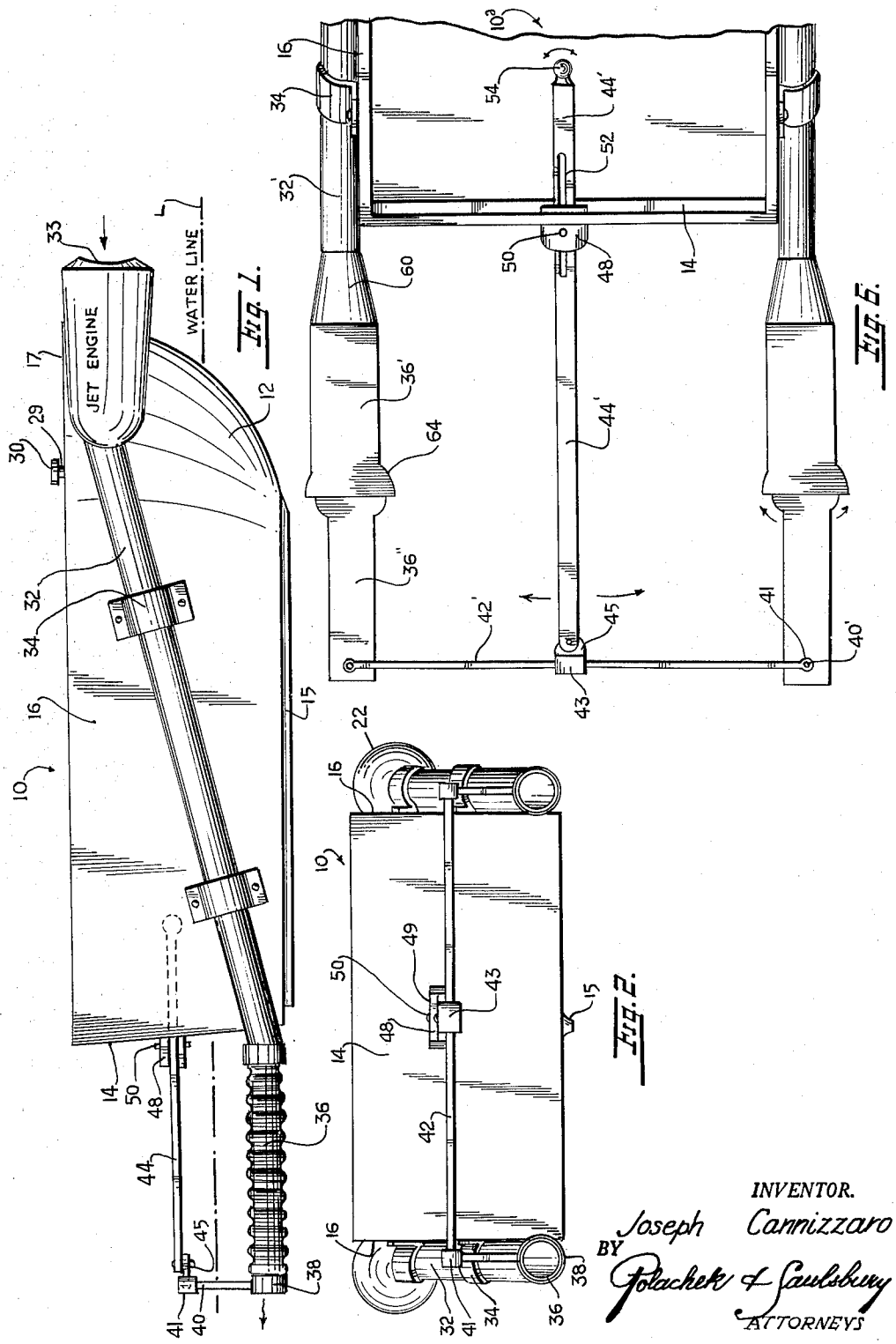
May 31, 1966 J. CANNIZZARO 3,253,568

JET PROPELLED BOAT

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JET