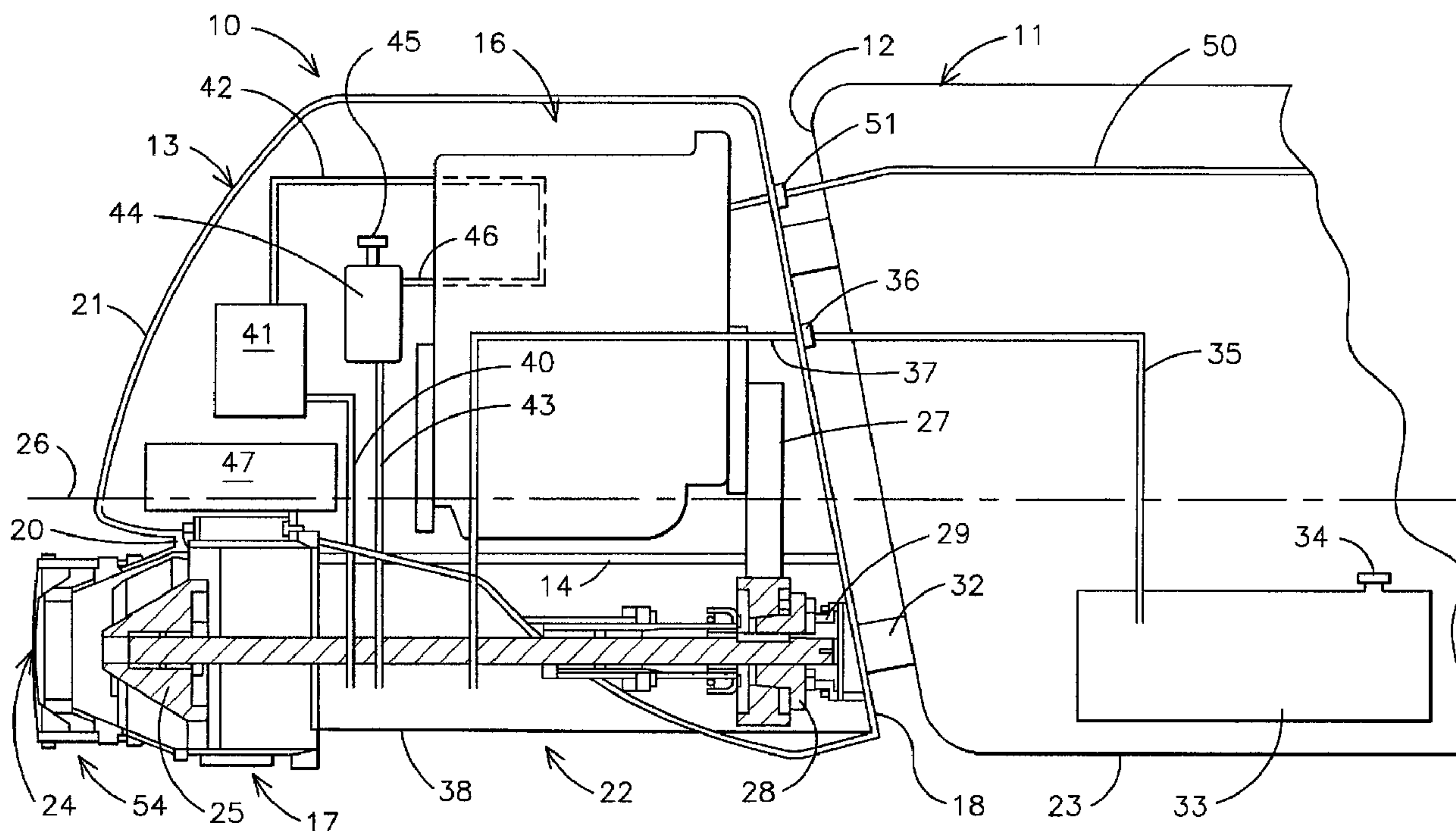




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(54) Title: OUTBOARD JET DRIVE BOAT



