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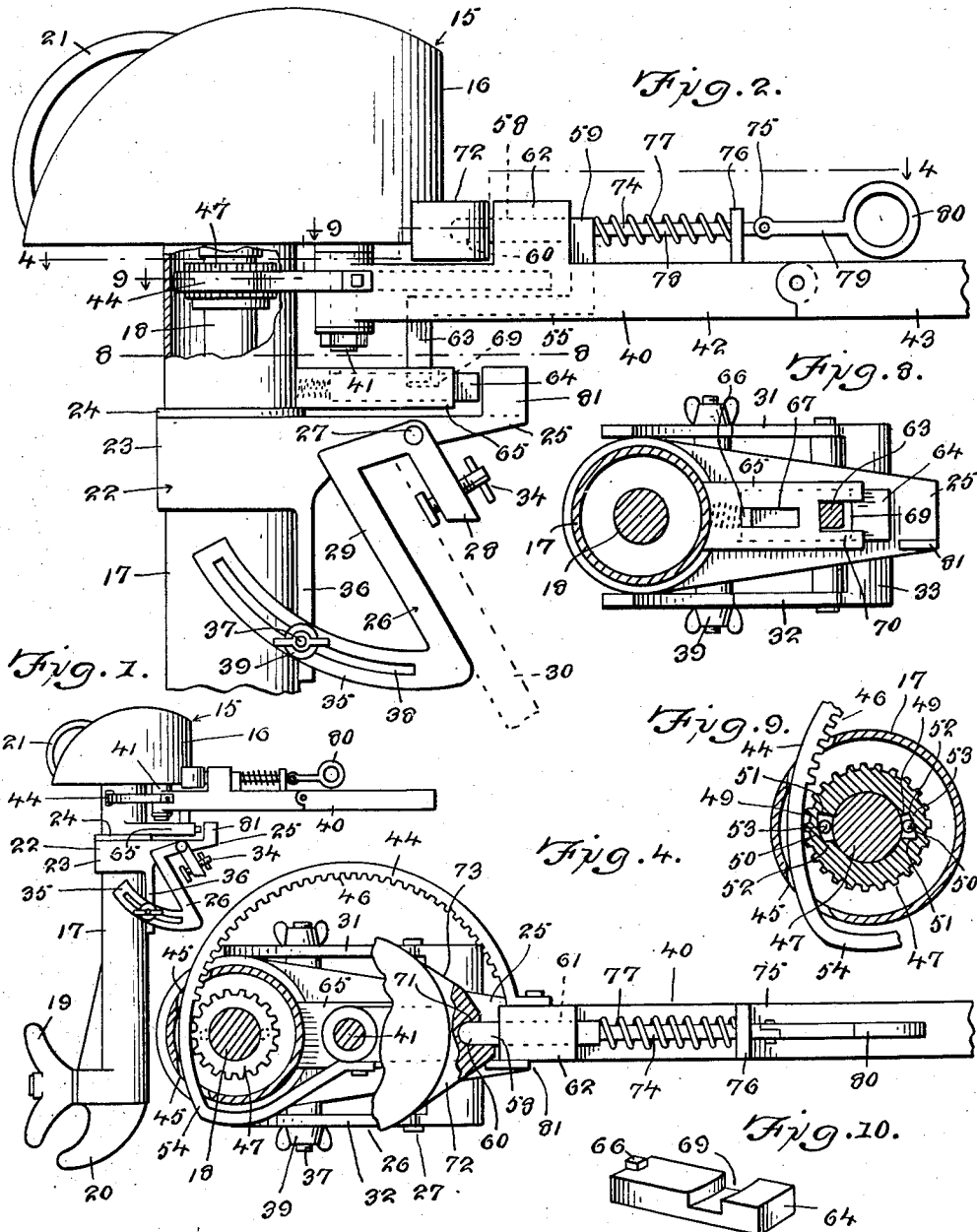
L. J. FRANCI

