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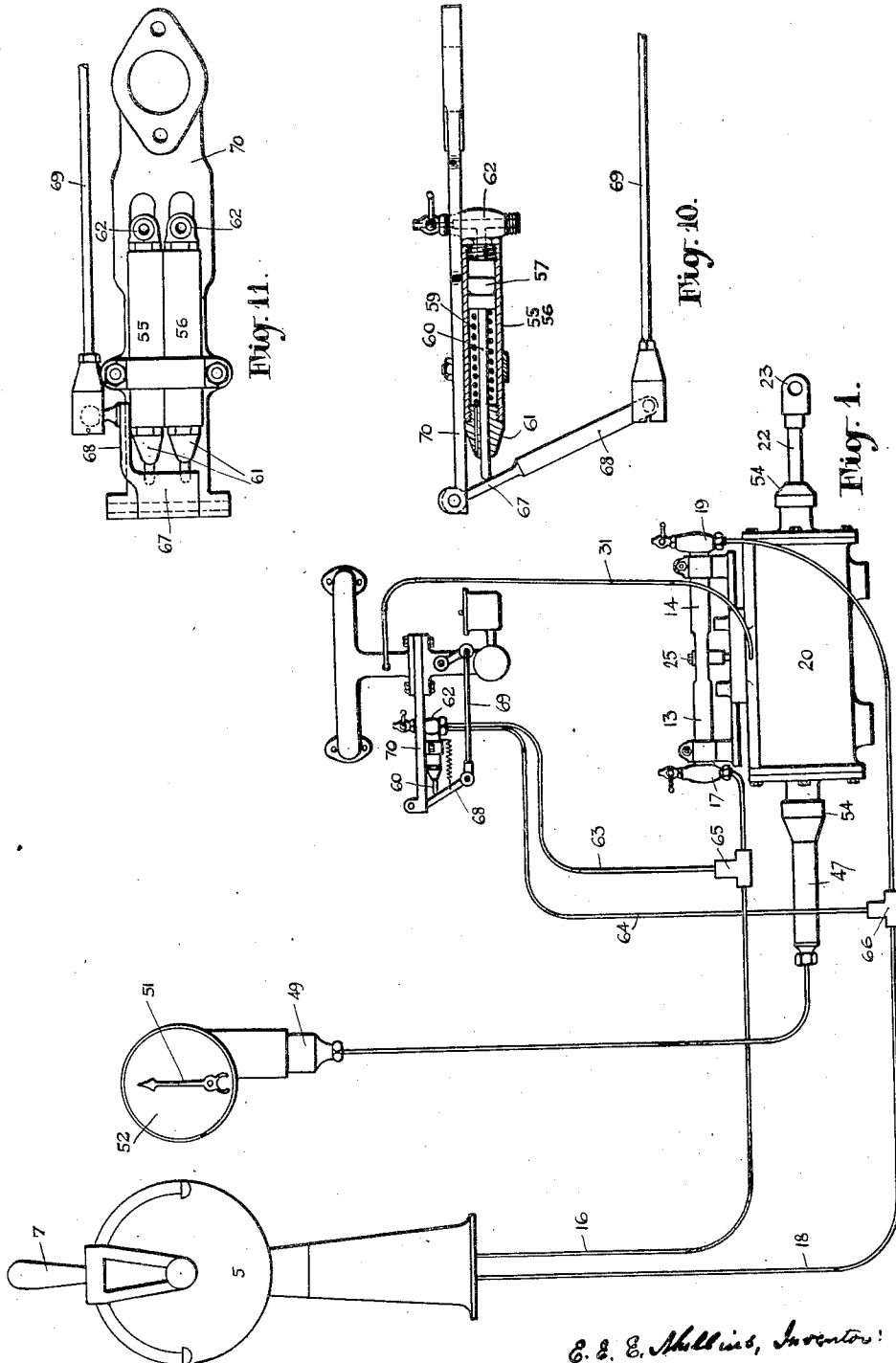
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REMOTE CONTROL APPARATUS FOR POWER DRIVEN BOATS

