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(54) **INBOARD/OUTBOARD WITH PORTABLE OUTDRIVE**

(57) An apparatus for propelling a water craft including an outboard propulsion assembly having a removable configuration that can be mounted and demounted by

hand without tools and a portable size so that it can be carried by an individual.

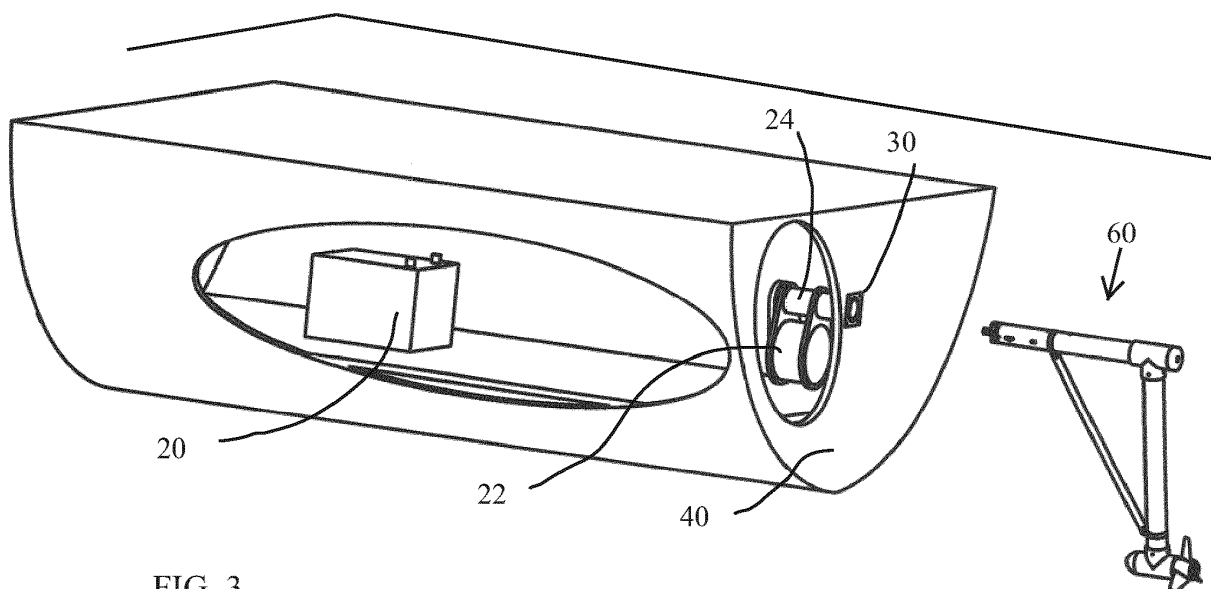


FIG. 3

## Description

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

[0001] The invention relates to an inboard/outboard with portable outdrive.

#### 2. The Prior Art

[0002] In certain instances it is desirable to equip small watercraft with a propulsion system. For example, it would be convenient to deploy a powered drive on a sailboat if there is no wind, or in tight quarters. However, the presence of such propulsion systems is undesirable and unattractive when the boat is under sail.

[0003] U.S. Patent 4,501,562 describes a transom bracket that allows a marine propulsion unit to be retracted when not in use. For example, FIG. 1 shows the marine propulsion unit in position for use. FIG. 2 shows the motor pivoted out of the water, while FIG. 5 shows the motor slid up out of the water. The transom bracket allows a conventional heavy motor to be translated through several positions while remaining on the transom at all times.

[0004] U.S. Patent 5,816,870 describes an electric drive system for launches and sailboats. It does not specify how the drive system is mounted or if it is removable. U.S. Patent 8,425,268 describes an outboard motor that is modularly connected to a battery power source. However, the motor is part of the outboard module, making it heavy and difficult to remove.

[0005] Accordingly, it would be desirable to provide a portable, lightweight outdrive that can be mounted and demounted by hand without the use of tools.

### SUMMARY OF THE INVENTION

[0006] It is an object of the present invention to provide an outdrive propulsion unit that can be attached and removed from a boat-mounted coupling by hand without the use of tools.

[0007] It is a further object to make the outdrive propulsion unit lightweight so it can be portably carried by one person for stowage on or off the boat.

[0008] The key aspects of the invention relate to a portable drive system including a hand operated coupling system mounted on a boat transom.

[0009] It is a further object to provide steering options on the removable outdrive.

[0010] More particularly, the invention relates to an apparatus for propelling a water craft having an outboard propulsion assembly with removable configuration that can be mounted and demounted by hand without tools and a portable size so that it can be carried by an individual.

[0011] The removable configuration includes a quick-connect and quick-disconnect coupling. The coupling

comprises a socket on the water craft and a mating plug on the outboard propulsion assembly. The plug and socket is the only connection between the water craft and the outboard propulsion unit. The mating plug is mounted to the water craft by plugging into the socket with a sliding motion in the axial direction. The coupling includes a simple hand-operated latching device.

The apparatus further includes a drive unit attached to the coupling. The drive unit includes a battery and motor combined with the coupling in a self-contained package. The drive unit is inboard of the coupling. The drive unit is selected from the group consisting of a gas powered drive unit, a diesel powered drive unit and a battery powered drive unit. A tiller pivots the outboard propulsion assembly to selectively vary the direction of thrust. A steering wheel rotates the outboard propulsion assembly to selectively vary the direction of thrust. A bracket is mounted on the water craft transom, and means for pivoting the socket with respect to the bracket so that the propulsion unit can be raised and lowered.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0012] The advantages, nature, and various additional features of the invention will appear more fully upon consideration of the illustrative embodiments now to be described in detail in connection with accompanying drawings. In the drawings wherein like reference numerals denote similar components throughout the views:

FIG. 1 is a right side elevational view of a straight removable drive.

FIG. 2 is a perspective view of a boat hull with partial cut-away showing an embodiment of a removable drive system connected to the transom-mounted coupling.

