

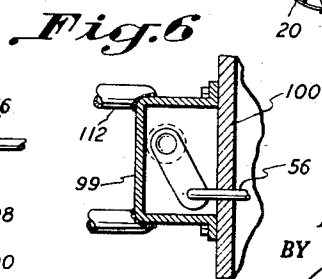
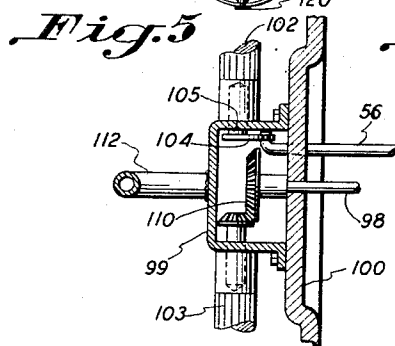
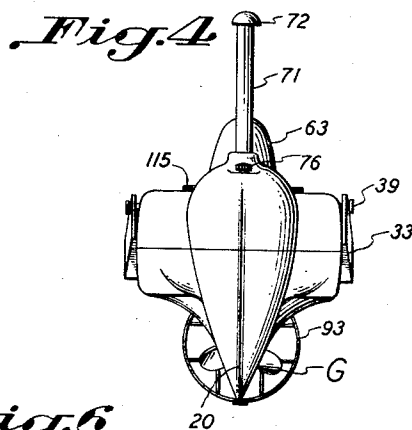
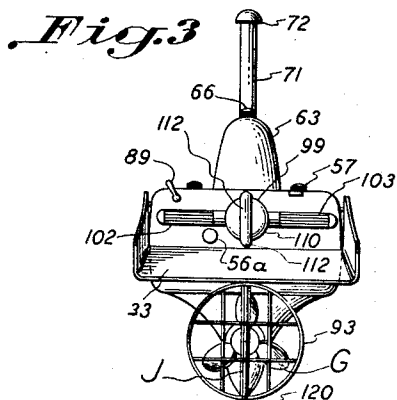
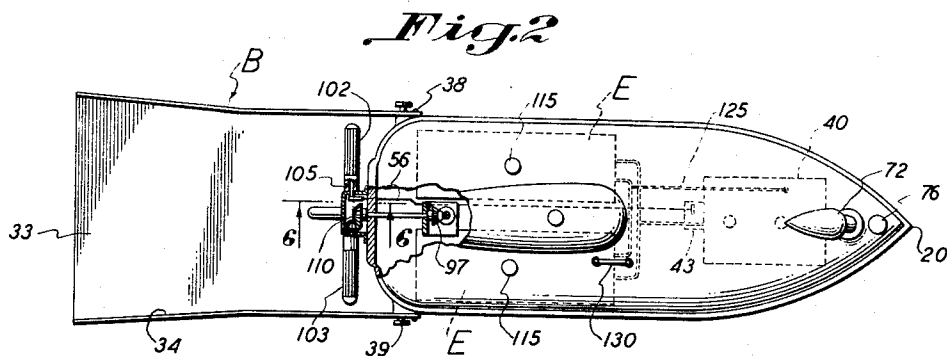
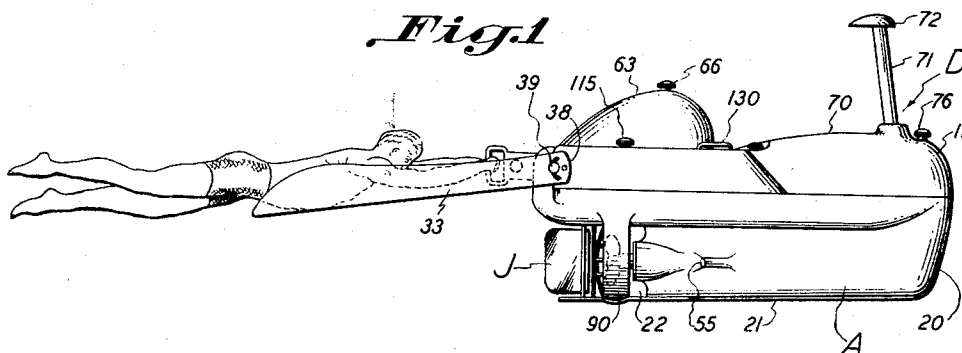
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POWER DRIVEN DRAFT UNIT

