May 31, 1938. W. L. KISSEL 2,118,928

OUTBOARD MOTOR

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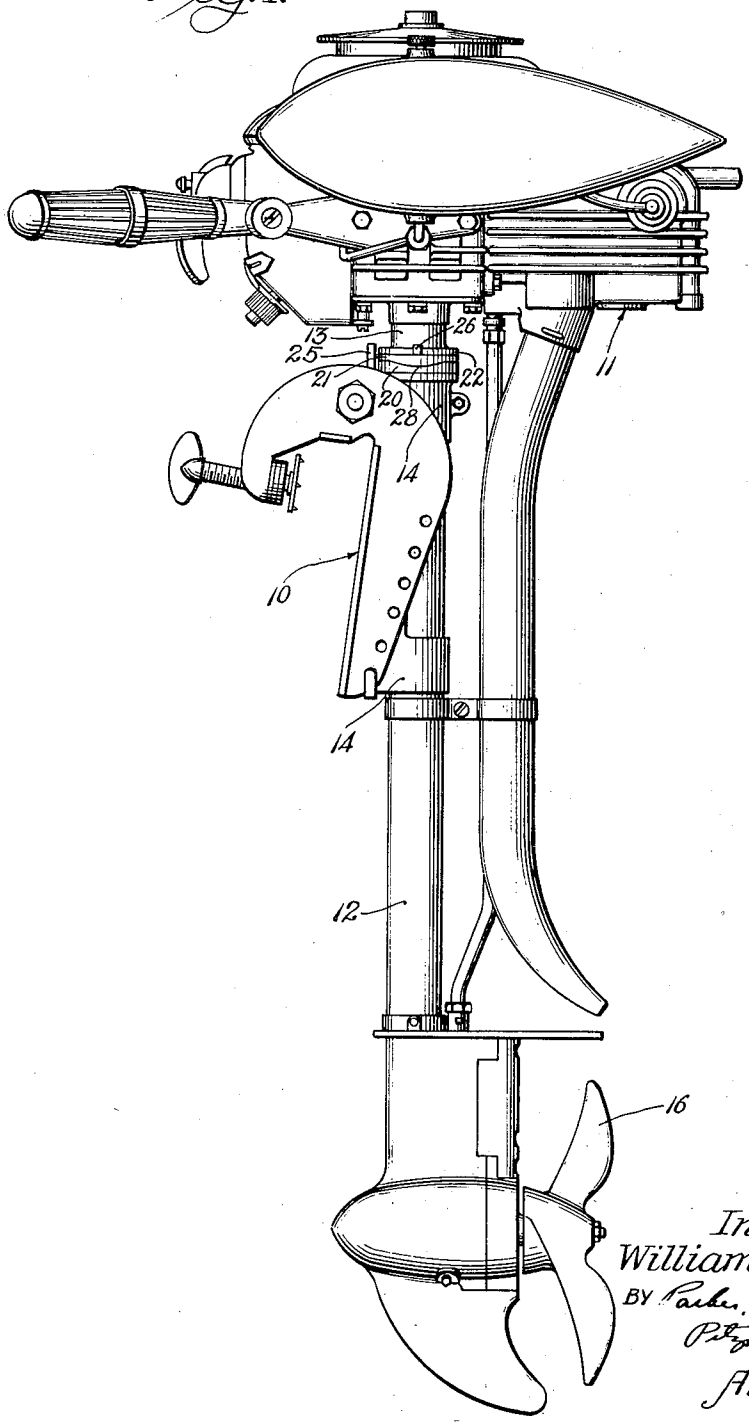
Fig. 1.



Inventor
William L. Kissel
BY Parker, Carlson, Peterson & Hubbard
Attorneys.

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Fig. 2.