FIG. 3 is a perspective view of a boat hull with partial cut-away showing the removable, and now portable, drive system disconnected from the transom-mounted coupling.

FIG. 4 is a right side elevational view of a steerable drive.

FIG. 5 is a perspective view of a boat hull with partial cut-away showing an embodiment of a steerable drive system connected to the transom-mounted coupling.

FIG. 6 is a perspective view of a boat hull with partial cut-away showing the steerable, and now portable, drive system disconnected from the transom-mounted coupling.

FIG. 7 is a right side elevational view of a rotating drive.

FIG. 8 is a perspective view of a boat hull with partial cut-away showing an embodiment of a rotating drive system connected to the transom-mounted coupling.

FIG. 9 is a perspective view of a boat hull with partial cut-away showing the rotating, and now portable, drive system disconnected from the transom-mounted coupling.

FIG. 10 is a perspective view of a boat transom section with a tiltable coupling shown in the tilted up position.

FIG. 11 is a perspective view of a boat transom section with a tiltable coupling shown in the down and locked position.

### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

[0013] The invention relates to a configuration where only a portable propulsion unit is located outboard of the transom. This outboard assembly is lightweight and can easily be unplugged and removed by hand when not in use. The heavy battery and motor are located inboard of the transom and can be permanently or temporarily mounted. A coupling provides an easy way to connect and remove the removable propulsion unit by hand from the internal power source.

[0014] FIG. 1 shows a portable propulsion assembly 60 having as primary features an input shaft 64 that drives a thrusting device, shown as a propeller 74 for illustrative purposes. Input shaft may be operatively coupled to propeller by any known drive means or linkages. For example input shaft may extend outwardly and drive belts that extend downwardly to a propeller shaft. The drive means are contained within a housing 62 having a coupling member 62a adjacent input shaft 64. Coupling member 62a is slid in an axial direction 64a to install the propulsion unit for use. Coupling member 62a is then slid in the opposite axial direction 64b to remove the propulsion unit to make it portable. A brace 62b may be provided to support the housing.

[0015] As can be seen in FIGs. 2 and 3, the invention provides a coupling unit 30 mounted on, and extending through, a boat transom 40. Inboard of the transom, a battery 20 powers a motor 22 coupled to a drive unit 24. The drive unit 24 may be a shaft directly driven by a power source or indirectly coupled via a transmission source. In this instance, FIGs. 2 and 3 show a motor coupling attached to the drive unit on the inboard side of coupling 30.

[0016] In FIG. 2 the propulsion assembly is attached to coupling unit 30, where the propeller can be rotated by motor 22 and drive unit 24. When the boat is under sail, propulsion assembly 60 can be disconnected from coupling unit 30, as shown in FIG. 3 and stowed. The removal of the propulsion assembly is achieved by sliding

it in axial direction 64b by hand. Removing propulsion unit eliminates the drag and unattractiveness associated with propulsion units on sailboats. The propulsion unit is designed with a low weight so it can be pulled on board by one person. The propulsion unit can then be carried to any suitable storage location.

[0017] Coupling member 62a has a plug that fits into a mating socket provided on coupling unit 30. To secure the plug in the socket, a simple hand operated latching device is provided. This may take the form of a clip or spring-loaded latch on either the plug or socket that can be unclipped by manual manipulation. The plug allows housing to remain stationary, while input shaft 64 drives propeller 74 internally.

[0018] FIG. 4 illustrates an alternate embodiment in the form of a steerable propulsion assembly 60s. A tiller 80 is pivotally mounted to effect angular rotation of the downwardly extending housing section thereby altering the direction of propeller 74. FIGs. 5 and 6 show how the steerable propulsion assembly 60s plugs into and out of the coupling unit 30 in the same manner as the propulsion assembly of FIGs. 1-3. In this embodiment, motor 22 is mounted to the bottom deck of the boat. Either motor mount can be used with either propulsion assembly.

[0019] FIG. 7 illustrates an alternate embodiment in the form of a rotating propulsion assembly 60r. A steering wheel 90 is mounted to effect angular rotation of the downwardly extending housing section thereby altering the direction of propeller 74. FIGs. 8 and 9 show how the rotating propulsion assembly 60r plugs into and out of the coupling unit 30 in the same manner as the propulsion assembly of FIGs. 1-3. In this embodiment, battery 20, motor 22 and drive unit 24 are combined in a power pack. Either motor configuration can be used with either propulsion assembly.

[0020] Referring now to FIGs. 10 and 11, there is shown a tiltable coupling unit 30t. In prior embodiments, the coupling unit is fixedly mounted on the transom. In this embodiment, a tiltable coupling unit 30t is pivotally mounted on the transom 40. More specifically, tiltable coupling unit 30t includes a bracket 30b mounted on transom 40 having a catch, and a pivoting section 30p having a striker 30s. Various other mechanical means can be employed to latch the tiltable coupling unit in place.

[0021] A motor 22 is mounted directly on pivoting section 30p, which provides a counter weight. From the operational configuration of FIG. 11, the catch can be released and motor 22 will pivot drive unit 24 downwardly, thereby pulling propulsion assembly 60s upwardly, to the configuration shown in FIG. 10. When it is desired to drop the propulsion unit into the water, the motor is lifted up by hand pivoting coupling unit upward 30u and propeller downward in direction 30d. When the coupling unit is fully pivoted, the striker 30s engages in the catch, in the configuration shown in FIG. 11. While steerable propulsion unit 60s is shown, either propulsion unit 60 or rotating propulsion unit 60r can be used interchangeably with the tiltable coupling unit 30t.

**[0022]** The propulsion unit includes a plug that can be axially plugged and removed from a socket located within tiltable coupling unit 30t. In other words, the plug and socket concept is present in all embodiments, whether straight drive, steerable drive or rotating drive. The socket may be fixed or pivotable. The motor may be mounted on a boat deck, on the coupling unit, or other suitable location.