PROPELLED BOAT

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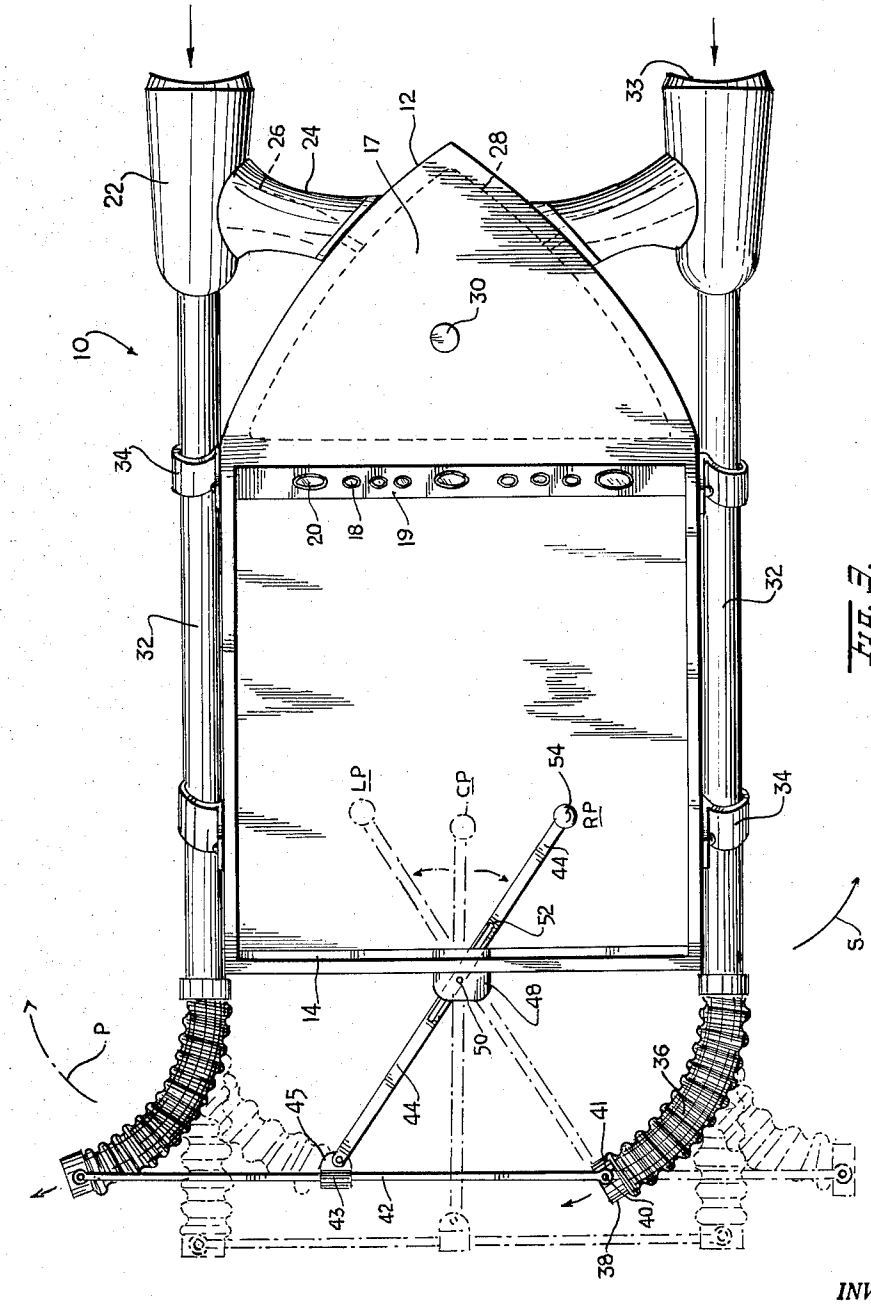


Fig. 7.