(57) Abrégé/Abstract:

An outboard jet drive boat apparatus has a boat hull (11) having a transom (12) and having a removably attached outboard jet drive (10) attached to the transom (12). The outboard jet drive (10) includes a housing (13) sealed against the intrusion of water and has an engine mounting platform (14) therein having an engine (16) mounted thereon on flexible engine mounts (15). The housing (13) has a sealable entrance through the top thereof and is removably attached to the transom (12). A jet drive unit (17) is attached in the housing (13) below the engine supporting platform (14) and extending generally parallel to the engine (16) and extending from the front of the housing (13) out the rear of the housing (13). A main fuel tank (33) is positioned inside the hull (11) and is connected to a fuel line (35) to an auxiliary fuel tank (38) inside the housing (13) and the auxiliary fuel tank (38) is connected to the engine (16) for feeding fuel to the engine (16).

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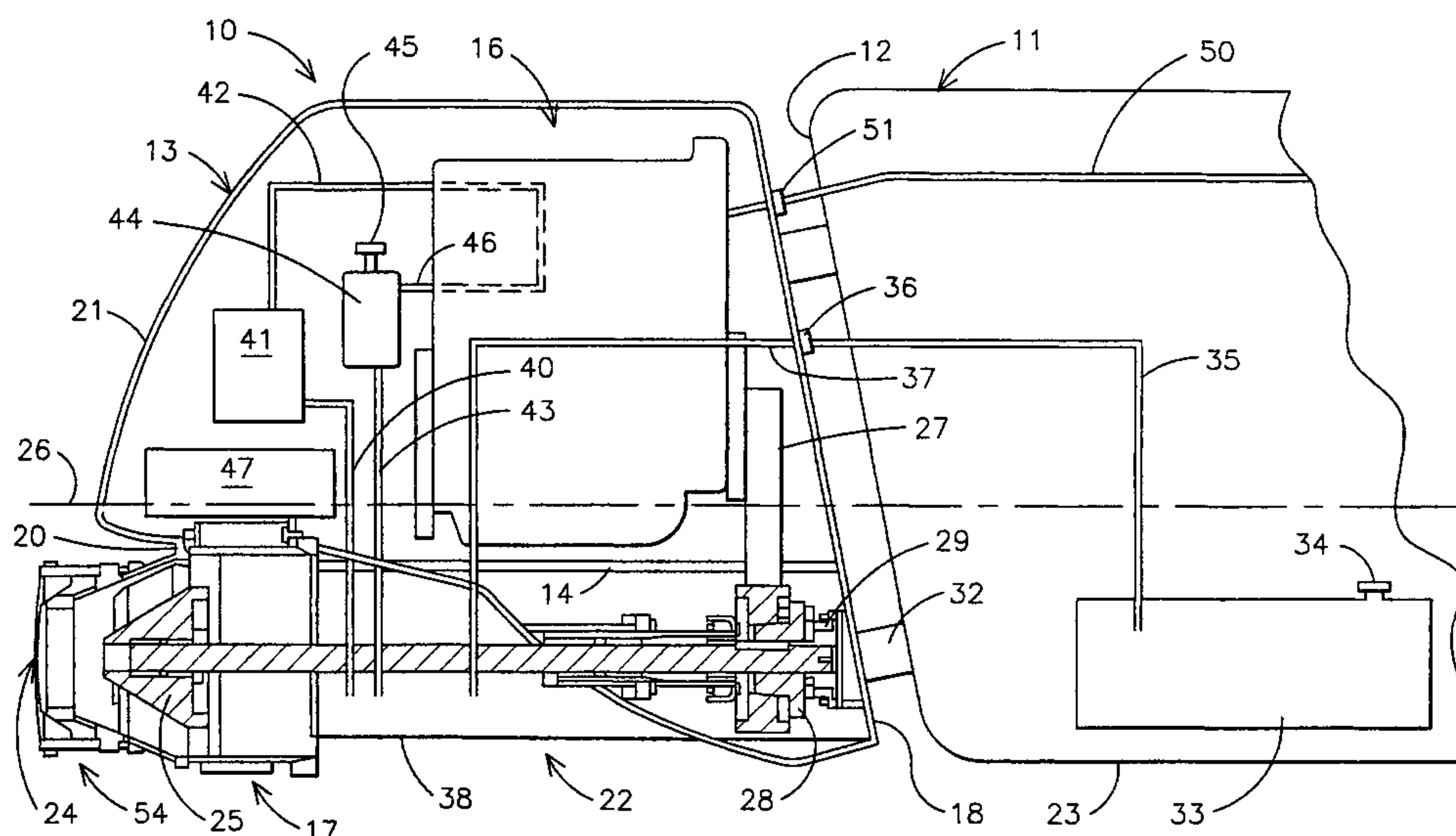
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(54) Title: OUTBOARD JET DRIVE BOAT