2,708,759

Filed April 29, 1952

2 Sheets-Sheet 1



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POWER DRIVEN DRAFT UNIT

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2 Sheets-Sheet 2

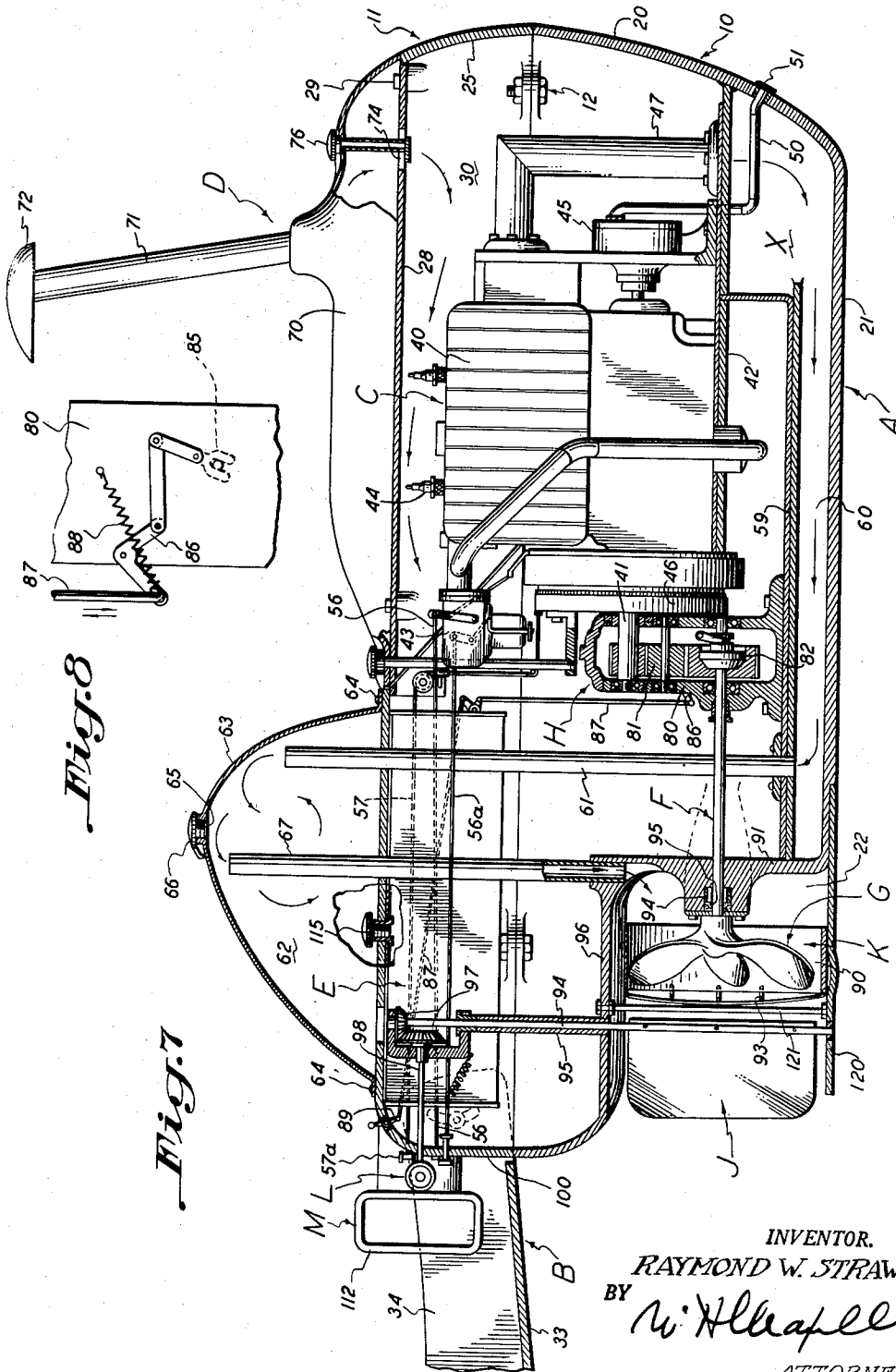


Fig. 8

Fig. 7

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POWER DRIVEN DRAFT UNIT

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4 Claims. (Cl. 9—18)