Filed Sept. 1, 1932

2 Sheets-Sheet 1



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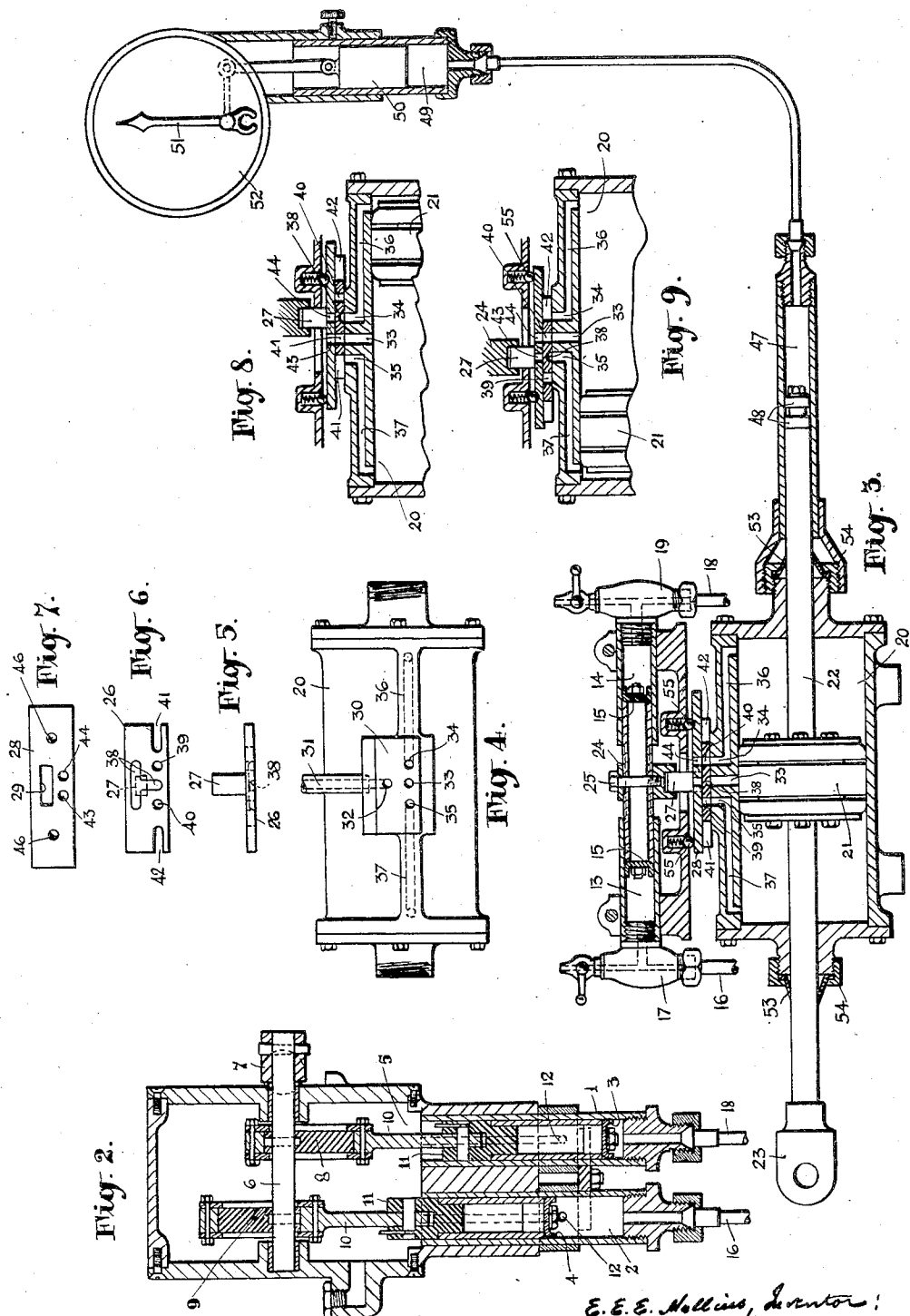
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UNITED STATES PATENT OFFICE

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REMOTE CONTROL APPARATUS FOR
POWER DRIVEN BOATSErnest Edgar Edward Mullins, Stockport,
EnglandApplication September 1, 1932, Serial No. 631,434,
and in Great Britain October 28, 1931

4 Claims. (Cl. 74-107)

This invention comprises certain improvements in remote control apparatus for the engines of power driven boats or the like, and it has for its object to provide an arrangement in which mechanical connections between the parts are reduced to a minimum in order that the device will be easy to operate and not liable to become deranged.