(57) **Abstract:** An outboard jet drive boat apparatus has a boat hull (11) having a transom (12) and having a removably attached outboard jet drive (10) attached to the transom (12). The outboard jet drive (10) includes a housing (13) sealed against the intrusion of water and has an engine mounting platform (14) therein having an engine (16) mounted thereon on flexible engine mounts (15). The housing (13) has a sealable entrance through the top thereof and is removably attached to the transom (12). A jet drive unit (17) is attached in the housing (13) below the engine supporting platform (14) and extending generally parallel to the engine (16) and extending from the front of the housing (13) out the rear of the housing (13). A main fuel tank (33) is positioned inside the hull (11) and is connected to a fuel line (35) to an auxiliary fuel tank (38) inside the housing (13) and the auxiliary fuel tank (38) is connected to the engine (16) for feeding fuel to the engine (16).



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OUTBOARD JET DRIVE BOAT

1 BACKGROUND OF THE INVENTION

2

3 The present invention relates to an outboard jet
4 drive boat and especially to an outboard jet drive
5 having an engine and jet drive mounted in a housing
6 which is removably attached to the transom of a boat
7 hull.

8 There have been several proposed types of
9 outboard jet drives for watercraft but most are
10 similar to an outboard motor in which the outboard
11 motor propeller and lower unit have been replaced with
12 a jet drive. The jet drive includes a jet pump in the
13 lower unit that operates so as to provide propulsion
14 force for a watercraft. There are advantages in
15 employing jet pumps for propulsion units as opposed to
16 propellers. The jet drive permits operation in
17 shallower water and also the propeller is shrouded and
18 there is less likelihood of injury. There has been a
19 variety of proposed constructions for outboard jet
20 drives for positioning the jet pump in different
21 positions relative to the hull transom and bottom of
22 the transom but in a typical jet drive, the engine and
23 jet drive are located directly in the hull with an
24 opening in the bottom of the hull for capturing water
25 passing under the hull and then utilizing the jet
26 pumps to thrust the water out the rear of the hull to
27 propel the boat. Outboard jet drive units are made
28 similar to typical outboard motors with a motor
29 driving a drive unit which operates a jet drive unit.

30 Prior art outboard liquid jet propulsion units
31 can be seen in the Nanami U.S. patent, No. 5,536,187,
32 for an outboard jet drive for watercraft in which the