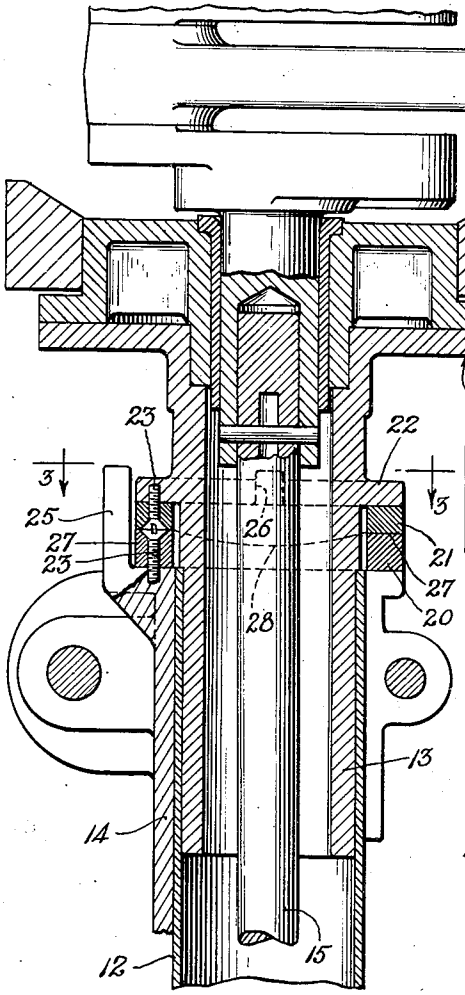


Fig. 4.

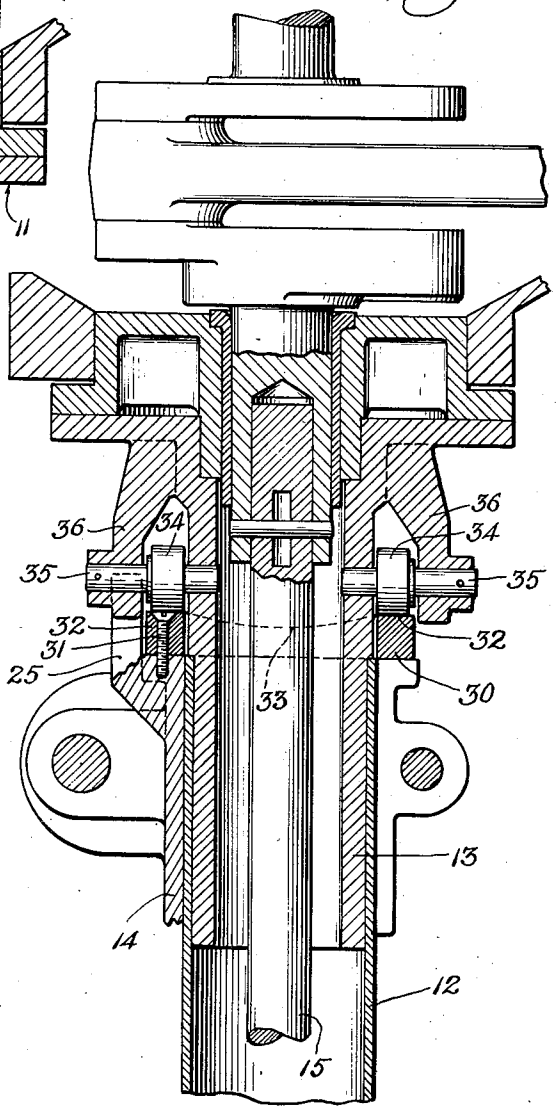
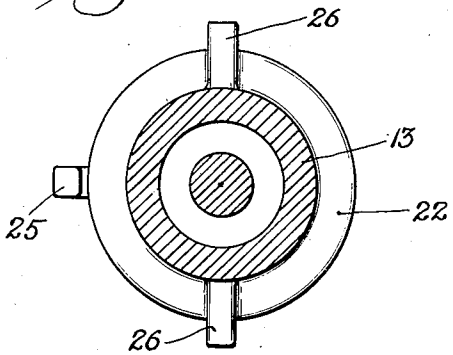


Fig. 3.



Inventor
William L. Kissel

BY Parker, Carlson, Pitzner & Hubbard.
Attorneys.

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UNITED STATES PATENT OFFICE

2,118,928

OUTBOARD MOTOR

William L. Kissel, Hartford, Wis., assignor to B. M. Kissel, doing business as Kissel Industries, Hartford, Wis.

