a spring 94. The auxiliary pump which will normally deliver fluid at a higher pressure than the pump 18, as is explained in more detail in the above-mentioned patents, when supplying fluid to valve 58 will force it to the right to first disconnect valve outlet line 96 from drain lines 99, 76 and then connect auxiliary pump pressure line 101 with valve outlet line 96 leading to shuttle valve 100, and then through opening 98 in valve 58 connect pressure line 101 with line 54 leading to the governor valve and through strainer 60 with lines 62 and 63.

Pressure in line 96 will force shuttle valve 100 to the right from the position shown in Fig. 1 so as to block

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drain line 88 from the increase pitch valve and connect line 96 with line 80 connecting with governor valve chamber 82 and the outlet of increase pitch valve 28. Shuttle valve 100 is normally urged to the left by a spring 102. Application of auxiliary pump pressure to line 80 and chamber 82 will raise pilot valve 22, thus connecting line 54 with increase pitch line 40. Pressure from auxiliary pump 20 passing through orifice 98 to line 54 will thus serve to move pitch changing motor 24 and the blades 34 towards increase pitch position. Pressure in increase pitch line 40 is applied through line 104 and shuttle valve 106 to the back side of low pressure relief valve 48, thus practically disabling that relief valve and bringing the pressure developed by pump 18 up toward the pressure of the auxiliary pump which is limited by the high pressure relief valve 46. Thus, if neither the increase pitch valve 28 nor the decrease pitch valve 26 is open, the propeller may be feathered on the auxiliary pump alone. When transfer valve 58 is moved to the right by pressure from the auxiliary pump 20 so that it will discharge fluid through port 98 to lines 54 and 62, both sides of the transfer valve are exposed to pressure from the same source. Spring 94 urges valve 58 to the left to disconnect pressure line 101 from delivery line 54 so that the pressure delivered by pump 20 to line 101 must always exceed the pressure delivered by the pump 18 or the pressure delivered by the auxiliary pump from passage 98, to line 54, by an amount equal to or slightly in excess of the pressure required to compress spring 94. In other words, there will always be a pressure drop from the left hand side of valve 58 as viewed in Fig. 1 through port 98 to line 54.

If the decrease pitch valve is open, auxiliary pressure passing through passage 98 in valve 58 to line 63 will pass through the decrease pitch valve 26 into line 68 and the chamber 70 back of plunger 72 but because there is already auxiliary pump pressure in chamber 82, the pressure in chamber 70 will not be able to move pilot valve 22. However, pressure in line 68 will be applied through line 108 to plunger 110 of the valve 100 and force the valve to the left because the area of plunger 110 is greater than the area of valve part 100 and because of the assistance of spring 102. Movement of the valve 100 to the left will block line 80 and prevent the introduction of auxiliary pressure to chamber 82 under the valve 22 and it will also open line 88, as long as increase pitch valve 28 is closed, and line 80, to drains 90 and 76. Valve 22 will thus be forced downward as chamber 82 drains and the propeller will be forced into a decreased or reversed pitch position by the auxiliary pump 20, and pump 18, pressure. However, actuation of the increase pitch valve will override the effect of the decrease pitch valve by closing valve 86 and blocking the connection between line 80 and drain line 88 and connecting line 62, containing auxiliary pump pressure, with line 80 and again applying pressure to chamber 82, forcing the pilot valve 22 upwardly to again increase the propeller pitch. Hence, in the event of inadvertent actuation of the decrease pitch valve or a malfunctioning of that valve, its action can be overcome by the increase pitch valve and the propeller feathered. Furthermore, in the event that neither valve is operative, the propeller can still be feathered by the auxiliary pump alone.

When pressure is applied to chamber 70, it is led through line 112 to shuttle valve 106 and thence to the back side of low pressure relief valve 48 to thus maintain a higher pressure for the pumps, limited only by the high pressure relief valve 46.

