Aug. 19, 1958 J. A. McINTOSH 2,847,966

OUTBOARD MOTOR PUMP

Filed Dec. 14, 1955

2 Sheets-Sheet 1

FIG. 5

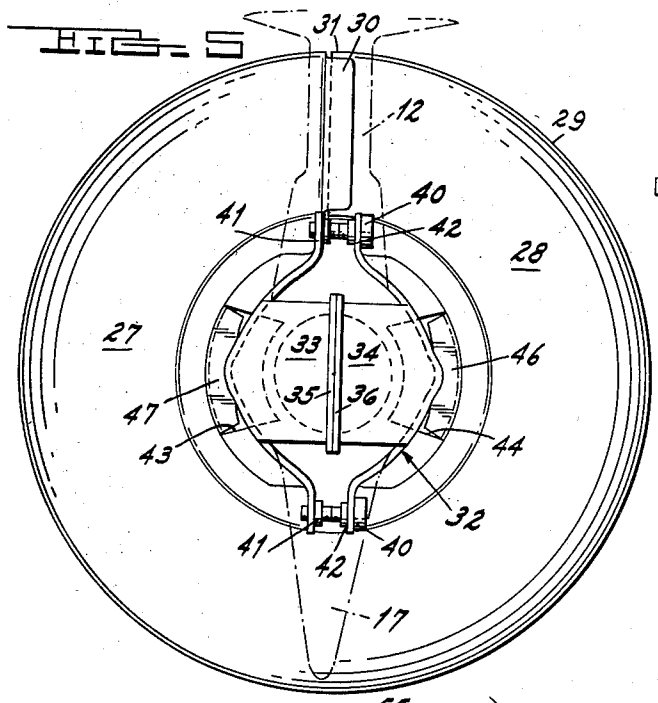


FIG. 1

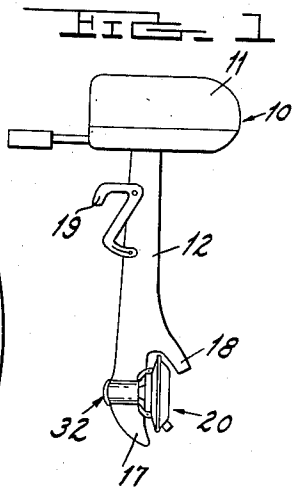


FIG. 7

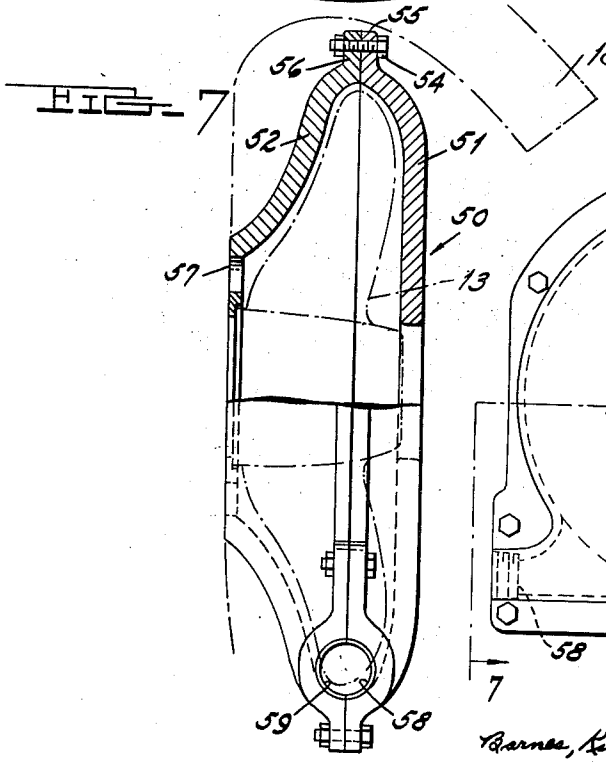
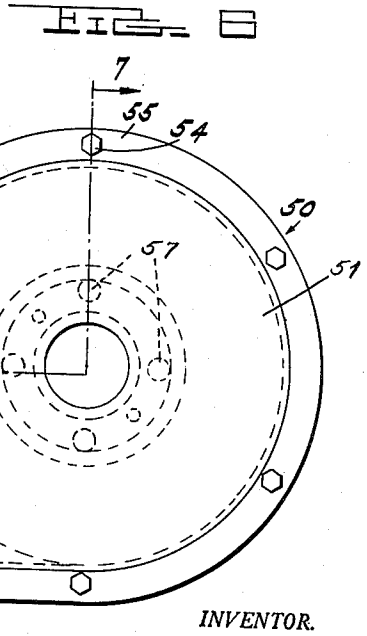