1 jet propulsion unit is disposed forwardly of the
2 transom and beneath the undersurface of the hull for
3 improving its pumping efficiency while the motor is
4 attached to the transom of the boat. In the Jordan
5 U.S. patent, No. 4,459,117, a liquid jet propulsion
6 unit is driven by a conventional outboard motor. The
7 drive of the motor directly rotates an impeller which
8 draws water into the impeller chamber and through an
9 outlet chamber and nozzle to drive the craft forward.
10 In the Miyamoto U.S. patent, No. 4,457,724, an
11 apparatus for driving a surfboard includes an internal
12 combustion engine mounted in a box which is mounted on
13 the rear portion of the surfboard. A water jet
14 propelling device is driven by the internal combustion
15 engine for propelling the surfboard. The exhaust gas
16 system in the water jet propelling device is
17 positioned in the box. In the U.S. patent to Boyer et
18 al., No. 4,942,838, an inflatable watercraft has a
19 portable engine package. The engine package includes
20 an internal combustion engine mounted in a thin
21 fiberglass hull. The base plate of the hull includes
22 a water inlet scoop for feeding water to the pump and
23 an exhaust port for exhausting the water. The pumps
24 high pressure water outlet is pointed in the aft
25 direction above the water line to propel the craft by
26 the reaction force resulting from the high velocity
27 water jet. In the F.C. Clark U.S. patent, No.
28 3,055,175, a marine propulsion unit takes a
29 conventional outboard motor and replaces the prop unit
30 with a marine jet motor using a pump to issue a jet of
31 water to propel a boat. The Parker U.S. patent, No.
32 5,356,319, is for a boat with a removably inboard jet
33 propulsion unit in which the integral jet power unit
34 is encased in a waterproof housing and positioned in

1 a well located in the hull and is mounted to be
2 removed from the hull.

3 The present invention is directed towards an
4 outboard jet boat in which the main fuel tank and
5 controls are mounted within the hull of a boat while
6 the outboard jet drive unit is mounted in a housing
7 with an engine and is removably attached to the
8 transom of the boat. The fuel tank and controls are
9 connected between the hull and outboard drive through
10 quick disconnect couplings. The housing is shaped to
11 support an engine on a platform directly over the jet
12 drive unit for actuating the jet drive unit through a
13 clutch mechanism with the engine and jet drive
14 positioned parallel to each other.

15

16 SUMMARY OF THE INVENTION

17

18 An outboard jet drive boat apparatus has a boat
19 hull having a transom and having a removably attached
20 outboard jet drive attached to the transom. The
21 outboard jet drive includes a housing sealed against
22 the intrusion of water and has an engine mounting
23 platform therein having an engine mounted thereon on
24 flexible engine mounts. The housing has a sealable
25 entrance through the top thereof and is removably
26 attached to the transom of the hull. A jet drive unit
27 is attached in the housing below the engine supporting
28 platform and extends generally parallel to the engine
29 from the front of the housing and through the rear of
30 the housing. The jet drive unit is operatively
31 attached to the overhead engine through a clutch
32 mechanism. A main fuel tank is positioned inside the
33 hull and is connected with a fuel line to an auxiliary
34 fuel tank inside the housing and the auxiliary fuel

1 tank is connected to the engine for feeding fuel to
2 the engine. The fuel pump is mounted in the housing
3 to pump fuel to the engine from the auxiliary fuel
4 tank and from the main fuel tank to the auxiliary fuel
5 tank. Electrical controls are located in the hull and
6 coupled through the housing to the engine to control
7 the engine and jet drive unit. Quick disconnect
8 couplings allow the fuel line and control lines to be
9 rapidly connected and disconnected to the outboard
10 drive unit.

11

12 BRIEF DESCRIPTION OF THE DRAWINGS

13

14 Other objects, features, and advantages of the
15 present invention will be apparent from the written
16 description and the drawings in which:

17 Figure 1 is a sectional view taken through an
18 outboard jet drive boat in accordance with the present
19 invention;

20 Figure 2 is a sectional view of an outboard jet
21 drive housing having a jet drive unit mounted therein;

22 Figure 3 is a rear elevation of the jet drive
23 unit of Figure 2; and

24 Figure 4 is a block diagram of the connected fuel
25 tanks.

26

27 DESCRIPTION OF THE PREFERRED EMBODIMENT

28

29 Referring to Figures 1-3, an outboard jet drive
30 unit 10 is shown attached to the hull of a boat 11 on
31 the transom 12. The outdrive unit includes a housing
32 13 having a platform 14 mounted therein and having a
33 plurality of flexible engine mounts 15 attached to
34 the platform 14. An internal combustion engine 16 is