The switches for actuating the decrease pitch valve, the increase pitch valve and the auxiliary pump may be individual, manually actuated switches or may be any desired combination of manual or automatically actuated switches. For purposes of explaining this invention, manual and automatically actuated switches similar to those shown in Patent 2,653,668 have been illustrated except that the auxiliary pump is connected for automatic operation with

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the reverse-unreverse switch. In these switches a source of electricity 126 is led to a terminal which may be contacted by switch bar 128 by actuation of the feather-unfeather switch 122 in either direction. Pushing the switch 122 to the right as viewed in Fig. 1 to feather the propeller will connect electrical source 126 through contact 130 and holding solenoid 120 with cutout switch 116 to hold the switch in feathering position as long as the cutout switch is closed. Source 126 will also be connected through contact 132 with increase pitch valve solenoid 78 to energize the same and open valve 28 and lift governor valve 22. Source 126 will also be connected through contact 134 with auxiliary pump motor 92 to energize the pump 20 and supply auxiliary fluid to line 40 and motor 24 to increase the propeller pitch. Increase pitch line 40 is connected to the chamber 116 of a cutout switch 118 to open the switch whenever the pressure in line 40 exceeds a predetermined amount above the pressure in the opposite line as when the propeller reaches feathered position. Opening of cutout switch 118 will de-energize solenoid 120 of the feather-unfeather switch 122 to thus permit spring 124 to bring that switch back into neutral position and de-energize motor 92 of the auxiliary pump when the propeller has reached a feathered position.

Actuation of switch 122 to the left as viewed in Fig. 1 to unfeather the propeller will connect source 126 through contact 136 with pull-in and holding solenoid 138 which is connected to ground during the unfeathering operation through contact 140 and conducting segment 142 of a propeller blade switch. Source 126 is also connected through contact 147 with auxiliary pump motor 92. Source 126 is also connected through contact 144 with a switch arm contact 146. Decrease pitch valve solenoid 64 is connected with switch arm 148. Switch arm 148 is brought into conducting relation with terminal 146 by energization of solenoid 138 to energize the decrease pitch valve solenoid 64 to which arm 148 is connected and the auxiliary pump is energized through contact 147 to supply high pressure fluid from the auxiliary pump to port 98, line 63, decrease pitch valve 26 and line 68 to chamber 70 to force the valve 22 down and further through line 112 and valve 106 to hold valve 48 closed and also to supply high pressure fluid through line 54 to the governor valve 22 and when the valve is forced down, through decrease pitch line 38 to reduce the propeller pitch and take the propeller out of feathered position. As the propeller moves out of feathered position, the blade switch 150 moves under contact 140 from the feathered position indicated at F toward the low pitch position indicated at LP. When the blade switch, grounded, conducting, segment 142 moves out from under the contact 140 so that contact 140 will rest on insulating segment 145, the ground of solenoid 138 is broken and switch arm 148 is returned to the position shown in Fig. 1 by spring 152, thus deenergizing both the decrease pitch valve and the auxiliary pump motor and returning the propeller to governor control.

For reversing and unreversing, a switch arm 154 is connected through an arming switch 156 to a source of electricity 158. Moving the arm 154 to the reverse pitch position will connect the source 158 with the decrease pitch valve solenoid 64 and to relay coils 160 and 162 which are connected to ground through switch arm 164. Energizing coils 160 and 162 will pull in the switch arms 166, 168 and 170. Closing switch 168 will, in effect, short circuit switch 154 so as to maintain coils 160 and 162 energized independent of the position of switch 154. Closing switch 170 will, in effect, short circuit switch 156 so as to maintain coils 160 and 162 energized independent of the position of switch 156. Closing of switch 166 has no immediate effect but prepares the circuit for unreversing. Switch 164 is normally held closed by spring 172. Energizing the decrease pitch valve solenoid will produce the same hydraulic action as in unfeathering except that the auxiliary motor is not normally ener-