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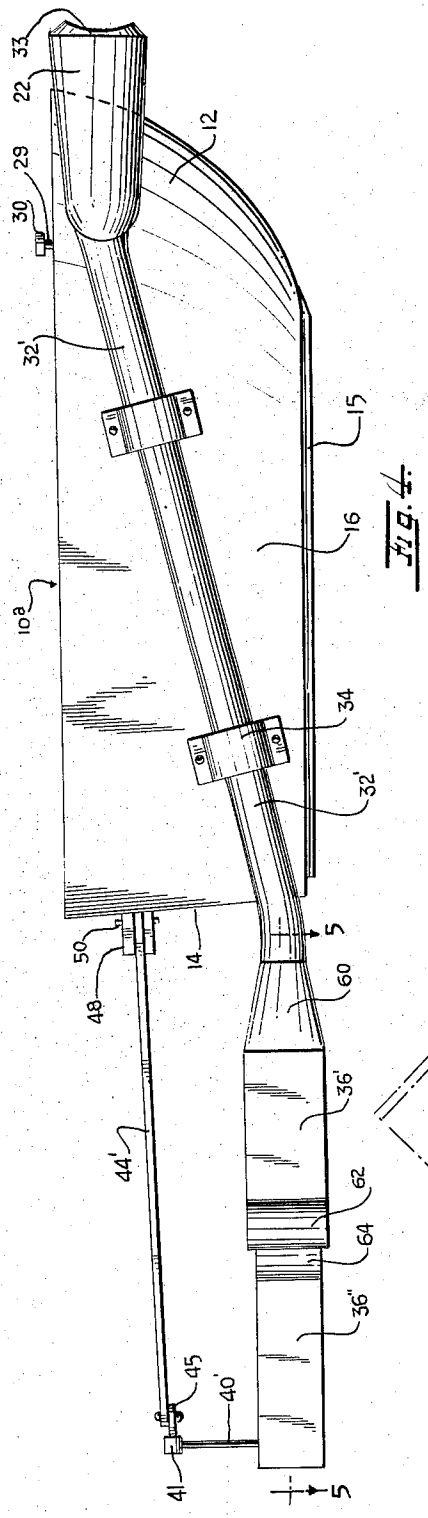


FIG. 4.

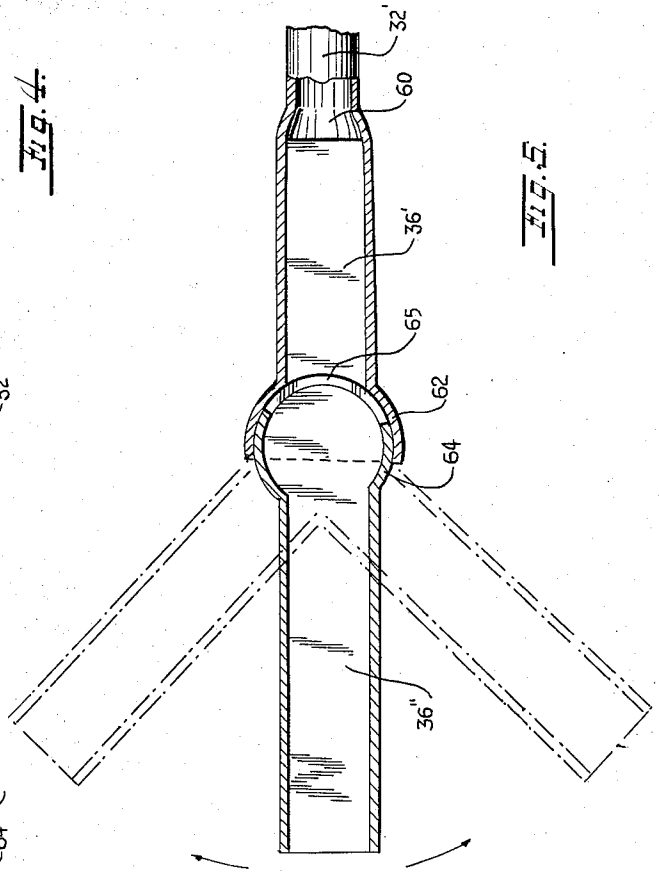


FIG. 5.