1 mounted to the engine mounts 15 on the platform 14.
2 The engine is preferably a diesel engine having a
3 turbocharger with an intercooler. A jet drive unit 17
4 is mounted beneath the platform 14 of the housing 13
5 and is attached to the front end 18 of the housing 13.
6 The jet drive unit extends through the rear 21 of the
7 housing, out an opening 20 in the housing 13. The jet
8 drive unit 17 has a water intake 22 and is positioned
9 to be about level with the bottom 23 of the hull 11.
10 A water exhaust 24 extending out the rear of the
11 housing 13. A jet pump 25 is mounted in the jet drive
12 17 for drawing the water thereinto through the jet
13 pump and out the water exhaust 24. The jet drive unit
14 17 is shown below the water line 26 and is supported
15 on brackets 29 on the front 18 of the housing 13.
16 Engine 16 has a belt drive 27 having a clutch
17 mechanism therein for connecting the engine 16 to the
18 drive pulley 28 of the jet drive unit 17. The housing
19 13 is sealed against the intrusion of water thereto
20 and sealed between the platform 14 and the housing 13
21 to prevent water intrusion and to prevent oil or
22 engine antifreeze from escaping therefrom.

23 The top of the housing 30 forms a removable entry
24 portion which is removable from the main part of the
25 housing 31, as shown in Figure 3. The housing 13 with
26 the engine 16 and the jet drive unit 17 mounted
27 therein is attached to the transom 12 of the hull 11
28 with a pair of brackets 32. Brackets 32 allow the
29 housing 13 to be mounted even with the bottom of the
30 boat hull or higher than the bottom of the boat hull
31 so as to reduce ingress of debris and damage to
32 wildlife. The hull 11 has the main fuel tank 33
33 mounted therein having a fuel tank inlet 34 and a fuel
34 line 35 extending therefrom through the transom 12 and

1 to a quick disconnect 36 where it can be quickly
2 coupled or decoupled from an internal fuel line 37
3 located inside the housing 13. The fuel line 37
4 enters an auxiliary internal fuel tank 38 which has a
5 fuel line 40 connected thereto which is connected to
6 a fuel pump 41 for pumping the fuel from the auxiliary
7 fuel tank 38 and from the main fuel tank 33 and into
8 the fuel line 42 where it is fed directly into the
9 fuel injectors of the engine 16. A fuel return line
10 43 is connected to the auxiliary fuel tank 38 and to
11 a de-aerator 44 having a bleed top 45 and having a
12 return fuel line 46 from the engine 16 fuel injectors.
13 A battery 47 is shown mounted within the housing 13
14 and is connected through a ground line 48 to the jet
15 drive unit 17. The engine and drive unit are
16 controlled through electrical control lines 50 which
17 is connected through a quick electrical connector 51
18 which is a waterproof connector mounted through the
19 housing 13 and to the engine 16 and clutch unit 27 to
20 control the operation of the outboard jet drive unit.

21 The rear wall 21 of the housing 13 has a tow
22 bracket 52 attached thereto for attaching a line. The
23 jet drive unit 17 may also have an anti-cavitation
24 plate 53 attached to the exhaust portion 54 of the jet
25 drive unit.

26 As seen in Figure 4, the main fuel tank 33 having
27 the filler cap 34 is connected through the fuel line
28 35 to the auxiliary tank 38 having an auxiliary tank
29 opening 55 and having the fuel pump 41 connected
30 through the fuel line 40 from the auxiliary tank 38
31 and through a line 42 to the fuel injectors and back
32 through a de-aerator 44 from the fuel injectors and
33 through the fuel line 43 back to the auxiliary fuel

34

1 tank 38. A breather 45 is connected to the de-aerator
2 unit 44.