This invention has to do with a power driven draft unit and it is a general object of the invention to provide a simple, practical, effective structure for moving an object such as a person or a number of persons through or over water.

It is a general object of the present invention to provide a draft unit of the general character referred to which is light and simple of construction and operation, making it useful and practical for various purposes, as for example, for pleasure, for commercial purposes, and also for military purposes.

It is a further object of the present invention to provide a draft unit of the general character referred to which is of simple, compact form and which is such that it can be incorporated in a structure of such size that it can be very easily handled or manipulated by but one person and is such that when in use it will carry a person over or through a body of water at a substantial rate of speed and with safety.

It is another object of the invention to provide a power driven draft unit of the general character referred to which, when in operation, is readily controllable and can be very easily controlled or operated, after but limited training or experience.

It is another object of this invention to provide a power driven draft unit of the general character referred to wherein the major or essential elements are arranged and related to provide a structure which is simple and practical of manufacture and is such that it can be easily and conveniently maintained or serviced.

Another object of the invention is to provide a structure of the type referred to in which an internal combustion engine is employed for power and the exhaust from the engine is handled so that there is a minimum of noise and no heated part likely to burn or inconvenience the operator, or unduly heat other parts.

The structure embodying the invention is characterized by a body formed of separable sections, one a main or hull section and the other a top section. The body defines a chamber in which a prime mover or engine is carried and a stabilizer is attached to and projects from the body and forms a convenient carrier or aid for the user of the structure. The engine is preferably an internal combustion engine supplied with air through an air supply means including an air inlet tube that projects up from the body to a point where its air receiving end is always above the level of water in which the structure is operated. Exhaust from the engine is handled in the structure so that it is effectively cooled and the sound of the exhaust is muffled. A shaft driven propeller operates the body and is driven from the engine through a speed reduction mechanism and under control of a clutch. A guard is provided in connection with the propeller so that the user is not subject to the danger of being injured by the propeller. A control mechanism is provided at the rear of the body accessible to a person located at or on the stabilizer and includes elements by which a rudder, provided for steering the structure, and the carburetor, of the engine, can

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be conveniently and accurately controlled. A draft device characterized by a grip is provided at the rear of the body and is accessible to a person operating the structure or adapted to be drawn thereby.

The various objects and features of my invention will be fully understood from the following detailed description of a typical preferred form and application of my invention, throughout which description reference is made to the accompanying drawings, in which:

Fig. 1 is a side elevation of a typical embodiment of the present invention illustrating, generally, the manner in which it is operated, being a view showing a person engaged in operating the structure. Fig. 2 is an enlarged plan view of the device as shown in Fig. 1 with certain parts broken away to show in section. Fig. 3 is a rear end view of the structure as shown in Fig. 2. Fig. 4 is a front end view of the structure as shown in Fig. 2. Fig. 5 is an enlargement of a portion of the structure shown in Fig. 2. Fig. 6 is an enlarged, detailed, sectional view of a part of the structure, being a view taken as indicated by line 6—6 on Fig. 2. Fig. 7 is an enlarged, longitudinal, detailed, sectional view of the structure showing the general arrangement and relationship of the principal elements, and Fig. 8 is an enlarged view of a portion of the structure, showing parts provided for the operation of the clutch controlling the drive from the engine to the propeller shaft.