**[0023]** Having described preferred embodiments for (which are intended to be illustrative and not limiting), it is noted that modifications and variations can be made by persons skilled in the art in light of the above teachings. It should be understood that propulsion assembly can take many varied forms, and is not limited to the specific embodiment shown and described. While a battery and electric motor are shown, it should be understood that other power sources can be employed within the scope of the invention. It is therefore to be understood that changes may be made in the particular embodiments of the invention disclosed which are within the scope and spirit of the invention as outlined by the appended claims. Having thus described the invention with the details and particularity required by the patent laws, what is claimed and desired protected by Letters Patent is set forth in the appended claims

## Claims

1. An apparatus for propelling a water craft comprising:
  - an outboard propulsion assembly having a removable configuration that can be mounted and demounted by hand without tools and a portable size so that it can be carried by an individual.
2. The apparatus of claim 1, wherein said removable configuration includes a quick-connect and quick-disconnect coupling.
3. The apparatus of claim 2, wherein said coupling comprises a socket on the water craft and a mating plug on said outboard propulsion assembly.
4. The apparatus of claim 3, wherein the plug and socket is the only connection between the water craft and said outboard propulsion unit.
5. The apparatus of claim 3, wherein said mating plug is mounted to the water craft by plugging into said socket with a sliding motion in the axial direction.
6. The apparatus of claim 5, wherein said coupling includes a simple hand-operated latching device.
7. The apparatus of claim 2, further comprising a drive unit attached to the coupling.

8. The apparatus of claim 7, wherein said drive unit includes a battery and motor combined with said coupling in a self-contained package.
9. The apparatus of claim 7, wherein said drive unit is inboard of the coupling.
10. The apparatus of claim 7, wherein said drive unit is selected from the group consisting of a gas powered drive unit, a diesel powered drive unit and a battery powered drive unit.
11. The apparatus of claim 1, further comprising a tiller to pivot said outboard propulsion assembly and selectively vary the direction of thrust.
12. The apparatus of claim 1, further comprising a steering wheel to rotate said outboard propulsion assembly and selectively vary the direction of thrust.
13. The apparatus of claim 3, further including a bracket mounted on the water craft transom, and means for pivoting said socket with respect to said bracket so that said propulsion unit can be raised and lowered.