3 In operation, the hull 11 has the fuel tank 33
4 installed therein along with all the controls and
5 sensors. The controls and sensors are connected
6 through the multi-line electrical conductor 50 while
7 the fuel tank 33 is connected through the fuel line 35
8 through the transom 12. The outboard drive unit 10
9 can then be attached to the brackets 32 on the transom
10 12 in a position to align the bottom of the unit with
11 the bottom of the hull 23. Then, merely attaching the
12 quick connect couplings 36 to the fuel line, connects
13 the fuel lines to the outboard jet drive while
14 connecting the quick coupling 51 connects the
15 electrical controls. If the unit has to be removed
16 for any reason, it can be disconnected from the
17 brackets 32 by disconnecting the quick couplings 36
18 and 51 to remove the entire unit. The outboard jet
19 drive unit 10 is made by constructing a waterproof
20 housing 13 mounting the jet drive unit 17 therein
21 underneath the platform 14 and mounting the engine 16
22 to the engine mounts 15 on the platform 14 and then
23 connecting the belt drive clutch mechanism 27 between
24 the engine 16 and the jet drive unit 17 through the
25 pulley 28.

26 It should be clear at this time that an improved
27 removable outboard jet drive boat has been provided
28 which forms a permanent part of the boat while
29 allowing the quick disconnection and removal of the
30 entire unit. This provides the advantages of a
31 conventional inboard jet drive unit with an onboard
32 fuel tank and control. However, the present invention
33
34

1 should not be considered limited to the forms shown
2 which are to be considered illustrative rather than
3 restrictive.

CLAIMS:

1. An outboard jet drive for a boat comprising:
a housing (13) sealed against the intrusion of water, said housing (13) having front and rear sides, and a top and bottom and having a sealable entrance through the top thereof, and said housing (13) adapted to be removably attached to a transom (12) of a hull (11);
an engine (16) mounted in said housing (13) and supported generally horizontally within said housing;
a jet drive unit (17) attached in said housing (13) below said engine (16) and extending generally parallel to said engine (16), said jet drive unit (17) extending from the rear of said housing (13) and being operatively attached to said engine (16) in said housing (13) and the water flow path is substantially axial from upstream of a pump jet to the water exhaust.
2. An outboard jet drive in accordance with claim 1 in which a fuel tank (38) mounted in said housing (13) is coupled to said engine (16).
3. An outboard jet drive in accordance with claim 2 in which said housing (13) has a transom (12) hanging bracket (32) attached thereto and positioned for attaching said housing (13) to the transom (12) of the boat hull (11).
4. An outboard jet drive in accordance with claim 3 in which said engine (16) is a diesel engine.

5. An outboard jet drive in accordance with claim 3 including a fuel pump (41) mounted in said housing (13) and coupled to said fuel tank (38).

6. An outboard jet drive in accordance with claim 4 in which the jet drive unit (17) is mounted through said housing (13) rear side and attached to said front and rear sides.

7. An outboard jet drive in accordance with claim 1 in which said engine (16) has monitoring sensors to provide sensed engine conditions.

8. An outboard jet drive in accordance with claim 1 having a clutched belt drive (27) operatively connecting said engine to said jet drive unit (17).

9. An outboard jet drive in accordance with claim 11 in which said housing (13) partially extends into the water to provide added buoyancy.

10. An outboard jet drive in accordance with claim 12 in which said engine (16) has a sealed engine coolant system whereby the engine cooling is not dependent upon water from the body of water in which the jet drive unit is disposed.

11. An outboard jet drive in accordance with claim 1 in which said engine (16) is mounted in a reverse direction to said jet drive unit (17).

12. An outboard jet drive in accordance with claim 9, in which said housing (13) has an auxiliary battery mounted therein.