FIG. 6



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FIG. 2

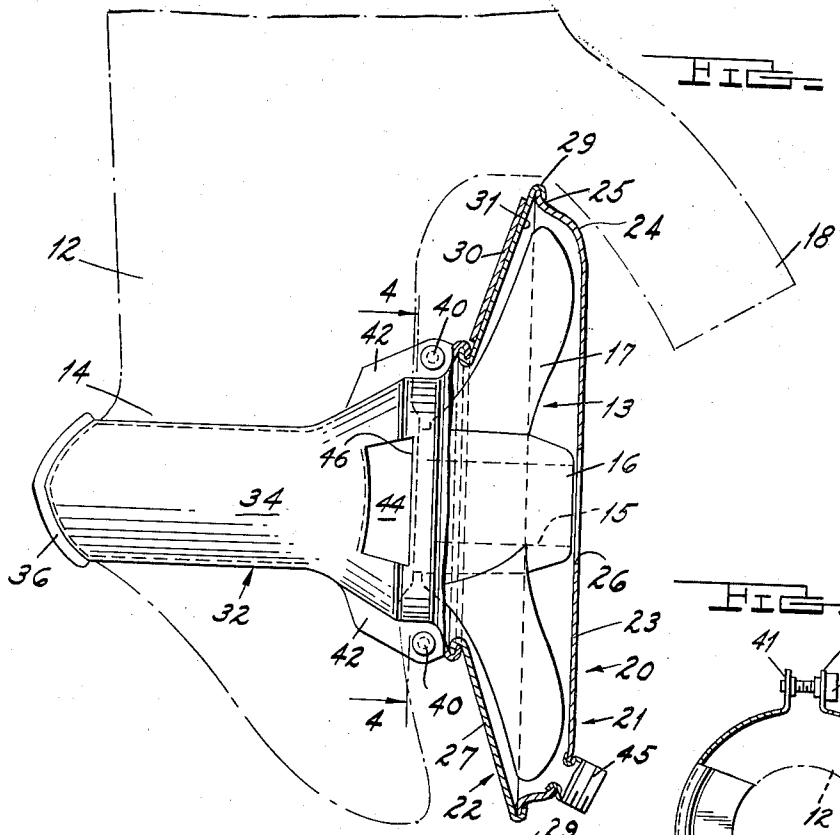


FIG. 4

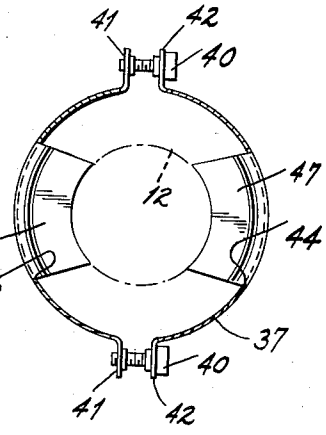
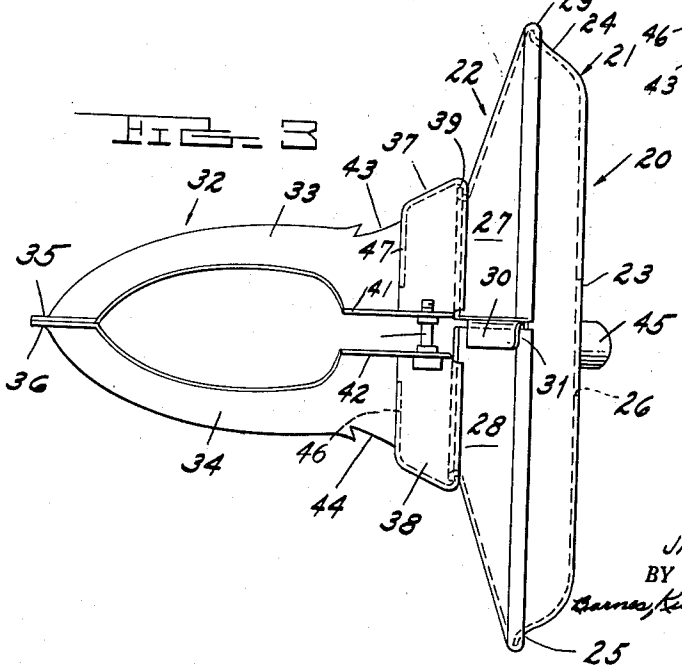