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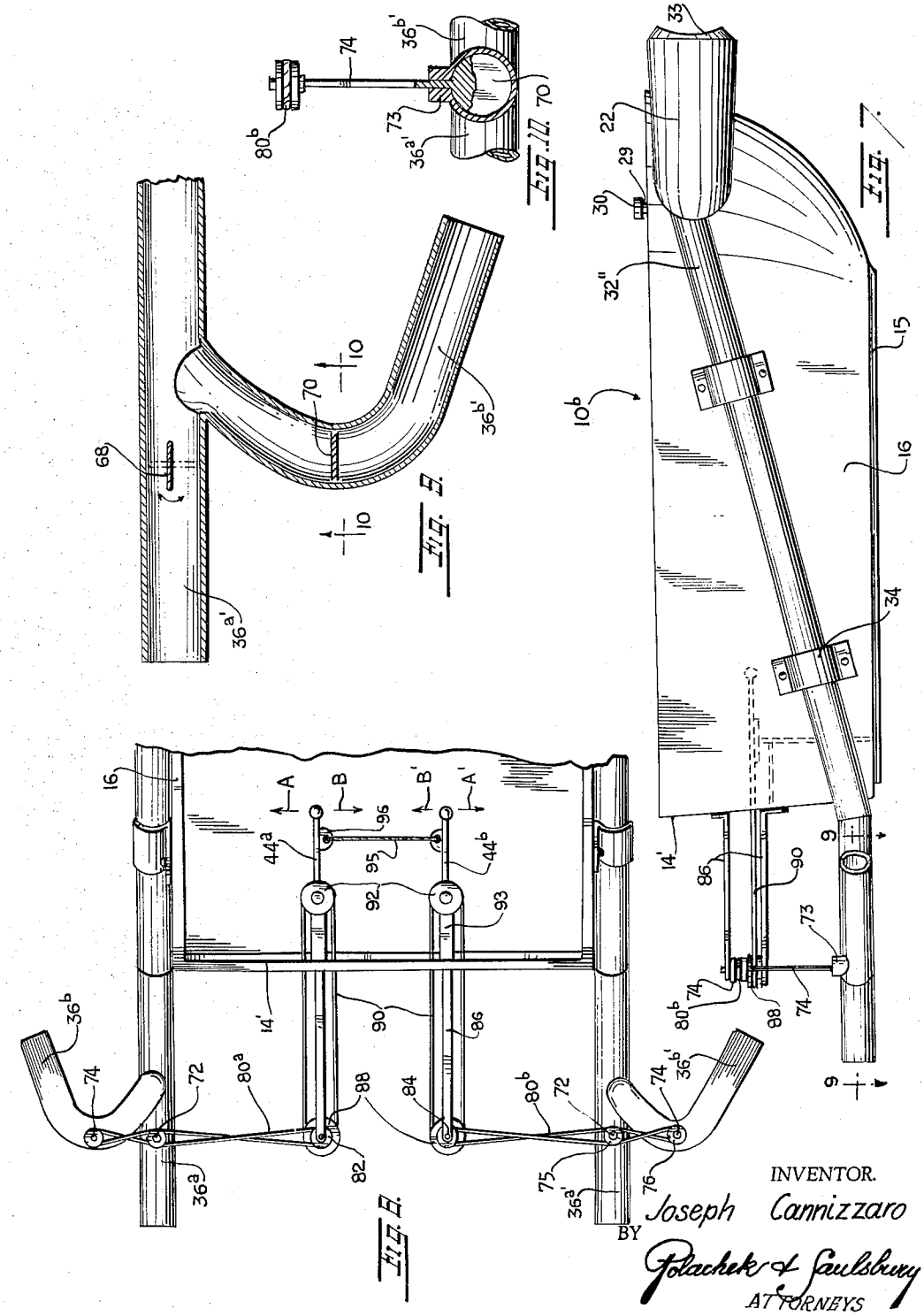


FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

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JET PROPELLED BOAT

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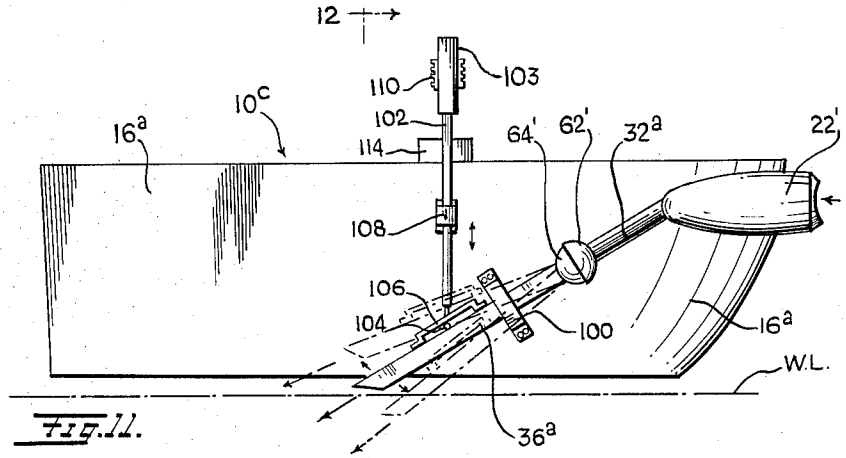


Fig. 11.