The structure as provided by the present invention includes, generally, a body A characterized by a main or hull section 10, a top section 11 and means 12 coupling or connecting the sections together. The stabilizer B is coupled to and projects from the body, preferably from the rear thereof, and a prime mover or engine C is carried within the body. An air supply means D is provided to supply air to the body for the engine C and one or more fuel containers E is provided in the body. A propeller shaft F is carried by the body and projects therefrom to operate a propeller G. A drive means H couples the engine C and shaft F and a rudder J is provided for effecting steering of the structure. A guard means K is provided in connection with or at the propeller G and a control mechanism L and draft means M are provided at the rear of the body accessible to a person engaged with the stabilizer.

The body A, in its preferred form, is of sectional construction and in the case illustrated it includes a main or hull section 10, which is normally submerged when the structure is in use, and a top section 11 which is joined to the hull section 10 by a connecting means 12 and may be submerged to various degrees as the structure operates.

The hull section 10 of the body A is preferably formed to have a suitably pointed bow end 20, and a substantially straight bottom or keel portion 21 extending from the forward end of the body to the rear portion thereof. The rear end portion of the body is characterized by a recess or propeller cavity 22 as clearly shown in Fig. 7 of the drawings.

The top section 11 of the body has a marginal depending flange portion 25 that registers with or engages the upper edge of the hull section, and this part of the top section is joined to the hull section by the fastening means 12 which, in practice, may be releasable means of any suitable form or type. The top section 11, in the case illustrated, is preferably provided at its forward portion with a removable or detachable cover 28 normally held in place by releasable fasteners 29. The cover 28 occurs over the engine C and makes possible access to the engine when that is necessary.

The body A, as hereinabove described, is formed, that is, it is shaped and proportioned, so as to define a closed chamber 30 of such size and shape as to adequately ac-

commodate the parts required to be carried by or in the body, and it is elongate in form and such as to move through a body of water with a minimum of resistance and disturbance of the water, while at the same time having the desired buoyance and stability.

The stabilizer B, as provided by the present invention, is preferably an elongate, fin-like element connected or coupled to the rear end portion of body A to project rearwardly therefrom. In the case illustrated the stabilizer is characterized by a substantially flat bottom 33 and it has upturned side portions 34. The elements 33 and 34 form a trough-like structure in which a person or a portion of a person operating the device is received, as indicated in Fig. 1 of the drawings. The stabilizer steadies the structure as it operates and it forms an effective guard or shield for the operator.

A suitable means is provided for connecting the stabilizer B to the body A and it is preferred that this means be such as to enable the stabilizer to be varied or adjusted as to the angle at which it extends rearwardly from the body. In the case illustrated the stabilizer is shown coupled to the body by pivot pins 38 and screw clamps 39 are provided for setting the stabilizer in the desired position or at the desired angle. Ordinarily the stabilizer may be set to extend rearwardly and somewhat downwardly in a manner such as is illustrated in the drawings.

The engine C is preferably an internal combustion engine located at the forward portion of the body, that is in the chamber 30 at the forward end portion thereof. It is to be understood that in practice any suitable form or type of engine may be employed in carrying out the invention and that the engine employed may be varied with the class of construction or the service that is to be performed.

In the particular case illustrated the engine C is illustrated as involving a main block 40 and a power shaft 41 projecting rearward from the block. The engine is carried on a suitable mounting plate 42 fixed in the hull section 10 of the body A and in the particular case illustrated the plate 42 is, in effect, a horizontal partition occurring in the hull section somewhat above the bottom thereof.

The engine is provided with or may include various accessories such, for example, as a carburetor 43, the necessary ignition elements 44, a coolant circulating pump 45, a starter mechanism 46, an exhaust manifold 47, etc. In accordance with the invention the pump 45 is located at the forward end of the engine and an intake or supply line 50 for the pump 45 extends from the forward end of the hull section 10 to the pump. The line 50 is provided at its forward or inlet end has a suitable screen or filter 51. The pump 45 circulates coolant or water through the cooling cells of the block 40 following which the coolant is discharged at the exterior of the hull as at discharge openings 55.