FIG. 3



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OUTBOARD MOTOR PUMP

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Application December 14, 1955, Serial No. 553,084
20 Claims. (Cl. 115—17)

This invention relates to outboard motors such as are used for propelling boats and particularly to means for converting such an outboard motor into a water pump.

Outboard motors which are used to propel boats generally are mounted on the side of boats and comprise a small internal combustion engine and a housing which is adapted to project over the side of the boat downwardly into the water and enclose the driving connections to a propeller mounted on a generally horizontal shaft in the lower part of the housing. The propeller includes a hub and blades projecting radially therefrom. The blades have a configuration such that rotation of the propeller produces a propelling force on the motor normal to the plane of rotation of the propeller. Such motors often include an exhaust tube which generally projects downwardly into the water and to the rear of the propeller.

It is an object of this invention to provide a mechanism for converting such an outboard motor to use as a water pump.

It is a further object of the invention to provide such means which may be readily mounted and removed from the outboard motor.

It is a further object of the invention to provide such a means which may be mounted and dismounted from the outboard motor without disassembly of the motor.

Basically, the invention comprises providing a housing surrounding the path of rotation of the propeller, and providing an inlet to said housing adjacent the axis of the propeller. In addition, the housing includes an outlet along the periphery thereof. When the housing is submerged in water and the internal combustion engine is operated to rotate the propeller, water is drawn in through the axial inlet and discharged out of the peripheral outlet at a high pressure.

In the drawings:

Fig. 1 is an elevational view of an outboard motor embodying the invention.

Fig. 2 is a part sectional view on an enlarged scale of one form of the invention, a portion of the outboard motor being shown in dotted lines.

Fig. 3 is a plan view of the same.

Fig. 4 is a sectional view on the line 4—4 in Fig. 2.

Fig. 5 is an end elevational view.

Fig. 6 is an end elevational view of a modified form of the invention.

Fig. 7 is a sectional view taken along the line 7—7 in Fig. 6.

As shown in Fig. 1, an outboard motor **10** comprises a small internal combustion engine **11** and a drive housing **12** projecting downwardly from the engine **11** and enclosing driving connections to a propeller **13** mounted on a short shaft **15** at the lower end of the housing **12**. The shaft **15** on which the propeller **13** is mounted is operatively connected to the engine **11** by driving connections (not shown) enclosed in the drive housing **12**. The propeller includes a hub **16** and blades **17** projecting radially therefrom. The configuration of the blades is such, as well known in the art, that rotation of the propeller produces a propelling force on the motor normal to the plane of rotation of the propeller. The portion **14** of the drive housing **12** into which the shaft **15** projects is generally elliptical. The engine also usually includes an exhaust tube **18** which is connected to the engine **11** and directs the exhaust gases to one side of the plane of rotation of the propeller **13**. The engine is provided with a mounting bracket **19** whereby it may be attached to the side of a boat or the like with the housing **12** projecting downwardly into the water so that the propeller **13** and the end of the exhaust tube **16** are submerged in the water.

When the engine is operated to rotate the propeller **13**, a thrust is provided such that the engine and, in turn, the boat to which it is attached, is propelled in a direction perpendicular to the plane of rotation of the propeller **13**. The exhaust gases are directed rearwardly of the direction of movement by the exhaust tube **18**.

The aforementioned construction is typical of outboard motors which are well known in the art.

My invention comprises adapting such an outboard motor so that it may be readily used as a pump for pumping water.