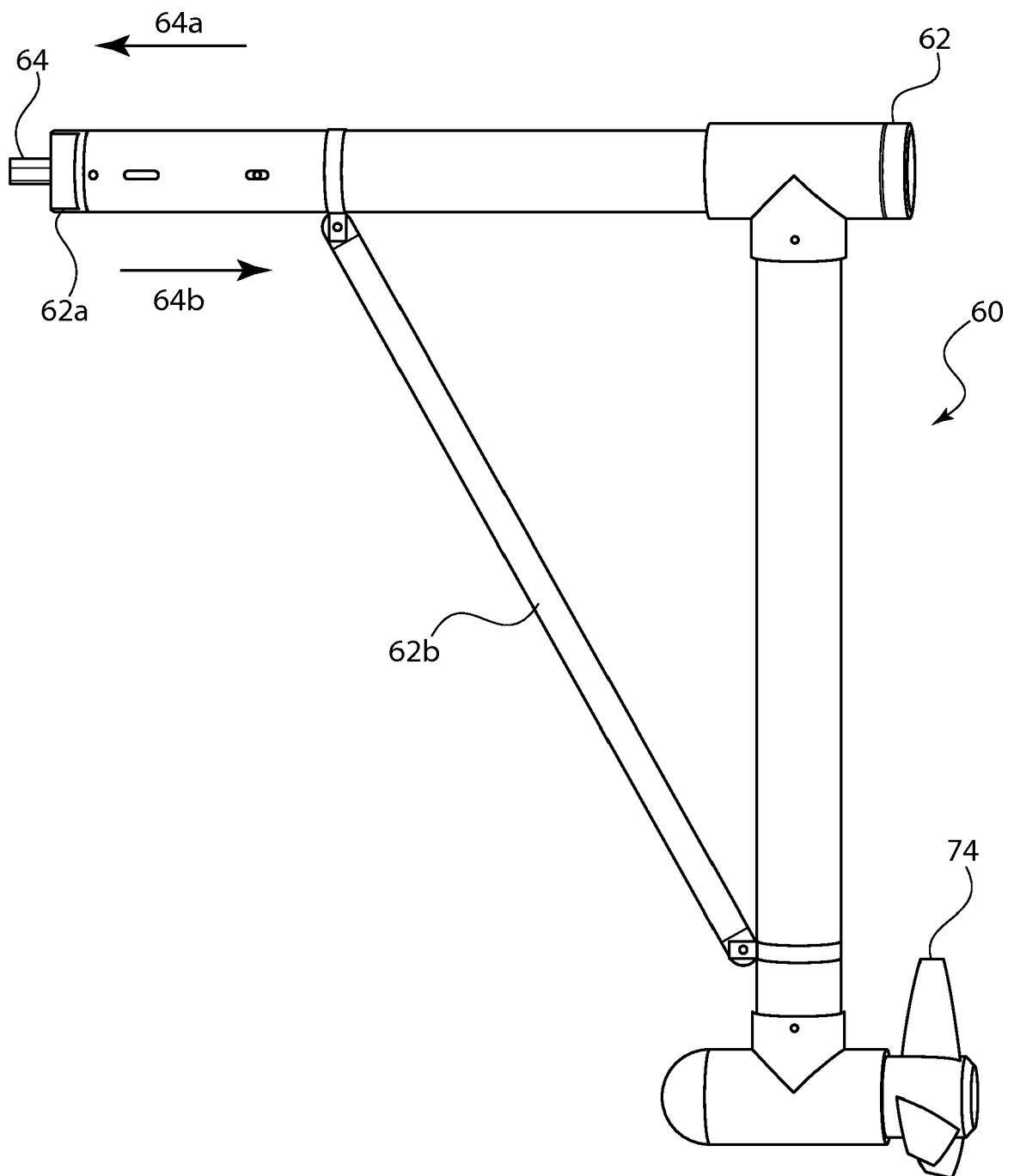


FIG. 1

FIG. 2

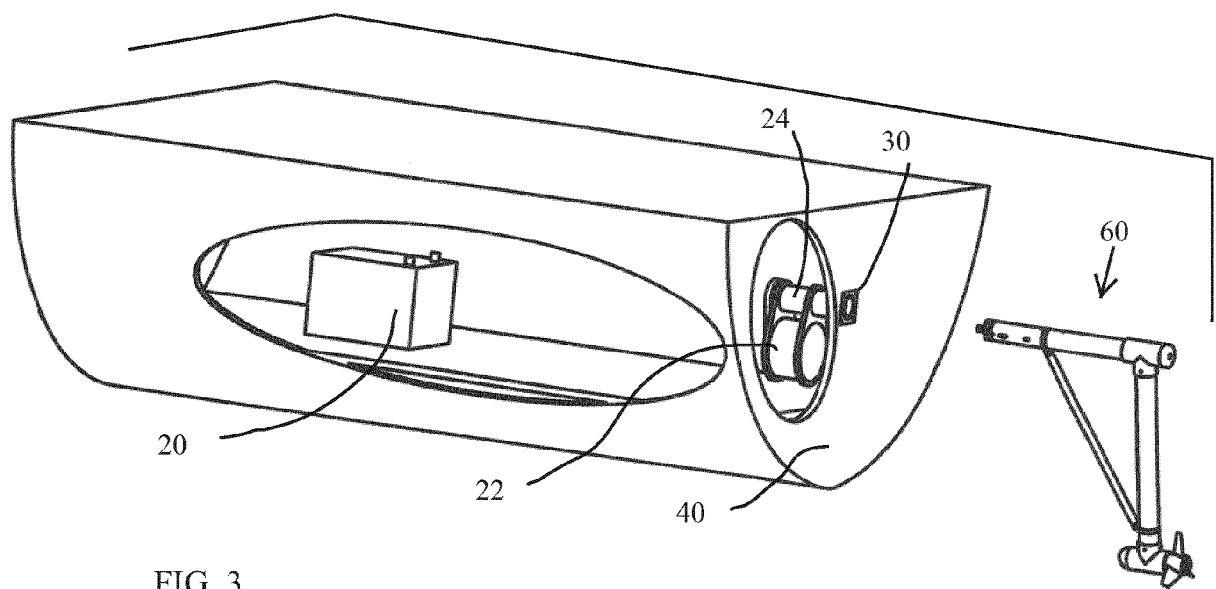
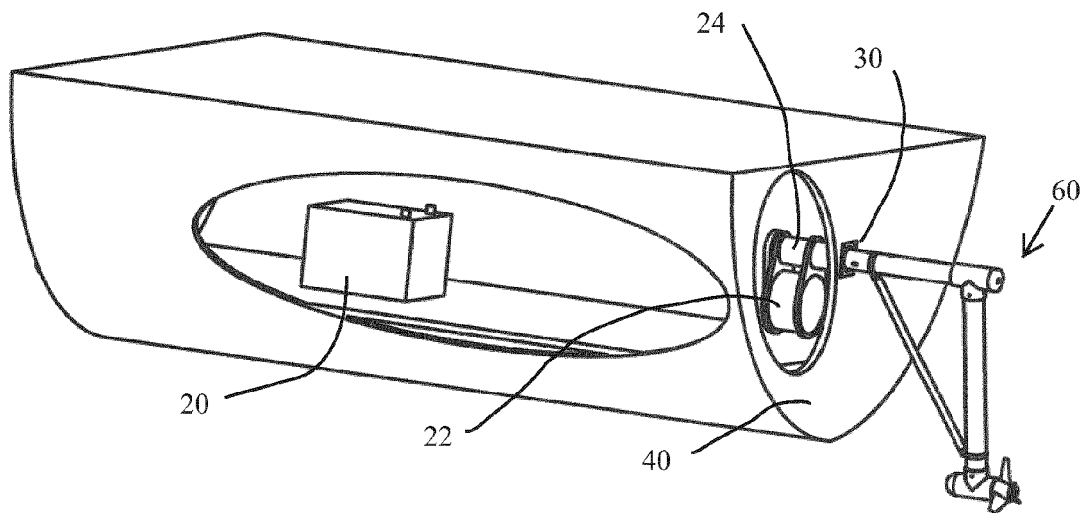