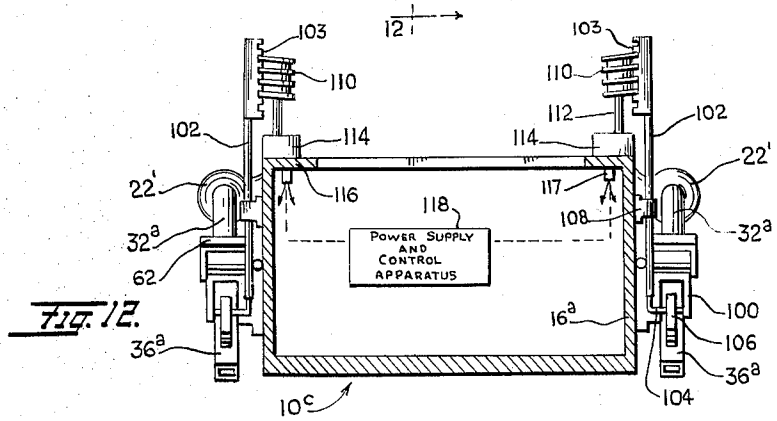


Fig. 12.

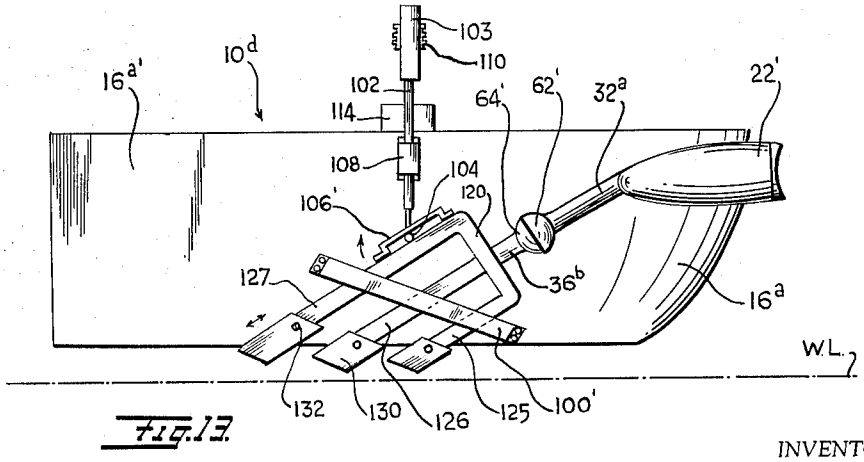


Fig. 13.

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JET PROPELLED BOAT

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4 Claims. (Cl. 115—11)

This invention relates to the art of jet motor drives for boats, and more particularly concerns means for controlling the exhaust of jet motors mounted on a boat in driving and turning the boat.

According to the invention a motor driven boat is provided with a pair of jet motors which exhaust under water. The exhaust pipes have extensions which direct the exhaust draft of the motors rearwardly or laterally of the boat for driving the boat ahead or astern, or for turning the boat to port or to starboard. The exhaust pipes are provided with a control bar or bars which replace the usual tiller and rudder. No propellers or paddle wheels are required to drive the boat.

In another form of the invention the exhaust pipes of the jet motors are arranged for elevating the boat out of the water to drive the boat like a hydrofoil.

It is one object of the invention to provide a motorboat with a pair of jet motors having exhaust pipes terminating in sections which can be turned in different directions by a control bar.

Another object is to provide exhaust pipes for jet motors on a boat, in which the pipes have control means for directing exhaust drafts in different directions, the control means being operated by the pilot of the boat.

A further object is to provide exhaust pipes for jet motors as described, wherein each pipe has a lateral section and a rearwardly extending section with valves for alternately opening one section while closing the other section and control means for operating the valves.

Still another object is to provide a boat driven by jet motors and employing exhaust pipes adapted to drive the boat ahead, astern, to port and to starboard.

A further object is to provide a boat with jet motors having exhaust pipes adapted to raise the boat out of the water in driving the same like a hydrofoil.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

FIG. 1 is a side elevational view of a motorboat embodying the invention.

FIG. 2 is a rear end elevational view of the boat of FIG. 1.

FIG. 3 is a top plan view of the boat of FIG. 1 with exhaust pipe end sections turned to port or starboard.

FIG. 4 is a side elevational view of another boat according to the invention.

FIG. 5 is an enlarged fragmentary sectional view taken on line 5—5 of FIG. 4.

FIG. 6 is a top plan view of part of the boat of FIG. 4.

FIG. 7 is a side elevational view of another boat embodying another form of the invention.

FIG. 8 is a top plan view of part of the boat of FIG. 7.