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gized for reversing as the propeller is being continuously engine driven and the main pump will supply all of the fluid necessary for pitch changing. However if desired an additional switch arm 171 may be added to those actuated by solenoid 160 to energize the auxiliary motor 92 when solenoid 160 is energized thus making auxiliary fluid available for reversing and unreversing. Also if desired a switch 173 may be utilized to positively disable the auxiliary motor in the reversing and unreversing operation. Switches 168 and 170 remain in closed position as long as the switch 154 is held in reverse pitch position and the propeller is thus held in reverse pitch position determined by the usual pitch limiting stops, not shown. To unreverse the propeller, switch 154 is brought to its unreversed position which will deenergize the decrease pitch valve. If desired contacts can be provided for switch 154 to connect the increase pitch valve through a switch actuated by solenoid 160 with electrical source 158 but in the modification shown the auxiliary pump alone is relied on for unreversing movement. Arming switch 156 may, if desired, be opened but will have no effect as it is short circuited by still-closed switch 170. Deenergization of the decrease pitch valve will, with the auxiliary pump running, cause the propeller pitch to increase and will turn blade switch 150 under contact 140 from the reverse pitch position indicated by R toward and past the low pitch position indicated by LP. When the blade reaches a position above the low pitch position, contact 140 will reach grounded conducting segment 174, thus completing the circuit from source 158 through switch 156 or 170, switch 154 and switch 166 to coil 176 and ground through contact 140. Energization of coil 176 will break the contact of switch 164, thus de-energizing holding coils 160 and 162 to thus de-energize the auxiliary pump and return the propeller to governor control.

In the event that the decrease pitch valve should remain open for any reason, movement of switch 154 to the unreversed position will not start the propeller toward feathered position. Complete feathering of the propeller can be obtained by pushing the feather switch 122 which will open the increase pitch valve 28 and continue the operation of the auxiliary pump.

In the event that neither the decrease pitch or increase pitch valve will operate, movement of the feather button to feather position will start the auxiliary pump which, as explained above, will direct fluid to chamber 82 under the valve 22 and direct auxiliary pressure to the increase pitch side of the pitch changing motor to thus feather the propeller on the auxiliary pump alone.

In the device above described it will be apparent that we have provided mechanism by which the propeller may be feathered by pushing the feathering button which will normally energize both the increase pitch solenoid and the auxiliary pump. A margin of safety is provided in that the propeller will be feathered even if the increase pitch solenoid is not working. The propeller may also be feathered if the decrease pitch solenoid is stuck open, or if through some malfunctioning it is inadvertently opened.

The propeller pitch control mechanism has been described above with both the decrease pitch valve and the increase pitch valve always connected to the engine driven pump 18. In some installations, it may be desirable to connect the decrease pitch valve with the line 96 leading from the auxiliary pump transfer valve and disconnect it from the strainer 60 and line 54 so that the decrease pitch valve can receive pressure only from the auxiliary pump. Fig. 2 shows a portion of Fig. 1 modified to show the above mentioned changes in connections. Energization of the decrease pitch valve by inadvertent actuation of the reversing switch with either switch 156 or 173 open or by a short circuit would have no effect even if the decrease pitch valve were to open for no pressure would be supplied to the decrease pitch

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valve unless and until the auxiliary pump was operated. It would, of course, be necessary to supply an additional switch such as switch 171 to control the auxiliary pump motor and this switch would have to be closed in order to supply fluid to the decrease pitch valve during reverse operation. As explained above, auxiliary fluid supplied to both the open decrease pitch valve and the transfer valve will put pressure on both sides of shuttle valve 100, 110 and allow the shuttle valve 100 to remain in the position shown in Fig. 1, thus applying fluid to chamber 70 and not chamber 82, forcing the governor valve 22 down, the chamber 82 being connected to drain through lines 80, 88, 90 and 76, and thus decreasing the propeller pitch. The functions of the increase pitch valve, including the feature of overriding the decrease pitch valve and also the ability to feather on the auxiliary pump alone, would be retained.

Under some conditions, it may be desirable to connect both increase and decrease pilot valve to line 96 so that inadvertent actuation (malfunctioning) of either the decrease pitch valve or the increase pitch valve would have no effect unless the auxiliary pump was also operated. Fig. 3 shows a portion of Fig. 1 including the transfer valve, the decrease pitch valve and the increase pitch valve modified to show the connections changed so that both the increase pitch valve and the decrease pitch valve are connected with the output line 96 from the transfer valve and are not connected to the engine oil pump 18. With this type of connection, the propeller could not be started towards feathered position and could not be reversed under governor or engine pump pressure alone because neither valve would receive any pressure until the auxiliary pump was actuated. This type of connection would retain the feature of overriding the reverse valve by actuation of the feathering valve while the auxiliary pump was running and would also retain the feature of feathering on the auxiliary pump alone if neither the increase pitch nor decrease pitch valves were open. The feathering and unfeathering switch and connections and the reverse-unreverse switch and connections would operate in the manner explained above as the auxiliary pump is actuated by those switches, to feather and unfeather and reverse and unreverse. An inadvertent short or malfunctioning of either the increase pitch or decrease pitch solenoid valve to open those valves would have no effect by itself.