FIG. 3

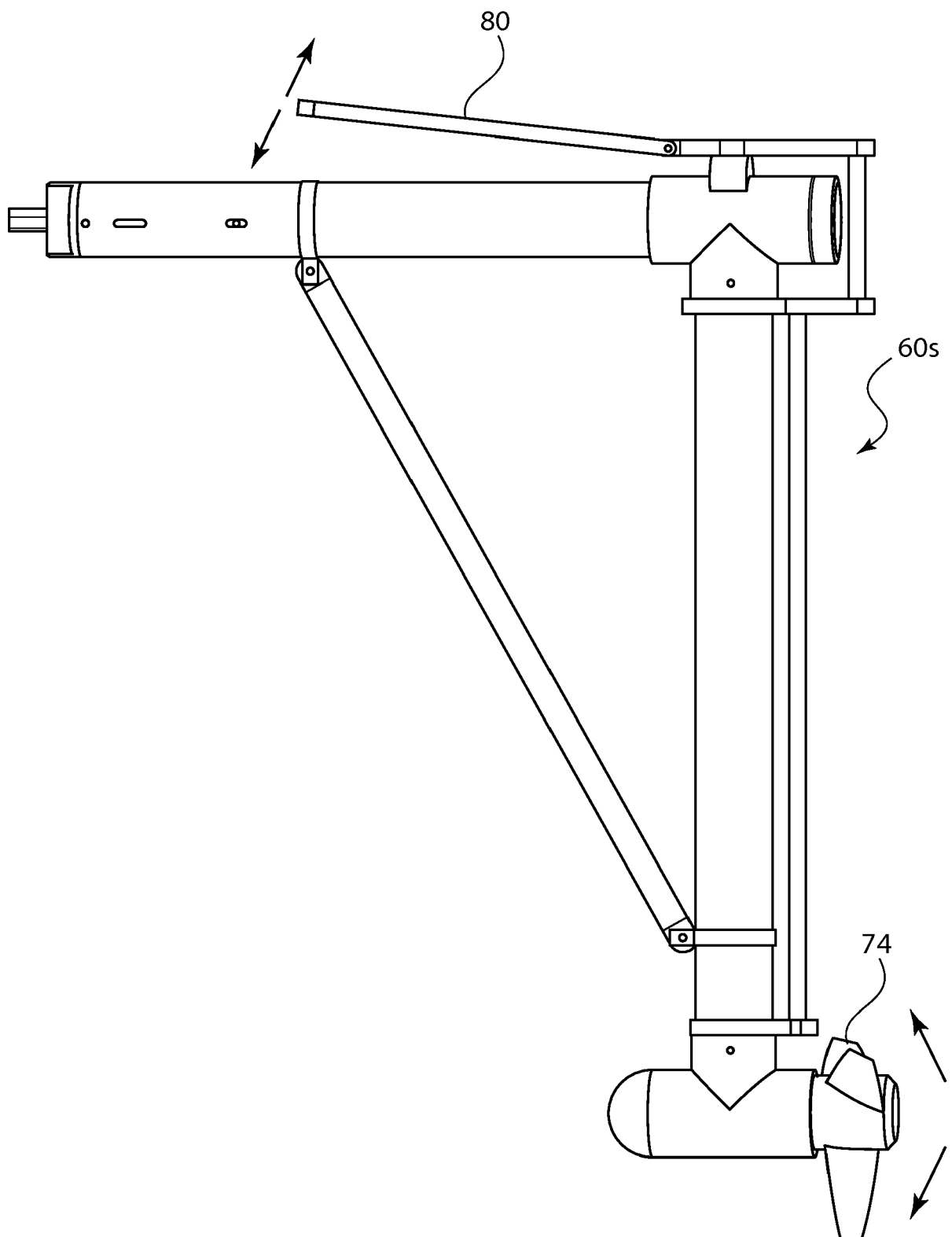


FIG. 4

FIG. 5

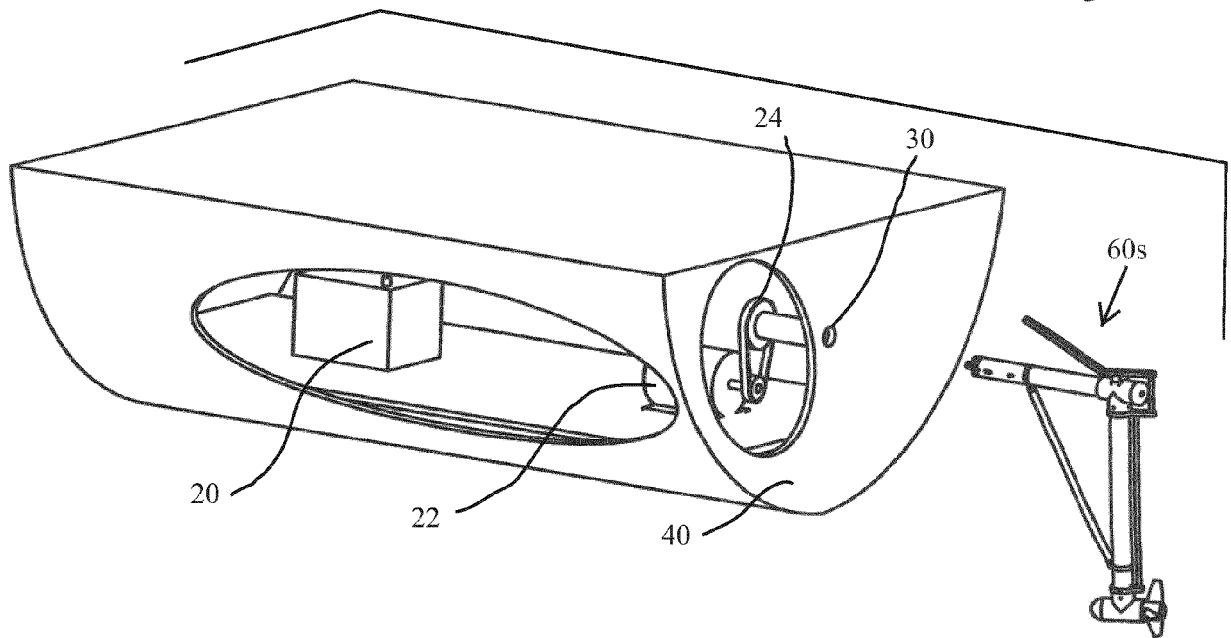
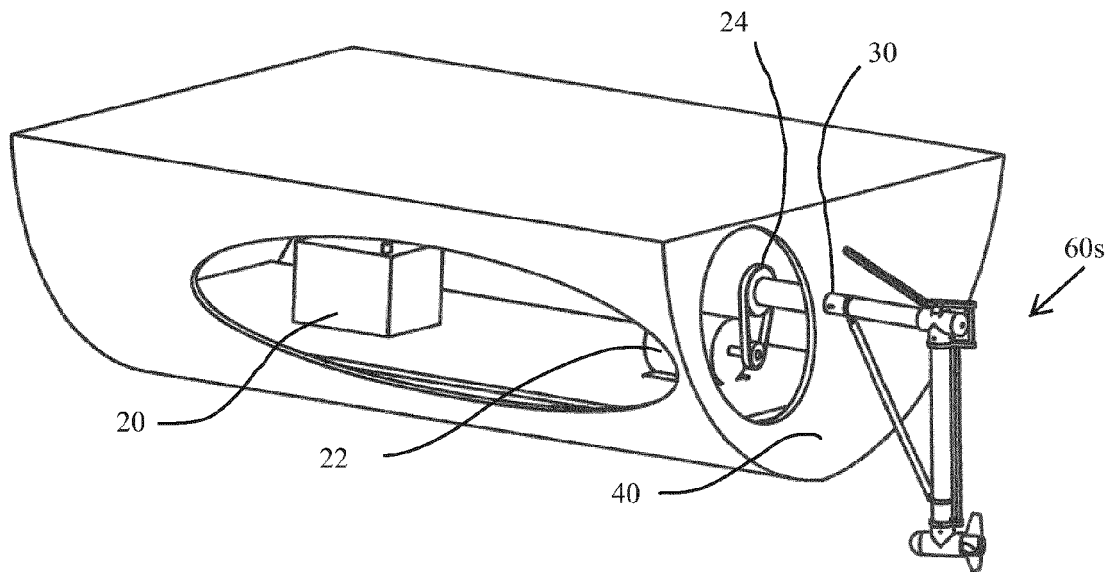