FIG. 9 is an enlarged fragmentary sectional view taken on line 9—9 of FIG. 7.

FIG. 10 is a cross-sectional view taken on line 10—10 of FIG. 9.

FIG. 11 is a side view of another boat embodying the invention.

FIG. 12 is a sectional view taken on line 12—12 of FIG. 11.

FIG. 13 is a side view similar to FIG. 11 of a boat embodying another form of the invention.

Referring first to FIGS. 1–3, there is shown a boat 10 having a bow end 12, rear or stern wall 14 and vertical sides 16. The boat may be provided with a forward deck 17 at which is a dashboard 19 on which are motor controls 18 and indicator dials 20. Two jet motors 22 are mounted at the bow end of the boat by massive struts or braces 24. Through these struts extend pipes 26 which pass fuel from a tank 28 installed below deck 17 at the bow end of the boat. The tank can be filled with liquid fuel via a fillter tube 29 closed by a removable cap 30 on deck 17. The boat has a keel 15.

Two long straight main exhaust pipes 32 extend downwardly and rearwardly from the rear ends of the jet motors. These motors have open front ends 33 into which air passes. The pipes 32 are secured by brackets 34 to the sides of the boat. The rear ends of pipes 32 terminate below the waterline L of the boat. The pipes have connected rear end sections 36 which are lengths of flexible metal tubing. At the rear ends of sections 36 are collars 38 to which are secured upstanding posts 40. Sleeves 41 at the ends of a crossbar 42 are rotatably engaged on the upper ends of posts 40.

Crossbar 42 is horizontal. The exhaust pipe sections 36 are disposed in a horizontal plane and normally extend axially in a fore and aft direction as shown in FIGS. 1 and 2. Secured to the center of crossbar 42 is a collar 43. One end of a flat control bar 44 is pivotally secured to an eye 45 extending forwardly from collar 43. This bar passes between guide plates 48. The plates 48 are horizontally spaced and secured in a slot 49 in the rear wall 14 of the boat. A pin 50 anchored vertically in the plates 48 passes through a slot 52 extending longitudinally of bar 44. The bar terminates at its forward end in a knob handle 54. The bar 44 can be turned from its normal center position CP indicated by dotted lines in FIG. 3 either to the right (starboard) position RP or to the left (port) position LP. The bar 44 is shown in the left position in dotted lines and in the right position in solid lines in FIG. 3. When the bar is turned to the right position RP as shown, then crossbar 42 moves both forwardly and to the left port position and turns both ends of both sections 36 to the left. When the bar is turned to the left position LP the ends of sections 36 move to the starboard or right position shown by dotted lines in FIG. 3.

When the bar 44 is centered at position CP the exhaust of the motors 22 is directed to the rear and the boat is driven forwardly by the reaction of the water on the exhaust gases moving rearwardly. When bar 44 is moved to the right position RP and pipe sections 36 turn to the left as shown in FIG. 3, then the boat turns to right or starboard direction S. When the bar 44 is moved to the left position LP and pipe sections 36 turn to the right, then the boat turns to the left or port direction P.

The pilot can thus turn the boat by turning the exhaust pipe end sections or can cause the boat to move ahead by setting the control bar to center position CP.

FIGS. 4–6 show another boat 10^a which is similar to boat 10. Corresponding parts are identically numbered. Pipes 32' are connected to rectangular fixed end sections 36' by transition sections 60. Sections 36' are axially horizontal and terminate in partially cylindrical portions 62. Rotatably engaged in these cylindrical portions are cylindrical forward end portions 64 of exhaust pipe end sections 36''. The sections 36'' are pivotable or turnable from the fore and aft direction to the right and left as indicated by dotted lines in FIG. 5. Sections 36'' are turned by an assembly of posts 40', crossbar 42' and control bar 44' similar to the control system of boat 10. By turning the control bar 44' to the right or left the sections 36'' will move oppositely and the boat will turn in the same direction as the direction in which the bar handle is

turned, in the same manner as described in connection with boat 10. It will be noted that the cylindrical forward end portions 64 have openings 65 which communicate with the passages of pipe sections 36′ in all positions of sections 36″.