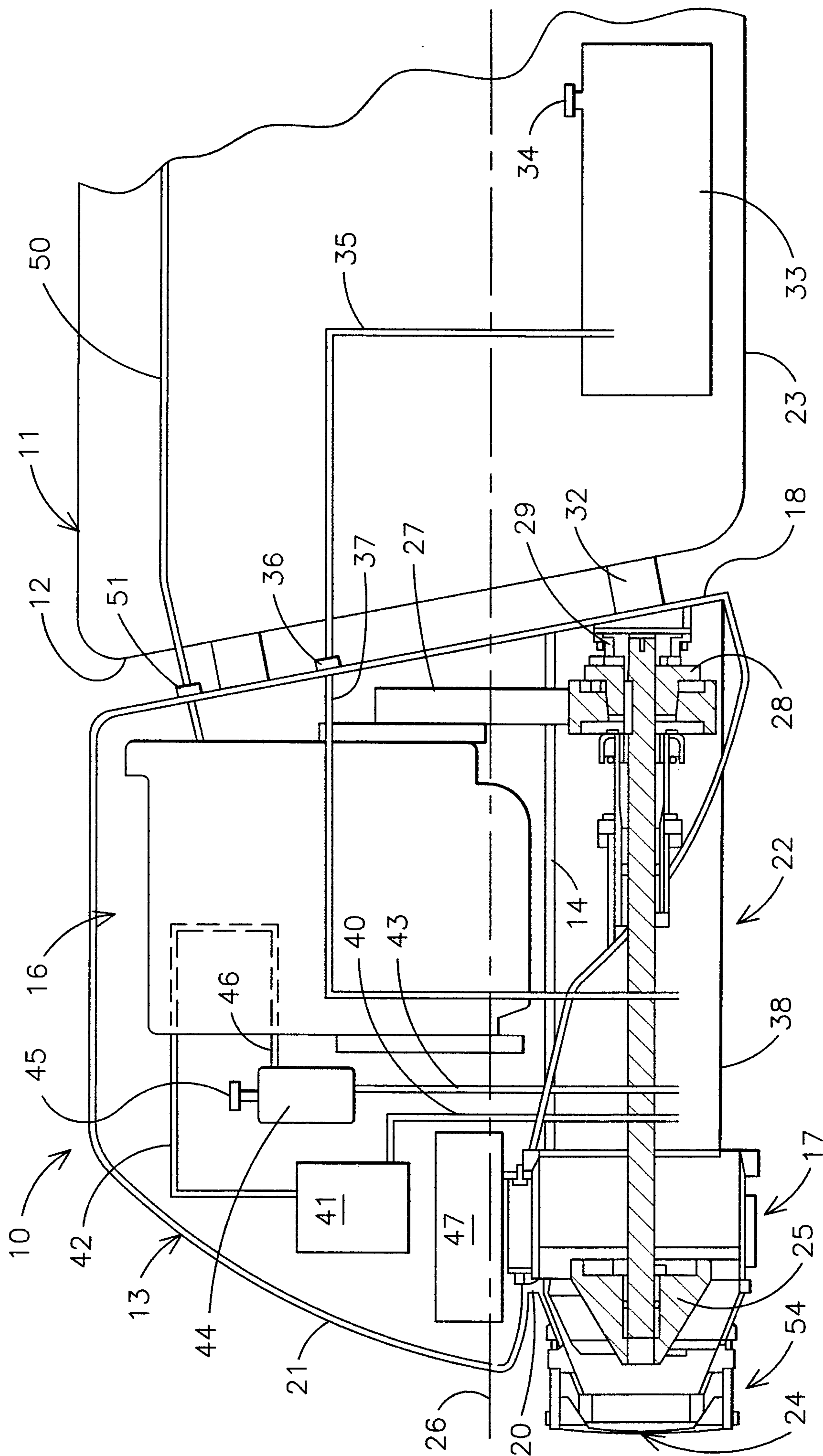


FIG. 1