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STARTER FOR OUTBOARD MOTORS

Filed April 8, 1940

2 Sheets-Sheet 1



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INVENTOR
BY Victor J. Evans & Co.
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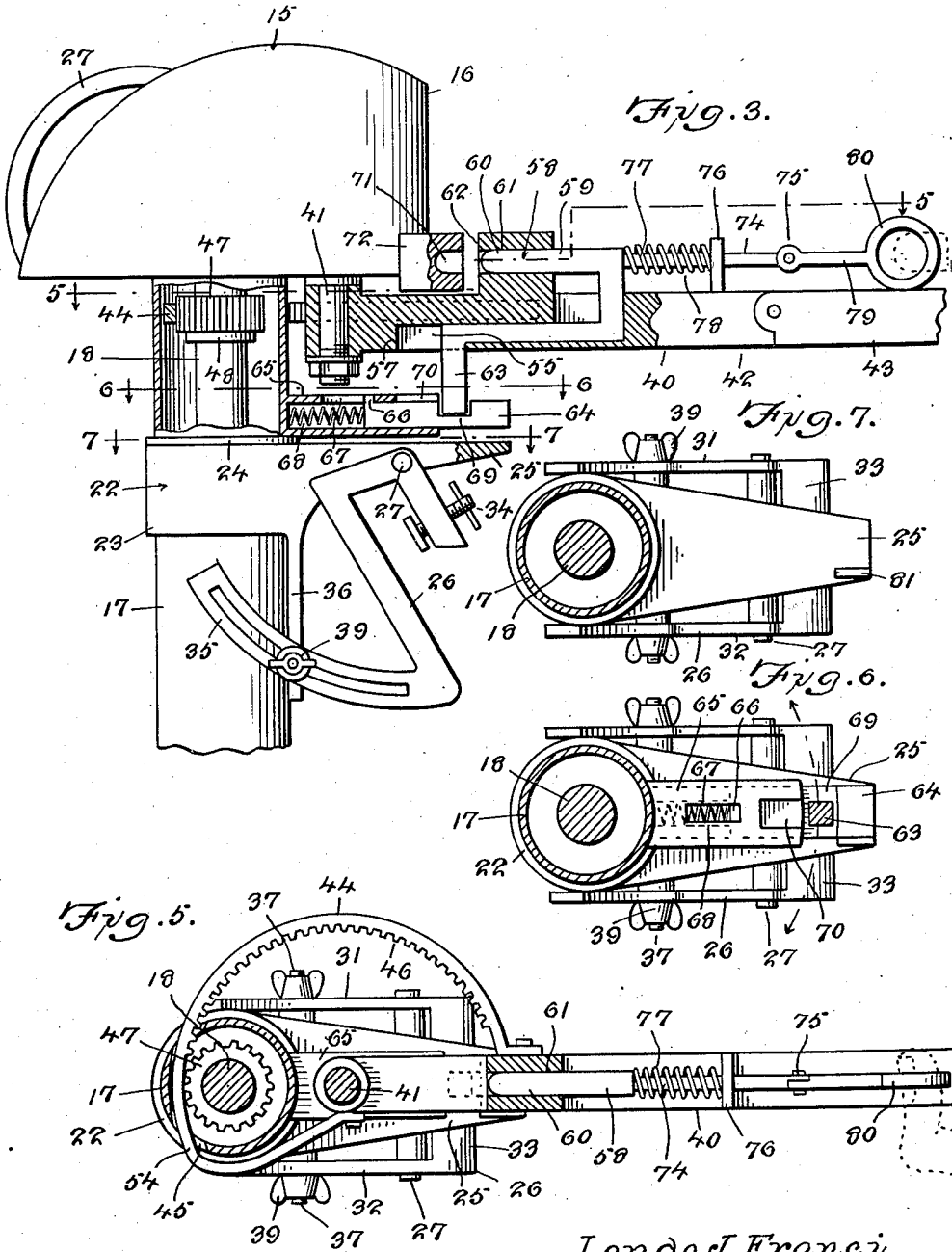
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UNITED STATES PATENT OFFICE

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STARTER FOR OUTBOARD MOTORS

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Application April 8, 1940, Serial No. 328,585

7 Claims. (Cl. 115—18)

My invention relates broadly to new and useful improvements in outboard motors, and more particularly to a starting and steering mechanism therefor.