The carburetor 43 is shown as provided with a suitable control gear 56 including an element extending to the rear of the body. An auxiliary control or choke operating element 56^a is provided and extends to the rear of the body. The starter mechanism 46 may be of any suitable character and, in practice, may be provided with an operating means including an element 57 extending to the rear of the body where it is provided with an operating handle 57^a.

The exhaust manifold 47 extends from the engine block 40 to the mounting plate 42 of the engine just forward of the engine, where it discharges downwardly into a chamber X formed between the bottom of the hull section 10 and the mounting plate 42. An elongate partition 59 occurs in the hull section 10 below the plate 42, and cooperates with the bottom of the hull section 10 to define an elongate passage 60 extending lengthwise of the hull section 10. A transfer duct 61 is located in the rear portion of the body A and extends upward from the passage 60 into a chamber 62 formed by a shell-like hous-

ing 63 provided on or above the top section 10 of the body at the rear portion thereof. The housing is secured to the top section 11 by suitable releasable fastening means 64 and is provided with an opening 65 provided with a closure 66 that can be opened or closed at will to provide for escape of burnt gases at the top of the housing 63, as circumstances may require. A tail pipe or exhaust line 67 extends from the chamber 62 defined by the housing 63 downwardly through the rear end portion of the body A to discharge in the propeller cavity 22 provided at the lower rear end portion of the body.

Assuming the closure 66 to be closed, exhaust from the engine C is conducted through the circuitous course provided by manifold 47, passage 60, duct 61, housing 63 and pipe 67, in the course of which flow or passage the gases are effectively cooled. The major portion of the heat initially in the exhaust gases is dissipated at the bottom of the hull section as the exhaust flows through passage 60. Through the tortuous flow and cooling of the exhaust gases an effective muffling is gained. Further, it is to be noted that with the exhaust gases discharging in the propeller cavity 22 the discharge is below the surface of the water in which the structure operates, thus aiding in the muffling action. If silent operation or muffling is not important the closure 66 can be opened and the exhaust discharged from the housing 63 into the air.

The air supply means D in the preferred form of the invention includes a shell or hood-shaped manifold 70 mounted on the top 11 of body A at the forward portion of the body and an air inlet duct or tube 71 that extends up from the manifold 70 and is provided at its upper end with a suitable trap 72 serving to admit air only into the duct or tube 71. The structure just described may, in practice, be of the so-called "snorkel tube" type. The manifold 70, being located above the removable plate 26 defines an air chest supplied with air by means of the tube 71, and one or more air inlet ports 74 may be provided in the plate 28 so that air is communicated from within the manifold 70 to the chamber 30 in the body A. In practice suitable releasable fastening means 76 may be provided for normally securing the manifold 70 in place on or above the top section 11 of body A.

The propeller shaft F is suitably mounted in the body A and projects into the propeller cavity 22 and the propeller G, which is preferably a conventional screw type propeller, is fixed on the shaft in the cavity 22.

The drive means H provided between the engine C and propeller shaft F preferably includes a speed reducing mechanism and a clutch. In the case illustrated the means H includes a housing 80 carrying speed reducing gears 81 forming a suitable gear train. The first gear of the gear train is on and driven by the engine shaft 41. The last gear of the train is rotatable on the propeller shaft F. A suitable clutch 82 is provided for coupling the last driven gear and the propeller shaft and is under control of a suitable operating mechanism.

In the particular case illustrated a clutch operating yoke 85 is operated by a system of levers, including a bell crank 86 and an operating rod 87 that extends to the rear end portion of the body A. A spring 88 is provided in connection with the bell crank so that it operates over-center and serves to hold the clutch either open or closed, depending upon the position to which it has been operated, as by means of a manual operating lever 89 located at the rear end portion of body A. The lever 89 connects to rod 87.

The guard K provided by the present invention serves to shield or protect the propeller G so that it will not injure the operator of the device, and in the form shown it is an annular or tubular element fixed to the rear end portion of the hull section 10 of body A to surround and be substantially concentric with the propeller. The guard is preferably provided at its rear end with a protective screen 93 which does not materially affect the flow of

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water rearward of the propeller but does shield the propeller against a person contacting it.