In FIGS. 7–10, boat 10^b has parts corresponding to those of boats 10 and 10^a, identically numbered. The main exhaust pipes 32″ have connected horizontal end sections 36^a, $36^{a'}$ disposed axially in a fore and aft direction and opening under water rearwardly of the boat. Elbow sections 36^b, $36^{b'}$ are secured to and extend laterally of end sections 36^a, $36^{a'}$ and are open forwardly. A rotatable circular valve plate 68 is disposed in each section 36^a, $36^{a'}$ rearwardly of each elbow section. Another circular valve plate 70 is disposed in each elbow section 36^b, $36^{b'}$. Shafts 72, 74 extend upwardly from the several end and elbow sections and are secured to upper ends of the valve plates 68, 70. The shafts may be journaled in bearing sleeves 73. Shafts 72 on sections 36^a, $36^{a'}$ carry pulleys 75. Shafts 74 on sections 36^b, $36^{b'}$ carry pulleys 76. Endless, flexible cables, cords or belts 80^a, 80^b are engaged on each pair of pulleys 74, 75 and are entrained on pulleys 82. Pulleys 82 are carried on shafts 84 which are supported by bracket arms 86 extending rearwardly from rear wall 14′ of the boat. On each shaft 84 is another pulley 88. An endless cable, belt or pulley 90 is entrained on each pulley 88 and passes through holes in the rear wall 14′ to pulleys 92 respectively. The pulleys 92 are carried by bracket arms 93 inside the boat. Control bars 44^a, 44^b are secured to the pulleys 92 and normally extend forwardly as shown best in FIG. 8. A flexible cord 95 may be provided, secured at opposite ends to eyes 96 on the bars 44^a, 44^b.

As best shown in FIG. 9, the valve plates 68 and 70 are so arranged that when valve plate 68 extends in the vertical axial plane of pipe section 36^a or $36^{a'}$ the other valve plate 70 extends transversely across the attached, fixed section 36^b or $36^{b'}$ blocking this section. Similarly, when plates 68 are turned 90° to block sections 36^a, $36^{a'}$, the plates 70 are disposed in the vertical diametral plane of the free ends of sections 36^b, $36^{b'}$.

In the position of the valve plates and control bars of FIG. 8, the elbow sections 36^b, $36^{b'}$ are blocked and the entire exhaust is directed rearwardly so that the boat will move forwardly. If control bar 44^a is pulled to the left or bar 44^b is pulled to the right as indicated by arrows A, A′, respectively, the other bar connected to it by cord 95 will also turn in the same direction to close the valves of sections 36^a, $36^{a'}$ and open the valves of sections 36^b, $36^{b'}$. It is possible to cause both control bars to move inwardly toward each other by pulling forwardly or rearwardly at the center of cord 95. In any case, turning of the control bars 44^a, 44^b together will cause the valve plates to block end sections 36^a, $36^{a'}$ and open sections 36^b, $36^{b'}$ so that the exhaust is directed forwardly from the pipes and the boat will move astern or to the rear.

If control bar 44^a alone is moved to the right in direction B, then the stern or rear end of the boat will turn to the right or starboard as section 36^a is blocked and section 36^b is opened. If the control bar 44^b alone is turned to the left in direction B′, then the rear of the boat will turn to the left as elbow section $36^{b'}$ is opened and end section $36^{a'}$ is blocked. This occurs because the forward ends of elbows 36^b, $36^{b'}$ extend axially at acute angles to the fore and after direction of the boat.

The control system for the exhaust pipes of boat 10^b thus provide the pilot with means to drive the boat forward, astern, to port or to starboard by proper manipulation of the control bars 44^a, 44^b.

In all forms of the invention described the exhaust drafts of the jet motors or engines serve to drive and turn the boat. No rudder or tiller is required. The usual propellers or paddle wheels of conventional motorboats are omitted. The invention makes it possible to drive a motor boat at higher speeds and with simpler, more easily operated controls than has hitherto been possible.

The invention is applicable to large and small boats, to fast moving speedboats and to slower cruisers or pleasure boats.

In FIGS. 11 and 12, the boat 10^c has a pair of jet motors 22′ mounted at the opposite sides 16^a of the boat like motors 22 in boats 10, 10^a and 10^b. Exhaust pipe sections 32^a extend obliquely downward from the rear ends of the motors. These sections terminate in partially cylindrical swivel joint portions 62′. Rotatably engaged in these cylindrical portions are cylindrical swivel joint portions 64′ at forward ends of exhaust pipe end sections or outlets 36^a. The sections 36^a are pivotable or turnable in vertical planes at opposite sides of the boat as indicated by dotted lines in FIG. 12. Guide brackets 100 are provided at the sides of the boat to restrict the sections 36^a to movement in vertical planes.