As shown in Figs. 2 and 3, the invention generally comprises providing a pump housing **20** around and in close proximity with the propeller **13**. The pump housing **20** consists of two complementary halves **21** and **22** which substantially encase and enclose the entire path of rotation of the propeller **13**. As shown in Fig. 2, the outer half **21** of the pump housing **20** comprises a generally flat central portion **23** extending substantially parallel to the plane of rotation of the propeller **13** and a curved peripheral portion **24** having a circumferential lip **25**. The half **21** also is provided with an opening **26** positioned centrally of the portion **23** adjacent the hub **14** of the propeller **13**. The inner half **22** of the pump housing **20** comprises two complementary sections **27**, **28** which interengage at overlapping portions **30**, **31** to form a frusto-conical ring. The sections **27**, **28** are provided with an inwardly turned rim **29** at the outer periphery thereof which engages with the lip **25** of the outer half **21**.

The pump housing **20** is mounted in fixed position relative to the drive housing **12** of the outboard motor by means of a bracket **32** removably connected to the housing **12** and the pump housing **20**.

The bracket **32** comprises complementary bracket sections **33**, **34** adapted to engage the generally elliptical portion of the driving housing **12**. The bracket sections **33**, **34** are generally curved to conform to the shape of the elliptical portions and include complementary engaging portions **35**, **36** at one end thereof and spaced collars **37**, **38** flaring outwardly at the other end thereof. The collars **37**, **38** are provided with inwardly turned flanges **39** at the periphery thereof which engage with and hold the sections **27**, **28** of inner half **22** of the pump housing **20**. The bracket sections **33**, **34** are held in position, and thereby maintain the pump housing **20** in position, by means of bolts **40** passing through short upstanding walls **41**, **42** on the sections **33**, **34**, respectively. The bracket sections **33**, **34** are also provided with openings **43**, **44**, respectively, adjacent the spaced collars **37**, **38**, which serve as inlets in order that the water may enter the pump housing **20**. The portions of the brackets between the openings **43**, **44** form inwardly directed tabs **46**, **47** which engage the driving housing **12** and maintain the pump housing **20** in axial alignment with the propeller shaft **15**. The pump housing **20** is also provided with an outlet **45** at the periphery thereof along the curved portion **24** of the outer path **21**. This outlet **45** may be threaded so that a hose may be readily attached or detached thereto.

In operation, with the pump housing **20** in position, the motor and pump housing are submerged in water. When the internal combustion engine of the outboard motor is operated and the propeller **13** is rotated water will be drawn into the housing through the inlets **43, 44** and forced outwardly under pressure through the outlet **45**. The opening **26** in the outer half **21** of the pump housing **20** may also serve as an inlet. The provision of the opening **26** prevents any bearing contact of the hub **14** on the housing.

As an example of the efficiency of the pumping operation, I have forced a stream of water eighty feet into the air by using an outboard motor having a nine inch propeller and operated at full load speed of 2800 R. P. M.

Although I do not wish to be bound by the theory involved, I believe that the pressure with which the water is forced out of the outlet **45** is produced by the combined thrust and centrifugal action of the propeller on the water. The pumping action which results is greater than the pumping action produced by a pump of similar size which operates on a centrifugal principle or a pump of similar size which operates on the water wheel principle.

The housing **20** and bracket **32** may be economically and easily manufactured by stamping relatively thin sheet metal.

A modified form of the invention is shown in Figs. 7 and 8 wherein the pump housing **50** comprises an outer half **51** and an inner half **52** having the same general configuration when in assembled position as the path of revolution of the propeller **13**. In this form of the invention, the inner half **52** is adapted to be mounted on the housing **12** after removal of the propeller. The propeller is then again mounted in position and the outer half **51** brought into complementary relationship with the inner half **52** and attached thereto by bolts **54** passing through peripheral flanges **55, 56** in the halves **51, 52**, respectively. The inlet to the housing is provided by openings **57** adjacent the hub of the propeller. The outlet is formed along the periphery of the housing by complementary grooves **58, 59** which form an outlet opening when the halves **51, 52** are in complementary assembled relationship.

The housing **50** may be made by casting each half thereof separately.

It can thus be seen that I have provided means for readily converting an outboard motor to use for pumping water which means can be easily mounted or removed from the outboard motor.

I claim:

1. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, said engine having an exhaust pipe directing the exhaust gases of combustion toward one side of the plane of rotation of the propeller, the combination comprising a pump housing surrounding the propeller and having a configuration similar to the solid of revolution generated by the rotation of said propeller, said housing being substantially imperforate and having an inlet opening generally axially of said propeller on the side of said propeller opposite said exhaust pipe, an outlet opening along the periphery of said housing, and an opening adjacent said hub on the side of said housing opposite said inlet opening, and means for mounting and supporting said housing in position surrounding said propeller, whereby when the housing is mounted and supported in position and the propeller is rotated, the boat remains stationary in the water and water is pumped through said inlet opening into said housing and out of said outlet opening.