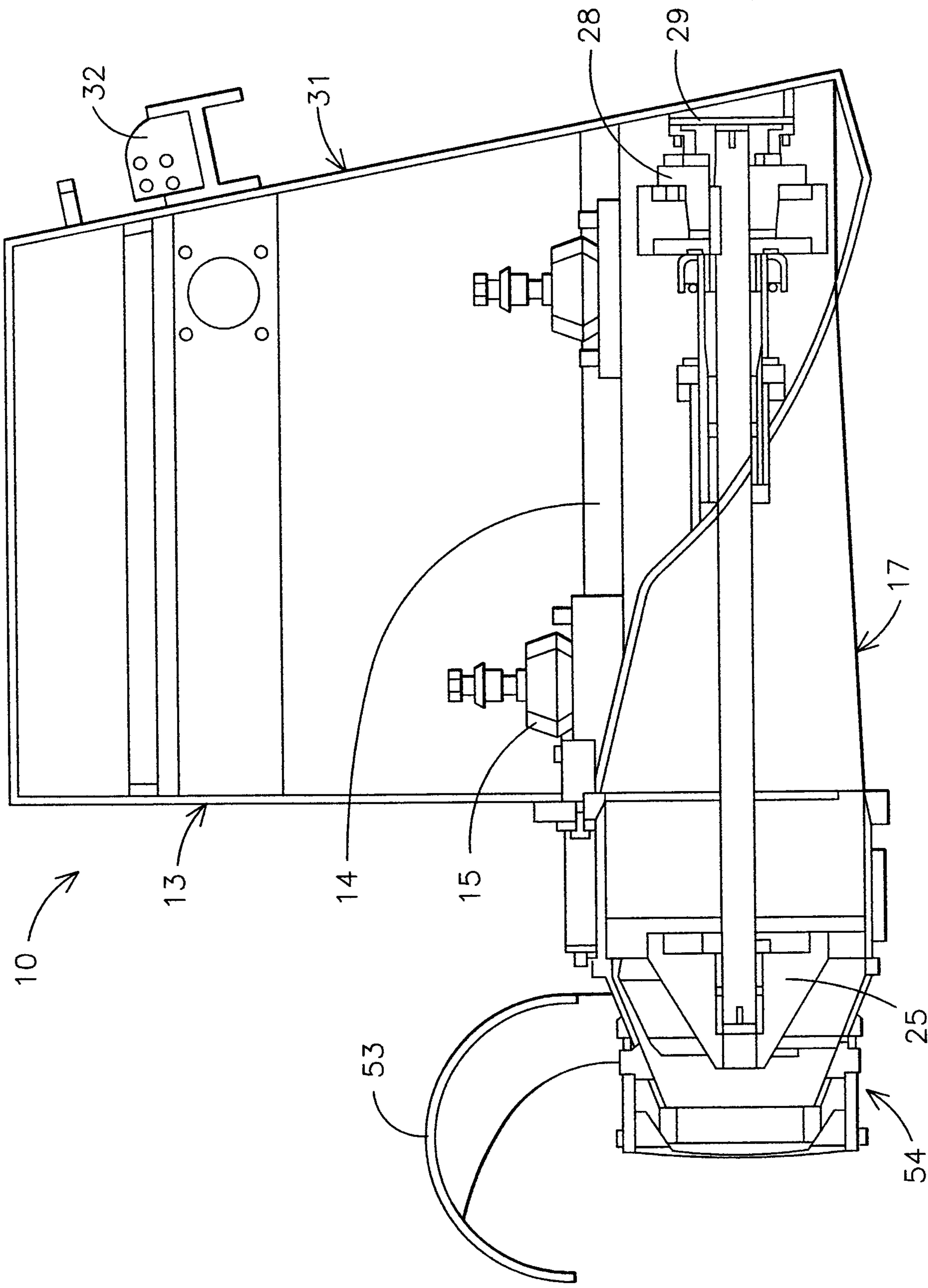


FIG. 2