Under some conditions, reversing may be so important that it would be desirable to retain the feature of reversing under the governor or engine pump 18 without having to actuate the auxiliary pump. Fig. 4 shows a portion of Fig. 1 including the transfer valve, decrease pitch valve and the increase pitch valve modified to show the increase pitch valve connected to the outlet 96 of the transfer valve and the decrease pitch valve connected through the line 63 and strainer 60 to the transfer valve as shown and described in Fig. 1. With this type of connection, the propeller could be started towards feather position only when the auxiliary pump was being operated as actuation of the increase pitch valve would have no effect under governor or engine pump pressure alone because it would not be connected to the governor or engine pump. The decrease pitch valve being connected to the pump 18 through lines 54 and 63 in the manner described in Fig. 1 would operate to put the propeller into reverse pitch in the manner indicated in the description of Fig. 1 even if the auxiliary pump was not operating by actuation of the switch 154 to the reverse position. However, in order to take the propeller out of the reverse pitch position, it would be necessary to start the auxiliary pump. These connections would retain the feature of feathering on the auxiliary pump alone if both the decrease pitch and the increase pitch valves are closed and would also retain the feature of overriding the decrease pitch valve by actuation of the increase pitch valve and the auxiliary pump.

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While one embodiment and three modifications have been described, it will be apparent that various changes and other modifications can be made in the construction and arrangement of the various parts without departing from the scope of this novel concept as defined in the subjoined claims.

We claim:

1. Pitch control mechanism for a propeller having a pitch changing hydraulic motor, valve means for directing pressure fluid to one side or the other of said motor for increasing or decreasing the propeller pitch, decrease pitch means connected with said valve means for forcing said valve means in one direction, increase pitch means connected with said valve means for overriding the effect of said decrease pitch means and forcing said valve in the opposite direction, an auxiliary source of fluid pressure, means, including means by-passing said increase pitch means, directing fluid from said auxiliary source to said valve means for forcing said valve in said opposite direction and directing said auxiliary fluid to said propeller.

2. In a propeller having governor controlled means for controlling the propeller pitch, decrease pitch mechanism and increase pitch mechanism connected with said governor for disabling said governor and including members for actuating a device to decrease and increase the propeller pitch, an auxiliary source of power and means actuated by said auxiliary source for by-passing said increase pitch mechanism and connecting said source with said governor and feathering said propeller while said increase pitch and decrease pitch mechanism is inoperative.

3. A device as claimed in claim 2 in which the propeller is hydraulically controlled and has governor controlled valve means for controlling the propeller pitch, and in which said mechanism actuates said valve means, and said auxiliary source of power is a source of fluid pressure which actuates a valve to bypass said increase pitch mechanism.

4. In propeller pitch control means having governor controlled means for regulating the propeller pitch, and decrease pitch mechanism connected with the governor for decreasing the propeller pitch and increase pitch mechanism connected with the governor for increasing the propeller pitch, an auxiliary source of power and means for feathering the propeller with power from said auxiliary source with both said increase and said decrease mechanism inoperative, said increase pitch mechanism including means overriding the effect of said decrease pitch mechanism and feathering said propeller with said auxiliary power with said decrease pitch mechanism energized.

5. A device as claimed in claim 1 including a governor connected with said valve for actuating said valve, and in which the bypassing means includes a check valve actuated by the auxiliary pressure.

6. Pitch control mechanism for a propeller having a pitch changing hydraulic motor, a first source of fluid pressure and governor controlled valve means movable in one direction or the other for directing fluid from said source to one side or the other of said motor for decreasing or increasing the propeller pitch, decrease pitch means directing fluid to said valve means for forcing said valve means in one direction to decrease the propeller pitch, increase pitch means directing fluid to said valve means for forcing said valve means in the opposite direction to increase propeller pitch including means overriding the effect of said decrease pitch means, a second source of fluid pressure, and means connecting said second source with the outlet side of said increase pitch means and with said valve means to move said valve means in said opposite direction to increase propeller pitch.