In order to elevate and lower the exhaust pipe sections 36^a there is provided a lifter mechanism at each side of the boat. The lifter mechanism includes a lifter bar 102 having a laterally extending arm 104 movably engaged in a guide plate 106 secured to the upper side of the pipe section. The bar 102 is axially vertical and slides in a sleeve guide 108 secured to the side of the boat. At the upper end of bar 102 is a rack gear 103 which is meshed with a worm 110. Each of the worms 110 is supported on a shaft 112 and is driven by a motor enclosed in a housing 114 on side decks 116. The motors are connected via control cables 117 to a power supply and helmsman's control apparatus 118, so that the helmsman can drive either or both worms 110 for raising or lowering either or both of the exhaust pipe sections 36^a. The boat will be elevated above the water line W.L. at least partially when the boat is in motion for attaining a greater speed than is otherwise possible. The helmsman will change the angular position of the exhaust pipe sections 36^a with respect to the water line W.L. depending on the load the boat is carrying, weather conditions and other factors.

In FIG. 13, the boat 10^d is similar to boat 10^c and corresponding parts are identically numbered. Attached to each of the exhaust pipe sections 36^b on opposite sides $16^{a'}$ of the boat is a manifold 120 having an assembly of three exhaust pipe sections or outlets 125, 126 and 127. The three outlets are parallel to each other and extend angularly to the water line W.L.

The three exhaust pipe outlets can be raised and lowered together by means of the worms 110 which drive the rack gears 103 on lifter bars 102. The lifter bars are slidably engaged in sleeve guides 108. Guide brackets 100′ at opposite sides of the boat enclose the three exhaust outlets and restrict them to movement in vertical planes. The guide plates 106′ in which arms 104 of bars 102 are engaged are secured to the upper side of exhaust outlet 127. Three sleeves 130 are telescopically secured to the ends of the exhaust outlets 125–127 for extending or shortening these exhaust outlets. The sleeves 130 can be fixed in place by screws or bolts 132.

In both boats 10^c and 10^d rate of gas passage through the exhaust outlets at the opposite sides of the boats can be independently controlled by independently controlling the jet motors. The boat can be turned in one direction or the other by driving one jet motor faster than the other. In both boats the exhaust gas emitted from the exhaust pipe outlets will elevate the boat at least partially out of the water like a hydrofoil.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as

new, and desire to secure by United States Letters Patent is:

1. A drive system for a motorboat, comprising a pair of jet motors mounted outside the boat at opposite sides of the boat near the top of the bow end thereof, main exhaust pipes disposed outside the boat, connected to the jet motors respectively and extending rearwardly and downwardly to points below the waterline of the boat, gas exhaust pipe end sections movably disposed outside the boat and connected to the main exhaust pipes, said end sections extending in a horizontal plane and opening rearwardly of the boat, means for deflecting the end sections laterally simultaneously at either side of the boat discharging two jets simultaneously for turning the boat, and control means operatively connected to the exhaust deflection means and operable inside the boat to determine the direction of turning of the end sections.

2. A drive system for a motorboat, comprising a pair of jet motors mounted outside the boat at opposite sides of the boat near the top of the bow end thereof, main exhaust pipes outside the boat, connected to the jet motors respectively and extending rearwardly and downwardly to points below the waterline of the boat, gas exhaust pipe end sections movably disposed outside the boat and connected to the main exhaust pipes, said end sections extending in a horizontal plane and opening rearwardly of the

boat, each of said end sections being a flexible member, a linkage system connecting the end sections, and control means connected to the linkage system and operable inside the boat for bending the flexible end sections simultaneously parallel to each other in the horizontal plane to determine the direction of two simultaneous gas jets issuing from the end sections for turning the boat.

3. A drive system for a motorboat as recited in claim 1, wherein the end sections are rigid members pivotally joined to the main exhaust pipes respectively.

4. A drive system for a motorboat as recited in claim 2, wherein the linkage system comprises a crossbar linking the end sections, and a handle bar connected to the crossbar and extending through the rear end of the boat for manipulation inside the boat.

References Cited by the Examiner

UNITED STATES PATENTS

1,408,178	2/1922	Downing	115—11
2,408,928	10/1946	Hait	115—12 X
2,543,024	2/1951	Humphrey	115—15
3,003,455	10/1961	Alexander et al.	115—12

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