2. The combination set forth in claim 1 wherein said means for mounting comprises a bracket engaging said engine housing and supporting said pump housing.

3. The combination set forth in claim 2 wherein said bracket comprises complementary halves surrounding said engine housing and adapted to support said pump housing.

4. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, said engine having an exhaust pipe directing the exhaust gases of combustion toward one side of the plane of rotation of the propeller, the combination comprising a pump housing surrounding the propeller, said housing comprising complementary halves, one said half comprising a generally flat portion and a curved peripheral portion and having an opening located generally centrally thereof, the other said half comprising a multiplicity of curved sections which interengage to form a frusto-conical surface, said halves having interengaging surfaces to thereby define a hollow housing having a configuration similar to the solid of revolution generated by the rotation of the propeller, the innermost edge of said half which defines a frusto-conical surface being spaced from the propeller such as to provide an inlet opening, and a bracket for mounting said pump housing on the drive housing of the engine.

5. The combination set forth in claim 4 wherein said drive housing of the engine includes generally elliptically curved surfaces adjacent the propeller, said bracket comprising complementary elliptical sections adapted to contact said elliptically curved surfaces of the drive housing.

6. The combination set forth in claim 5 wherein said bracket and said housing are formed with interengaging surfaces.

7. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, said engine having an exhaust pipe directing the exhaust gases of combustion toward one side of the plane of rotation of the propeller, the combination comprising a pump housing surrounding the propeller, said housing comprising complementary halves, one said half comprising a generally flat portion and a curved peripheral portion and having an opening located generally centrally thereof, the other said half comprising a multiplicity of curved sections which interengage to form a frusto-conical surface, said halves having interengaging surfaces to thereby define a hollow housing having a configuration similar to the solid of revolution generated by the rotation of the propeller, the innermost edge of said half which defines a frusto-conical surface being spaced from the propeller such as to provide an inlet opening, said outer half having a peripheral lip extending generally radially outwardly from the curved peripheral portion, and said curved sections which form the inner half being provided with an inwardly turned rim adapted to engage the lip on said outer half, and a bracket for mounting said pump housing on the drive housing of the engine.

8. The combination set forth in claim 7 wherein said bracket comprises complementary half sections adapted to engage said drive housing.

9. The combination set forth in claim 8 wherein said

curved sections of the inner half are formed with a peripheral lip extending radially outwardly from the innermost portion thereof and said bracket sections are formed with inwardly turned flanges which engage with said lip on said inner half sections to support said pump housing in proper spaced relationship with said propeller.

10. The combination set forth in claim 9 wherein said bracket sections are provided with means for clamping said sections in position on said drive housing.

11. The combination set forth in claim 10 wherein said brackets are provided with inlet openings adjacent said pump housing.

12. The combination set forth in claim 10 wherein each said bracket section comprises a generally elliptically curved section, complementary engaging portions at one end thereof and a housing engaging portions at the other end thereof.

13. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outward from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, the combination comprising a pump housing surrounding the propeller and having a configuration similar to the solid of revolution generated by the rotation of said propeller, said housing being substantially imperforate and having an inlet opening generally axially of said propeller, an outlet opening along the periphery of said housing, and means for mounting and supporting said housing in position surrounding said propeller, whereby when the housing is mounted and supported in position and the propeller is rotated, the boat remains stationary in the water and water is pumped through said inlet opening into said housing and out of said outlet opening.

14. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, the combination comprising a pump housing surrounding the propeller, said housing comprising complementary halves, one said half comprising a generally flat portion and a curved peripheral portion and having an opening located generally centrally thereof, the other said half comprising a multiplicity of curved sections which interengage to form a frusto-conical surface, said halves having interengaging surfaces to thereby define a hollow housing having a configuration similar to the solid of revolution generated by the rotation of the propeller, the innermost edge of said half which defines a frusto-conical surface being spaced from the propeller such as to provide an inlet opening, and a bracket for mounting said pump housing on the drive housing of the engine.

15. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, the combination comprising a pump housing surrounding the propeller, said housing comprising complementary halves, one said half comprising a generally flat portion and a curved peripheral portion and having an opening located generally centrally thereof, the other said half comprising a multiplicity of curved sections which interengage to form a frusto-conical surface, said halves having interengaging surfaces to thereby define a hollow housing having a configuration similar to the solid of revolution generated by the rotation of the propeller, the innermost edge of said half which defines a frusto-conical surface being spaced from the propeller such as to provide an inlet opening, said outer half having a peripheral lip extending generally radially outwardly from the curved peripheral portion, and said curved sections which form the inner half being provided with an inwardly turned rim adapted to engage the lip on said outer half, and a bracket for mounting said pump housing on the drive housing of the engine.

16. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, the combination comprising a pump housing surrounding the propeller, said housing comprising complementary halves, one said half comprising a generally flat portion and a curved peripheral portion, the other said half having a frusto-conical surface, said halves having interengaging surfaces to thereby define a hollow housing having a configuration similar to the solid of revolution generated by rotation of the propeller, said housing being substantially imperforate and having an inlet opening generally axially thereof on the forward side of the propeller, an outlet opening along the periphery thereof, and means for mounting said housing in position surrounding said propeller.

17. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, said engine having an exhaust pipe directing the exhaust gases of combustion toward one side of the plane of rotation of the propeller, the combination comprising a pump housing surrounding the propeller, said housing comprising complementary halves, one said half comprising a generally flat portion and a curved peripheral portion, the other said half comprising a multiplicity of curved sections which interengage to form a frusto-conical surface, said halves having interengaging surfaces to thereby define a hollow housing having a configuration similar to the solid of revolution generated by the rotation of the propeller, the innermost edge of said half which defines a frusto-conical surface being spaced from the propeller such as to provide an inlet opening, and a bracket for mounting said pump housing on the drive housing of the engine.

18. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, said engine having an exhaust pipe directing the exhaust gases of combustion toward one side of the plane of rotation of the propeller, the combination comprising a pump housing surrounding the propeller, said housing comprising complementary halves, one said half compris-

ing a generally flat portion and a curved peripheral portion, the other said half comprising a multiplicity of curved sections which interengage to form a frusto-conical surface, said halves having interengaging surfaces to thereby define a hollow housing having a configuration similar to the solid of revolution generated by the rotation of the propeller, the innermost edge of said half which defines a frusto-conical surface being spaced from the propeller such as to provide an inlet opening, said outer half having a peripheral lip extending generally radially outwardly from the curved peripheral portion, and said curved sections which form the inner half being provided with an inwardly turned rim adapted to engage the lip on said outer half, and a bracket for mounting said pump housing on the drive housing of the engine.

19. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, the combination comprising a pump housing surrounding the propeller, said housing comprising complementary halves, one said half comprising a generally flat portion and a curved peripheral portion, the other said half comprising a multiplicity of curved sections which interengage to form a frusto-conical surface, said halves having interengaging surfaces to thereby define a hollow housing having a configuration similar to the solid of revolution generated by the rotation of the propeller, the innermost edge of said half which defines a frusto-conical surface being spaced from the propeller such as to provide an inlet opening, and a bracket for mounting said pump housing on the drive housing of the engine.

20. In an outboard motor adapted to be mounted on the side of a boat or the like and comprising a small internal combustion engine, a housing projecting downwardly from said engine when the engine is mounted on the boat, a propeller mounted on the lower end of the housing and including a hub and vanes projecting generally radially outwardly from the hub, the configuration of said vanes being such that rotation of the propeller causes the boat to be propelled along the water, the combination comprising a pump housing surrounding the propeller, said housing comprising a generally flat portion and a curved peripheral portion, the other said half comprising a multiplicity of curved sections which interengage to form a frusto-conical surface, said halves having interengaging surfaces to thereby define a hollow housing having a configuration similar to the solid of revolution generated by the rotation of the propeller, the innermost edge of said half which defines a frusto-conical surface being spaced from the propeller such as to provide an inlet opening, said outer half having a peripheral lip extending generally radially outwardly from the curved peripheral portion, and said curved sections which form the inner half being provided with an inwardly turned rim adapted to engage the lip on said outer half, and a bracket for mounting said pump housing on the drive housing of the engine.

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