FIG. 6



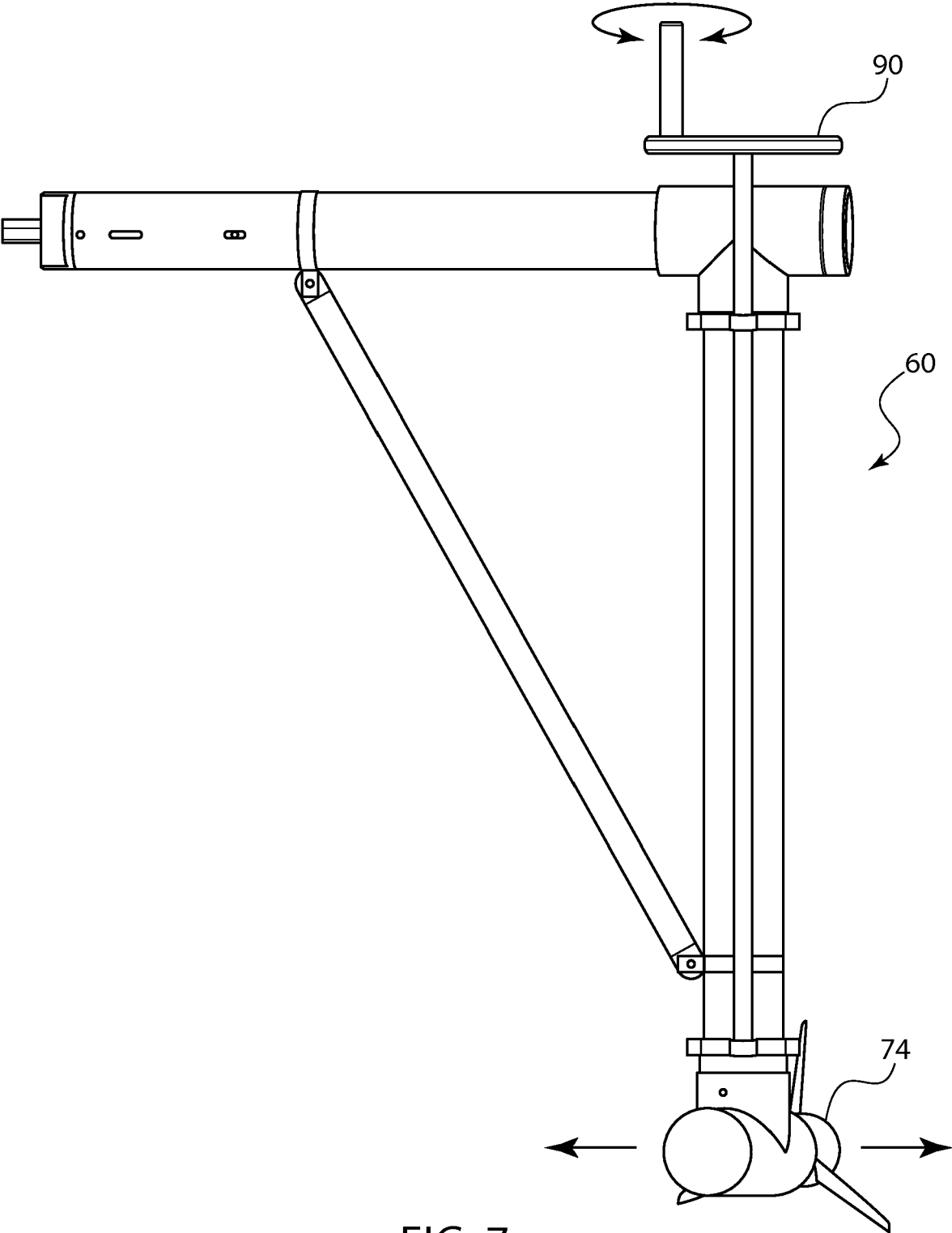


FIG. 7

FIG. 8