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3 Claims. (Cl. 115—18)

The invention relates generally to outboard motors and more particularly to an outboard motor of the type having a bracket adapted to be attached to a boat with the motor as a whole turnable in said bracket for steering purposes.

The general object of the invention is to provide an outboard motor of the foregoing type which is supported in its attaching bracket in a manner causing the motor to tend to remain in or to return to its centered or straight-ahead position whenever the operator releases it from his control, whereby the boat will tend to move in a straight course.

More specifically, it is an object to provide an outboard motor supported in its attaching bracket in such a manner that gravity is utilized to cause the motor to return to its straight-ahead position after being turned to one side in steering and to overcome any tendency of the torque of the motor to cause it to turn away from its forward or straight-ahead position.

It is also an object to provide supporting means for centering the motor, which is of simple but effective construction and does not involve structure requiring any particular care or maintenance.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of an outboard motor embodying the features of the invention.

Fig. 2 is an enlarged fragmentary sectional view showing a preferred form of centering the motor.

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 2.

Fig. 4 is a sectional view similar to Fig. 2 but showing a modified form.

As mentioned above, the invention is embodied in an outboard motor of the type having a boat attaching bracket and a depending drive shaft casing turnable to either side of the straight-ahead or centered position for steering. The preferred embodiment of the invention comprises generally a motor of this type having means whereby the motor is caused to rise when the drive shaft casing is turned to either side of its centered or straight-ahead position whereby the weight of the motor proper tends to oppose such a rise and thereby causes the drive shaft casing to tend to remain in or to return to its straight-ahead position should it be turned to either side in steering.

As shown in the drawings, the outboard motor comprises a motor proper supported by a bracket 10 adapted to be clamped onto the stern of a boat. The motor proper includes a motor unit, indicated generally at 11, having a tubular drive shaft casing 12 depending therefrom and enclosing a drive shaft 15 having a connection with a propeller 16. In the structure illustrated in the drawings, the drive shaft casing 12 is telescoped over a sleeve 13 projecting downwardly from the crank case of the motor unit 11. The bracket 10 is provided with a bearing 14 in which the drive shaft casing 12 is journaled to permit turning thereof to either side of the straight-ahead or centered position for steering.

It is desirable that, after the motor has been manually turned to one side or the other in steering, it be automatically returned to the straight-ahead position so that the boat to which it is attached will then move in a straight course. It is also of great convenience to the operator to be able not to have to keep his hand on the steering lever of the motor in order to maintain a straight course. In motors of this character, there is a tendency, due to the torque of the motor, for it to turn to one side of the centered position. It is therefore desirable to overcome or compensate for such tendency so that a straight course will be maintained.

To these ends, the preferred embodiment includes means for causing the motor to rise in the bracket when turned to either side of the centered position. Said means comprises a pair of elements, one relatively fixed and the other movable with the motor in turning, shaped to cause the motor to rise. Preferably said elements are in the nature of a cam and follower.

In the preferred form shown in Figs. 1, 2 and 3, the elements comprise a pair of contacting rings or races 20 and 21, the ring 20 being secured to the upper end of the bracket bearing 14 and the ring 21 being secured to the lower face of a flange 22 formed integrally on the crank case sleeve 13. The rings thus serve to support the motor on the bracket. Preferably the rings are detachably secured to the bearing 14 and the flange 22 as by screws 23.

The contacting faces of the rings 20 and 21 are shaped so that, upon relative rotation therebetween, the motor is caused to rise. Preferably the contacting faces are complemental so that they bear against each other for their entire facial area when the motor is centered. To lift the motor, each ring has a pair of high points 27 and a pair of depressions 28, those of each pair being diametrically opposite each other, so that when

the motor is turned the two rings are in contact at diametrically opposite points and firmly support the motor. With this arrangement of high points and depressions, the maximum lift of the motor is attained when the motor is turned through 90° in either direction from its centered position.

To prevent the motor from turning beyond its position of maximum lift, stop means is provided to limit the turning movement to approximately 90° in either direction. As shown herein, said stop means comprises an upstanding lug **25** preferably integral with the bearing **14** at the front thereof. Cooperating with the lug **25** is a pair of lugs **26** rigid with the flange **22** of the crank case sleeve **13** and located at opposite sides thereof. The lugs **26** are adapted to abut the fixed lug **25** when the motor is turned to one side or the other, thereby limiting the movement of the motor to about 90° on either side of its centered position.