In the preferred construction the wall 91 of the hull section 10 carries a bearing 94 supporting the shaft F and a suitable seal or packing means 95 seals around the shaft to prevent the entrance of water into the hull.

The rudder J is preferably located in the rear end portion of the cavity 22 or immediately behind the propeller G, and it is shown carried by a stem 94 that projects upwardly through a tubular case 95 that projects upward from the top wall 96 of cavity 22. The upper end of the stem projects above the case 95 and is connected to an operating shaft 98 as by means of bevel gears 97. The shaft 98 extends rearwardly and projects from the rear end of the body A.

In the preferred construction the lower end of the stem 94 carrying rudder J is supported or guided by an extension or skid-like part 120 that projects rearwardly from the bottom or keel portion 21 of the hull section 10 and this member or extension 120 is braced by means of a rod 121 located between the rudder stem and the propeller and extending from the extension 121 to the wall 96, as clearly shown in Fig. 6 of the drawings.

The control mechanism L is located at the rear end portion of body A, preferably at the upper rear corner thereof, and includes a carrier 99 fixed to and projecting rearwardly from the rear end wall 100 of the top section 11 of body A. Grips 102 and 103 are supported by the carrier 99 and project in opposite directions therefrom or from opposite sides thereof. The grips are independently or individually rotatable and one of them, for instance, grip 92, is connected with the rod or member 56 that controls the carburetor 43. The connection is shown as through a lever arm 104 on the rotatable shaft 105 that carries the grip 102.

The grip 103 is connected with the shaft 98 which operates the rudder, and in the case illustrated the connection is through gears 110. One gear is on the shaft that supports the grip and the other gear is on the shaft 98. The construction just described provides the grips extending transversely of the structure at a position where they can be conveniently grasped by the hands of the person using the machine. Through the construction provided simple rotation of the grips effects the control of speed as well as the direction of operation.

The draft means M is provided as a means whereby a person can maintain connection with the structure, as by gripping the means M, or any suitable object can be connected to the structure by any suitable form of connection. In the case illustrated the means M is shown as including a loop-shaped grip 112 rigid with and projecting rearwardly from the rear wall 100 of the top section 11 of body A. The grip is located centrally of the structure and is of such size and shape that it can be readily gripped by the hand or hands of a person or persons, or can be employed to receive a tow line, or the like.

The fuel containers or tanks E are preferably located in the rear portion of the body A, as for instance, in practice there may be two fuel tanks E located in the upper rear portion of the body and the tanks may be provided with normally closed filling openings 115 accessible when the housing 63 is removed. It is to be understood that suitable connections may be provided between the tanks and the engine, including a pressure connection 125 whereby feed pressure is maintained on the tanks.

In practice one or more handles 130 may be provided on the structure, for instance, on the body, to facilitate convenient handling of the structure as a whole, either in or out of water.

In practice it is preferred to construct the mechanism of the present invention of simple, light parts. For example, the body A can be formed of aluminum or a like material, or alloy of materials, and the various parts

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included in the structure can be of simple, light construction, all to the end that the mechanism is not only simple and inexpensive of manufacture but is light and convenient to handle and operate.

From the foregoing description it will be apparent that a person to operate the structure positions the stabilizer B at the desired angle projecting rearwardly from the body A and as the device is operated the user can maintain engagement with the structure by holding on to the grips 102 and 103 and may extend his body substantially straight in a manner such as is illustrated in Fig. 1, to the end that the apparatus and the user are closely confined to the water and are not readily visible from an appreciable distance. The user can, however, assume various positions relative to the body of the device or to the stabilizer. In practice the positioning of the stabilizer will vary the manner in which the structure operates or more or less planes, and it will be apparent that the structure can be operated or can be loaded to operate with the body A at various depths in the water, so long as the air tube 71 is maintained a proper distance above the surface of the water.