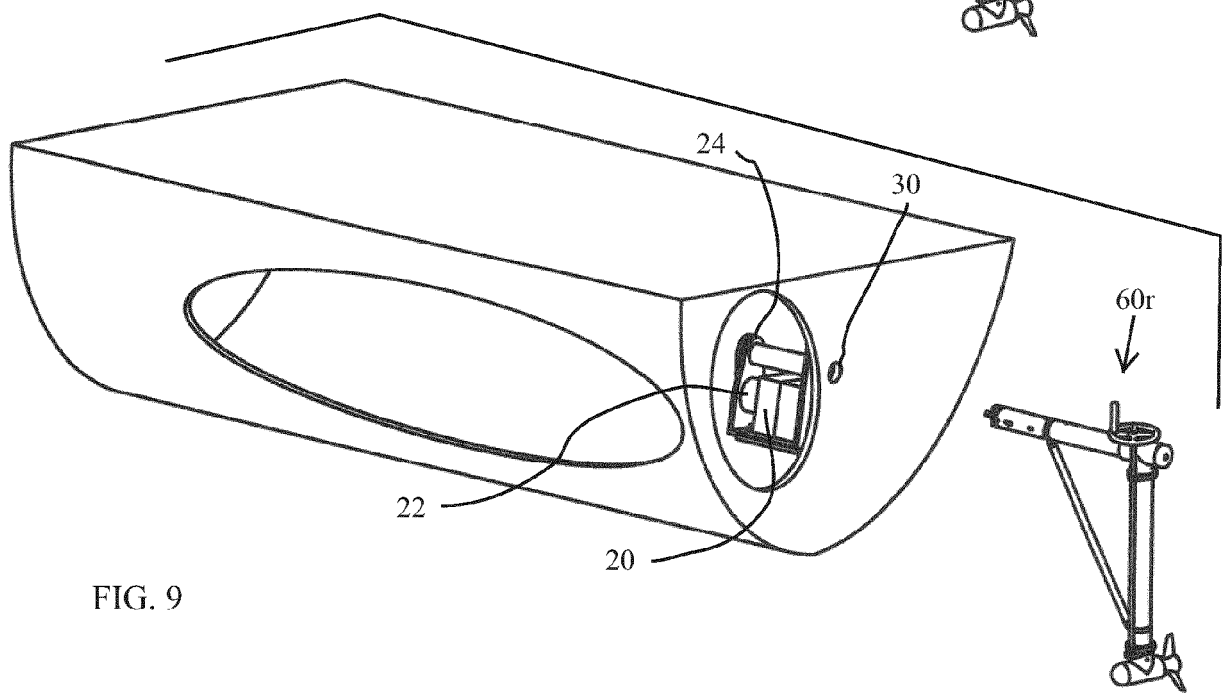
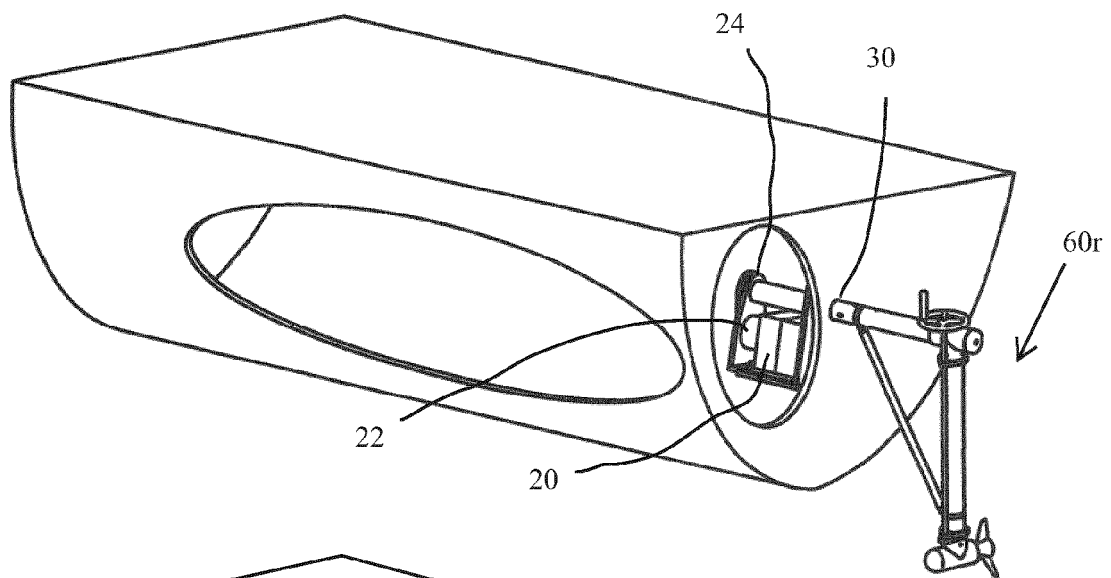