According to the present improvements, a remote control apparatus for motor driven boats and the like comprises a primary unit formed of a manually controlled lever, a fluid container system, means for forcing fluid from one part of the system through a conduit and simultaneously drawing in fluid at another part of the container system through a conduit, and a secondary unit comprising a fluid container system and a piston or pistons or member or members moved in the container system by the forcing in of fluid at one part of the system and drawing out of fluid at the other part of the system. In some cases the secondary unit brings into action a power driven unit for operating the gear control lever or such like control member. The operation of the hand control of the primary unit may also operate the carburetter or like control for the engine. The carburetter or engine power control is effected by means of two pistons working in cylinders which are respectively connected to the cylinders of the primary unit so that the throttle or the like is operated when the hand control lever is moved either in "astern" or "ahead" directions, and after the gear control has been operated.

Referring to the drawings:—

Figure 1 is a general arrangement of a device constructed according to this invention.

Figure 2 is a sectional elevation of the primary unit hereinafter referred to.

Figure 3 is a sectional view of the secondary unit hereinafter referred to, showing the suction valve in a central position, after having been moved from right to left.

Figure 4 is a plan view of the suction cylinder showing the valve seating.

Figure 5 is a side elevation of the suction controlling valve.

Figure 6 is a face view of the valve shown by Figure 5.

Figure 7 is a face view of a suction lag plate valve hereinafter referred to.

Figure 8 is a view showing the suction valve moved to the right, the lag plate remaining in the position shown by Figure 3.

Figure 9 is a view showing the valve moved

to the left, past the neutral position, the lag plate having been moved.

Figure 10 is a side elevation of the piston and cylinder device controlling the carburetter or engine throttle, and

Figure 11 is an underside plan of the device shown by Figure 10.

According to a convenient embodiment of this invention, the primary unit comprises two piston cylinders 1 and 2 in which reciprocate pistons 3 and 4. The piston cylinders 1 and 2 are carried by a casing 5 in which is mounted a spindle 6 carrying the hand lever 7. The spindle 6 has eccentric blocks 8 and 9 thereon and eccentric rods 10 are mounted on these eccentric blocks, the inner ends of the rods being pivotally connected to the forked ends 11 of the pistons 3 and 4. The casing 5 forms an oil reservoir which is placed in communication with the piston cylinders 1 and 2 by way of the conduits 12. Should there be any leakage of fluid in the system, such leakage will be automatically replaced, because when the pistons 1 and 2 are at the top of their stroke, the conduits 12 will place the cylinders in communication with the reservoir. The eccentrics are arranged to reciprocate the pistons 1 and 2 in opposite directions, so that when one piston is at the bottom of its stroke the other piston is at the top of its stroke. The cylinders 1 and 2 are placed respectively in communication with the cylinders 13 and 14 of a secondary unit, the double acting or the two connected pistons 15 reciprocating in the cylinders. The conduit 16 passing from the cylinder 2 is connected to the union 17 on the end of the cylinder 13, whilst the conduit 18 leading from the cylinder 1 is connected to the union 19 on the end of the cylinder 14. When therefore the hand lever 7 is moved in one direction the pistons 3 and 4 are respectively raised or lowered so that fluid is respectively forced into or drawn from the cylinders 13 and 14, thereby operating the piston 15 to move to the right or left in accordance with the directional movement of the hand lever 7.