Having described only a typical preferred form and application of my invention, I do not wish to be limited or restricted to the specific details herein set forth, but wish to reserve to myself any variations or modifications that may appear to those skilled in the art and fall within the scope of the following claims.

Having described my invention, I claim:

1. A draft unit of the character described including, an elongate body defining a closed chamber, a propeller at the exterior of the body, an internal combustion engine in the body and adapted to drive the propeller, air supply means adapted to supply air to the chamber and including an air duct projecting upwardly from the body, means adapted to handle exhaust from the engine within the body including a partition in the body defining a passage in the body adjacent the bottom of the body and adapted to conduct the engine exhaust, a housing defining an exhaust chamber at the exterior of the body, and ducts adapted to carry the exhaust from the passage to the exhaust chamber and from the exhaust chamber to the exterior of the body to discharge under water in which the unit is carried, and a stabilizer carried by the body and projecting rearwardly therefrom, the stabilizer being adapted to receive and shield an operator within reach of the body.

2. A draft unit of the character described including, an elongate body defining a closed chamber, a propeller at the exterior of the body, an internal combustion engine in the body and adapted to drive the propeller, air supply means adapted to supply air to the chamber and including an air duct projecting upwardly from the body, means adapted to handle exhaust from the engine within the body including a partition in the body defining a passage in the body adjacent the bottom of the body and adapted to conduct the engine exhaust from the forward end portion of the body to the rear end portion thereof, a housing defining an exhaust chamber at the exterior of the body above the rear portion thereof, and ducts adapted to carry the exhaust from the passage to the exhaust chamber and from the exhaust chamber to the exterior of the body to discharge under water in which the unit is carried, and a stabilizer carried by the body and projecting rearwardly therefrom, the stabilizer being adapted to receive and shield an operator within reach of the body.

3. A draft unit of the character described including, a body having separable hull and top sections defining a closed chamber, an internal combustion engine mounted in the forward portion of the chamber, an inlet means for the engine including a shell on the top section at the forward portion thereof defining a space which is in communication with the chamber and a duct projecting up from the shell and receiving air at its upper end and

delivering air to said space, means handling exhaust from the engine including a partition in the hull section defining a passage adjacent the bottom of the hull section receiving exhaust at the forward end portion of the body and conducting it to the rear end portion thereof, a housing on the top section at the rear end portion thereof, and ducts carrying exhaust from the passage to the housing and from the housing to the exterior of the unit, a propeller shaft carried by the hull section and projecting from the rear thereof, a propeller on the rear end of the shaft, a drive from the engine to the shaft including a speed reducing mechanism and a clutch, a rudder carried by the body rearward of the propeller, control means for the engine and rudder including operable grips at the rear end portion of the body, an elongate stabilizer, and means coupling the forward end of the stabilizer to the rear end portion of the body for angular adjustment of the stabilizer relative to the body.

4. A draft unit of the character described including, a body having separable hull and top sections defining a closed chamber, an internal combustion engine mounted in the forward portion of the chamber, an inlet means for the engine including a shell on the top section at the forward portion thereof defining a space which is in communication with the chamber and a duct projecting up from the shell and receiving air at its upper end and delivering air to said space, means handling exhaust from the engine including a partition in the hull section defining a passage adjacent the bottom of the hull section receiving exhaust at the forward end portion of the body

and conducting it to the rear end portion thereof, a housing on the top section at the rear end portion thereof, and ducts carrying exhaust from the passage to the housing and from the housing to the exterior of the unit, a propeller shaft carried by the hull section and projecting from the rear thereof, a propeller on the rear end of the shaft, a drive from the engine to the shaft including a speed reducing mechanism and a clutch, a rudder carried by the body rearward of the propeller, control means for the engine and rudder including operable grips at the rear end portion of the body, an elongate stabilizer, means coupling the forward end of the stabilizer to the rear end portion of the body for angular adjustment of the stabilizer relative to the body, a fuel tank in the rear portion of the body, and a draft member projecting from and accessible at the rear end of the body.

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