FIG. 9

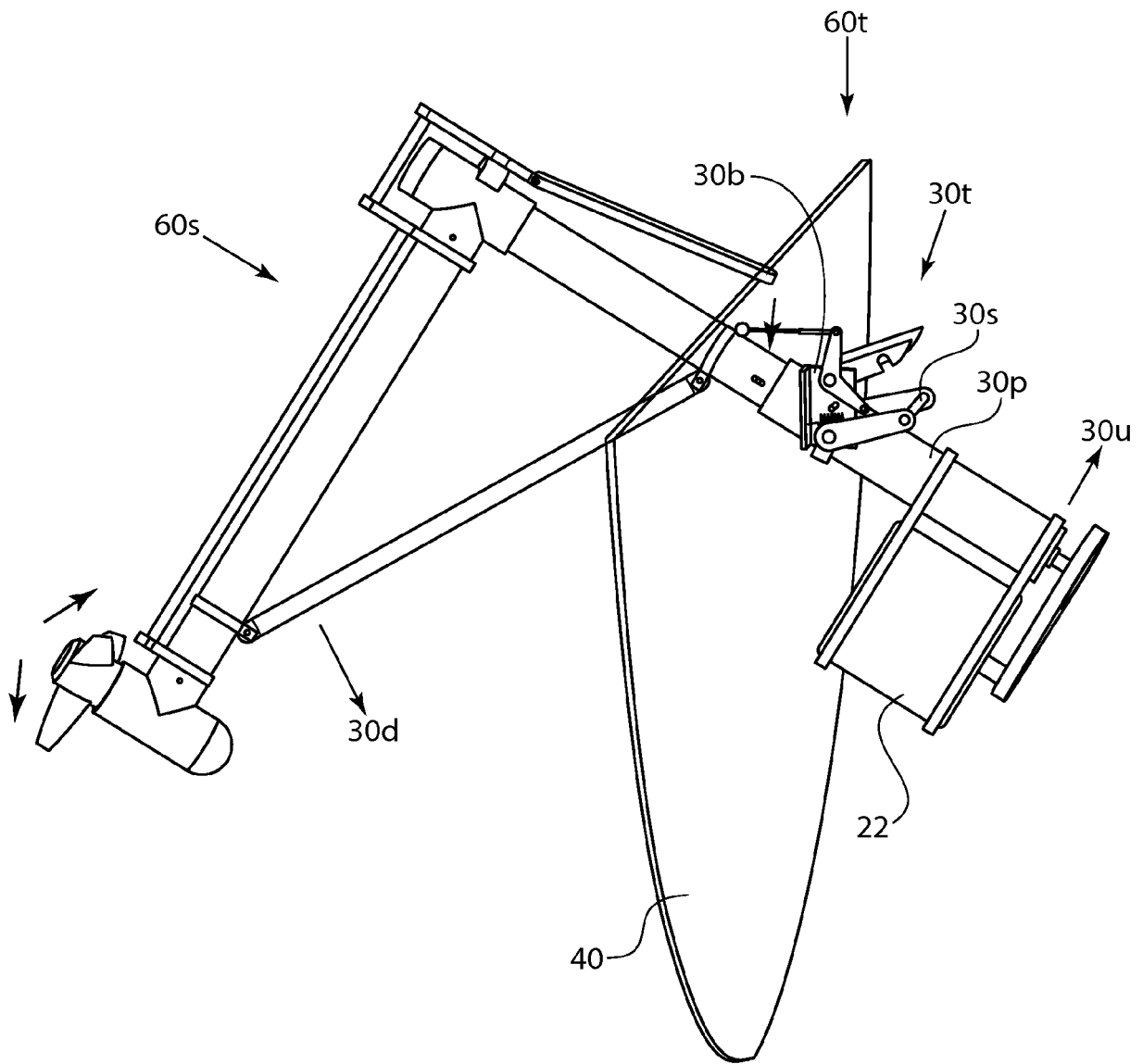


FIG. 10

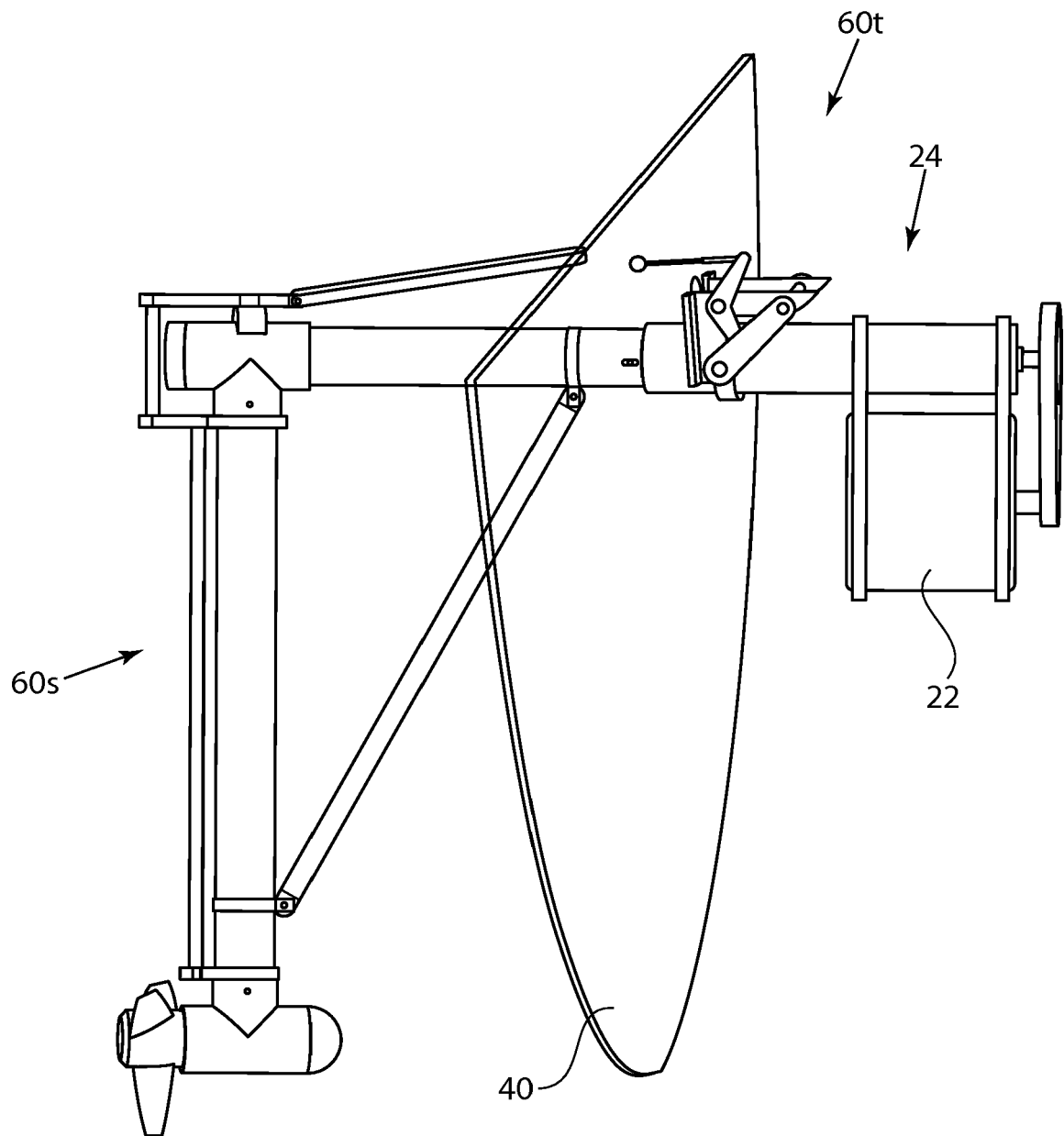


FIG. 11



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Place of search Munich		Date of completion of the search 4 July 2016	Examiner Brumer, Alexandre
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>4 July 2016</b>	Examiner <b>Brumer, Alexandre</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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