7. A device as claimed in claim 6 in which the means connecting said second source with the outlet side of said increase pitch means comprises a pressure actuated valve movable by fluid from said second source.

8. A device as claimed in claim 6 including means for

blocking said first source from said decrease pitch means and including means connecting the inlet side of said decrease pitch means with said second source.

9. A device as claimed in claim 6 including means for blocking said first source from both said decrease pitch means and said increase pitch means and including means connecting the inlet side of both said decrease pitch means and said increase pitch means with said second source.

10. A device as claimed in claim 6 including means for blocking said first source from said increase pitch means and including means connecting the inlet side of said increase pitch means with said second source.

11. A device as claimed in claim 6 including means permanently connecting the inlet side of said decrease pitch means and said increase pitch means with said first source.

12. Pitch control mechanism for a propeller having a pitch changing hydraulic motor, a first source of fluid pressure and governor controlled valve means movable in one direction, or the other, for directing fluid from said source to one side or the other of said motor for decreasing or increasing the propeller pitch, decrease pitch means directing fluid from said source to said valve means for forcing said valve means in one direction to decrease propeller pitch, increase pitch means directing fluid from said source to said valve means for forcing said valve means in the opposite direction to increase propeller pitch, including means overriding the effect of said decrease pitch means, an auxiliary source of fluid pressure, a pressure actuated valve movable by fluid from said auxiliary source to connect said auxiliary source with the outlet side of said increase pitch means and with said valve means to move said valve means in said opposite direction to increase propeller pitch.

13. A pitch control for a propeller having a pitch changing hydraulic motor, a first source of fluid pressure, and governor controlled valve means movable by said governor in one direction for directing fluid from said source to one side of said motor for decreasing the propeller pitch and in the opposite direction for directing fluid from said source to the other side of said motor for increasing the propeller pitch, mechanism disabling said governor and moving said valve means, an electrically actuated valve for directing fluid from said source to said mechanism to move said valve means in said opposite direction, electrically actuated means providing a second source of fluid pressure and a pressure actuated valve movable by fluid from said second source to connect said second source with said mechanism and said valve means to move said valve means in said opposite direction to direct fluid from said second source to said motor to increase the propeller pitch.

14. A pitch control for a propeller having a pitch changing hydraulic motor, a first source of fluid pressure and governor controlled valve means movable by said governor in one direction or the other for directing fluid from said source to one side or the other of said motor

for decreasing or increasing the propeller pitch, mechanism for moving said valve means and disabling said governor, a first electrically actuated valve for directing fluid to said mechanism to move said valve means in one direction, a second electrically actuated valve for directing fluid to said mechanism to move said valve means in the opposite direction, including means overriding the effect of said first valve, electrically actuated means providing a second source of fluid pressure, and a pressure actuated valve movable by fluid from said second source to connect said second source with said mechanism and said valve means to move said valve means in said opposite direction to direct fluid from said second source to said motor to increase the propeller pitch.

15. A device as claimed in claim 14 including switching means for simultaneously energizing said second electrically actuated valve and said electrically actuated means.

16. A device as claimed in claim 14 including a first switching means for simultaneously energizing said first electrically actuated valve and said electrically actuated means to put the propeller into reverse pitch, and a second switching means for simultaneously energizing said second electrically actuated valve and said electrically actuated means to increase the propeller pitch and take the propeller out of reverse pitch position, whereby the operativeness of the second electrically actuated valve may be tested by momentarily pushing said second switching means into contact and manually pulling it out of contact while said first switching means is in contact and said propeller may be feathered by pushing said second switching means into contact with or without said first electrically actuated valve energized and can be feathered on the second source alone in the event neither electrically actuated valve is operative.

17. A control as claimed in claim 4 in which the decrease pitch mechanism includes a valve actuating motor having an effective area and said feathering means includes a valve actuating motor having a greater area than, and opposed to, the said first mentioned effective area.

18. A control as claimed in claim 4 in which the governor controlled means includes a governor valve, the decrease pitch mechanism includes a motor connected with said valve to move said valve in one direction and the increase pitch mechanism includes a more powerful motor connected with said valve to move the valve in the opposite direction and said feathering means includes means independent of said increased pitch mechanism for energizing said increase pitch motor.

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