In some cases the gear control lever may be operated directly by the piston 15, and in some cases the power for operating the gear lever is obtained from the suction of the engine. In such latter case the said secondary unit is mounted on a cylinder 20 in which reciprocates the double acting piston 21, this double acting piston 21 being mounted on the rod 22, the end 23 of which is suitably connected to the gear control lever. The suction from the engine is controlled by a

valve which is operated by the piston 15. For this purpose the piston 15 has a saddle piece 24 fixed thereto by means of a stud 25. The valve comprises a slide plate 26 having an upstanding member 27 which engages in a recess in the underside of the saddle piece 24. Slidably mounted above the valve plate 26 is a lag valve plate 28, such plate having a slot 29 through which the projection 27 passes, the slot 29 being longer than the projection 27. The cylinder 20 is provided with a flat valve seating 30, to one side of which is connected the pipe 31 passing to the induction pipe of the engine. The induction pipe opens into the valve seating at the port 32. The valve seating also has a port 33 which passes directly through the wall of the cylinder 20 and therefore communicates with the centre of the cylinder, and also two ports 34 and 35 which communicate by way of conduits 36 and 37 with each end of the cylinder. The underside of the valve plate 26 has a T-shape recess 38 so that the port 32 is always in register with the recess 38, whilst such recess can be placed in communication with any one of the ports 33, 34 and 35 to apply suction to the cylinder 20. When suction is applied on one side of the piston 21 the other side must be placed in communication with the atmosphere and for this purpose the slide plate 26 is provided with air ports 39 and 40 and also air port slots 41 and 42. The lag plate valve 28 is also provided with air ports 43 and 44. When the hand control lever is in neutral position the slide plate 26 is in a position with the port 38 opposite the port 33 which is closed by the piston 21 (see Figure 3). If the piston 15 is moved to the right the plate valve 26 will be moved so that the port 38 lies over the port 34, thus passing the suction through the channel 36 to thereby draw the piston 21 to the right. At the same time the port 33 is brought into register with the port 39 so that air can pass into the cylinder on the left hand side of the piston 21. The slot 41 is also in register with the port 35 so that air can pass through such port also. The movement of the plate valve 26 into this position also ensures that the plate valve 28 is positioned with the port 43 over the port 39. In this position the projection 27 bears against the right hand side of the slot 29. If it is now desired to bring the piston back to central position (Figure 3) the plate valve 26 is moved so that the port 38 registers with the port 33. In view of the width of the slot 29 the lag valve 28 has not been moved and therefore the port 44 will register with the port 40 and the port 34 thus allowing air to enter the right hand side of the cylinder. It will be observed that the lag valve 28 closes the port 39 when in this latter position as shown by Figure 3. It will also be observed that the slot ports 41 are necessary as air cannot be sucked through the registering ports 33 and 39 until the piston has moved from the central position. A similar operation takes place when the valve plate 26 is moved to the left. Spring pressed balls 55 are adapted to engage in holes 46 in the lag plate valve 28 in the extreme positions of the lag plate to facilitate indicating to the operator moving the hand lever 7 that such lever 7 has been moved sufficiently to obtain the change of gear.

Further to indicate the position of the suction control piston, an indicating device is provided, and for this purpose the end of the spindle 22 works in a cylinder 47 and has a piston 48 on the end. This cylinder contains oil and the pis-

ton 48 is adapted to force or extract oil from a cylinder 49 and thus move up and down a float 50. This float 50 is connected to an indicating pointer 51 moving over a dial 52 which is marked to indicate "astern", "stop" and "ahead".

In order to produce an air tight joint between the piston rod 22 and the cylinder 20 conical leather or like washers 53 are fixed by the locking member 54 to the end of the boss on the cylinder. Any attempt to suck air through the bearings will cause the leather conical caps to close tightly on the piston rod 22 and thereby effect an efficient air tight joint.