In the modified form shown in Fig. 4, where the motor is shown at one of its positions of maximum lift, the lifting means comprises a cam element and a roller element with the elements respectively secured to the bearing **14** and the crank case sleeve **13**. The cam element preferably comprises a ring **30** secured to the bearing **14** as by a screw **31**, and having a pair of diametrically opposite high points **32** and a pair of diametrically opposite depressions **33**. In the present instance, two rollers **34** bear on the ring **30** and are located at diametrically opposite points. The rollers are preferably mounted on pins **35** extending radially of the crank case sleeve **13** and supported at their inner ends by said sleeve and at their outer ends by arms **36** extending downwardly from the upper part of the crank case sleeve **13**.

To limit the turning movement of the motor so that it cannot be turned beyond its points of maximum lift, the stop lug **25** on the bearing **14** extends upwardly into the path of the roller-supporting arms **36**. Abutment of the arms **36** with the stop lug **25** thus limits the turning movement of the motor.

In operation, when the motor is manually turned to one side or the other to steer the boat, the ring **21** turns out of its complemental arrangement with the ring **20**, and because of the high and low points on the contacting faces of the rings, the motor is lifted. When the operator releases the motor, the weight thereof causes it to turn back to its centered position, the low point of the upper ring **21** sliding down the inclined face of the lower ring **20** until the two rings assume their complemental arrangement. With such arrangement, the torque of the motor is insufficient to cause the motor to turn to one side, since the torque is not great enough to force the upper ring **21** up the incline of the lower ring and lift the weight of the motor. The lugs **26**, when they move into abutment with the fixed lug **25**, prevent the motor from turning beyond its points of maximum lift so that it always will return to its centered position.

In the modified form shown in Fig. 4, the rollers **34**, which are positioned at the low points **33** of the cam **30** when the motor is centered, are forced to roll up the inclined face of the cam toward the high points **32** when the motor is turned. Upon release by the operator, the rollers readily roll down the inclined face of the cam and reassume their position at the low points **33** to hold the motor centered. The weight of the motor is sufficient to prevent the torque from forcing the rollers up the inclined face. The roller-supporting arms **36** abutting the stop lug **25** comprise means to prevent the rollers from moving beyond the high points **32**, so that the motor will always be in a position from where it may return to its centered position.

From the above description, it will be apparent that I have provided a motor which will tend to remain in its centered position and resist the tendency of the torque of the motor to turn it to one side. In steering, when the motor is turned to either side, it tends to return to its centered position, under the influence of gravity, so that, as soon as the operator releases it, it automatically returns. The centering means is simple in construction and does not involve any structure demanding care or attention.

I claim as my invention:

1. An outboard motor comprising, in combination, a motor unit, a drive shaft casing depending from said motor unit, a boat-attaching bracket having a bearing in which said drive shaft casing is journaled for steering, a cam element and a coacting roller element, said elements being respectively associated with said bearing and said drive shaft casing, said cam element being shaped to cause the drive shaft casing to rise when turned to either side of its straight-ahead position.

2. An outboard motor comprising, in combination, a motor unit, a drive shaft casing depending from said motor unit, a boat-attaching bracket having a bearing in which said drive shaft casing is journaled for steering, an annular cam rigid with said bearing, and a pair of rollers in contact with said cam and supporting said drive shaft casing and motor unit, said cam being shaped to cause the drive shaft casing to rise when turned to either side of the straight-ahead position.

3. An outboard motor comprising, in combination, a motor unit, a drive shaft casing depending from said motor unit, a boat-attaching bracket having a bearing in which said drive shaft casing is journaled for steering, an annular cam rigid with said bearing and having a pair of diametrically opposite high points and a pair of diametrically opposite depressions, a pair of rollers supporting said drive shaft casing and rolling on said cam to lift said drive shaft casing when turned to either side of the straight-ahead position, and a stop member on said bearing adapted to limit the turning movement of the drive shaft casing so that the rollers will not pass beyond the high points on the cam.

WILLIAM L. KISSEL.