The primary control unit is also adapted to operate the engine throttle, and for this purpose two cylinders 55 and 56 each have a piston 57 mounted therein. The pistons are normally forced inwardly by means of spiral springs 59 mounted on the piston rods 60, such piston rods passing through caps 61 in the ends of the cylinders. Suitable air openings are provided to permit air to freely enter or leave the space in the cylinders at the rear containing the springs. The forward ends of the cylinders are fitted with cap unions 62 and these are respectively connected by conduits 63 and 64 to by-pass unions 65 and 66 on the conduits 16 and 18. The springs 59 are sufficiently strong to prevent any fluid being forced into the cylinders until a gear control movement has been effected. Any further movement of the hand lever 7 will therefore force the fluid through the by-pass unions to one of the cylinders 55 and 56, whilst a corresponding amount of fluid will be drawn from the other cylinder in accordance with the movement of the pistons 3 and 4. Therefore whether the hand lever 7 is moved in the "ahead" or in the "astern" directions one or other of the piston rods 60 will be moved outwardly to press against a flat portion 67 on the lever 68. This lever 68 is pivoted to the link 69 connected to the throttle. The cylinders 55 and 56 are mounted on the plate 70 which can be fixed between the usual coupling flanges on the induction pipe. With this construction therefore the operation of the lever 7 will move the gear lever into the forward, neutral, or reverse positions, and only after the gear has been engaged in either forward or reverse can the throttle be opened. Moreover the throttle must first be closed before the direction of the drive can be reversed.

I claim:

1. A remote control apparatus for motor driven boats and the like, comprising a primary unit formed of a manually controlled lever, a fluid container system, means for forcing fluid from one part of the system through a conduit and simultaneously drawing in fluid at another part of the container system through a conduit, and a secondary unit comprising a fluid container system and a piston or pistons moved in the container system by the forcing in of fluid at one part of the system and drawing out of fluid at the other part of the system, and means for connecting said piston or member to the gear lever or control member, and means whereby a carburettor or throttle control is operated hydraulically by the operation of the hand lever of the primary unit, comprising two piston cylinders, a piston working in each cylinder having a piston rod which passes through the cylinder head, a carburettor control lever or member actuated by the pressure of the piston rods, a spring pressing each piston rod into the cylinder and conduits connecting the inner ends of the cylinders so

that fluid is forced into one cylinder and withdrawn from the other by the said primary unit after the manually operated lever has been moved to actuate the gear lever into the forward or reverse positions.

2. A remote control apparatus for motor driven boats and the like, comprising a primary unit formed of a manually controlled lever, a fluid container system, means for forcing fluid from one part of the system through a conduit and simultaneously drawing in fluid at another part of the container system through a conduit, and a secondary unit comprising a fluid container system and a piston or pistons moved in the container system by the forcing in of fluid at one part of the system, and drawing out of fluid at the other part of the system, means connected to the secondary pistons for operating the gear lever for moving same into "ahead", "astern" or neutral positions, and means whereby the continued movement of the manual control lever causes the operation of a carburetter control which comes into action only after the gear lever has been moved either into "ahead" or "astern" positions.

3. A remote control apparatus for motor driven boats and the like, comprising a primary unit formed of a manually controlled lever, a fluid container system, means for forcing fluid from one part of the system through a conduit and simultaneously drawing in fluid at another part of the container system through a conduit, and a secondary unit comprising a fluid container system and a piston or pistons moved in the container system by the forcing in of fluid at one

part of the system and drawing out of fluid at the other part of the system, a suction operated device connected to a suction producer, a valve controlling the suction inlet operated by the said secondary unit, means operatively connecting the suction apparatus to the gear lever or control member, and means whereby the continued movement of the manual control lever causes the operation of a carburetter control which comes into action only after the gear lever has been moved either into "ahead" or "astern" positions.

4. A remote control apparatus for motor driven boats and the like, comprising a primary unit formed of a manually controlled lever, a fluid container system, means for forcing fluid from one part of the system through a conduit and simultaneously drawing in fluid at another part of the container system through a conduit, and a secondary unit comprising a fluid container system and a piston or pistons moved in the container system by the forcing in of fluid at one part of the system and drawing out of fluid at the other part of the system, a suction operated device connected to a suction producer, a valve controlling the suction inlet operated by the said secondary unit, means operatively connecting the suction apparatus to the gear lever or control member, means whereby the continued movement of the manual control lever causes the operation of a carburetter control which comes into action only after the gear lever has been moved either into "ahead" or "astern" positions, and an indicator connected to the suction operated device to indicate the position of the gear.

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