An important object of my invention is to provide an improved means for starting and steering an outboard motor, which means incorporates, in a unitary structure, a mechanism uniquely associated with the drive shaft of the motor in a manner to permit manual actuation thereof to start the motor and which is thereafter adapted to automatically disengage from the drive shaft and to engage the motor housing in a manner to function as a steering means.

Another object of my invention is to provide an apparatus of the above-mentioned character that includes means to automatically release the starter mechanism from the drive shaft of the motor when the motor is running, and that is automatic in its action to connect the starter mechanism to the shaft when it is desired to start the motor.

Still another object of my invention is to provide an apparatus of the above-mentioned character that includes locking means rendered operative during the starting operation to hold the motor housing against rotation relative to the boat to which it is attached, which means automatically becomes inoperative when the mechanism is associated with the motor in a manner to steer the same.

Yet another object of my invention is to provide an apparatus of the above-mentioned character that is light and compact in its construction and that is efficient and efficacious in the performance of its duties.

Other objects and advantages of my invention will be apparent during the course of the following description.

In the drawings, forming a part of this specification, and wherein like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of an outboard motor, and showing my improved starting and steering apparatus associated therewith.

Figure 2 is an enlarged fragmentary side elevation of the same, showing parts broken away, and the tiller in locked engagement with the motor housing.

Figure 3 is a view similar to Figure 2, but showing the tiller disengaged from the motor housing.

Figure 4 is a transverse sectional view taken on the line 4—4 of Figure 2.

Figure 5 is a transverse sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a transverse sectional view taken on the line 6—6 of Figure 3.

Figure 7 is a transverse sectional view taken on the line 7—7 of Figure 3.

Figure 8 is a transverse sectional view taken on the line 8—8 of Figure 2.

Figure 9 is a transverse sectional view taken on the line 9—9 of Figure 2, and

Figure 10 is a perspective view of the locking bolt embodying a part of my invention.

In the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 15 designates an outboard motor of conventional size and construction including a motor hood 16, and a drive shaft housing 17 through which the drive shaft 18 operates to rotate the propeller 19 through a suitable gearing (not shown). The lower end of the drive shaft housing is formed with a rudder 20 and the motor hood 16 is formed with a handle 21, which handle may be conveniently grasped by the person and permits the motor to be easily carried from place to place.

The attaching bracket 22 includes an annular sleeve 23 which rotatably receives the drive shaft housing 17 and is normally disposed with the upper edge thereof in abutting relation to the annular bead 24 integrally formed on the housing. The flange 25 of the sleeve extends outwardly of the housing 17 and the clamp 26 is pivoted thereto by means of the pivot pin 27. The clamp comprises spaced parallel members 31 and 32 joined at one end by the web 33 and disposed at opposite sides of the flange 25. The pivoted end of the clamp is substantially U-shaped to define the spaced parallel arms 28 and 29, which arms are adapted to embrace the back 30 of a boat, the arms 29 of the members being maintained in appressed relation with the outer face of the backboard 30 by the bolt 34 threadedly received by the web 33. The arms 29 of the clamp terminate in outwardly extending arcuately curved ends 35, which ends are disposed in embracing relation to the motor housing and at opposite sides of the flange 36 formed integral with and depending from the sleeve portion 23. Threaded shanks 37 extend outwardly from the opposite sides of the flange 36 and through the arcuate slots 38 in the ends 32 of the clamp. The wing nuts 39 are threadedly received by the shanks exteriorly of the arms and are adapted to be threaded into appressed relation therewith to hold the bracket in the desired position and against pivotal movement about the pivot pin 27. The tiller 40 is mounted for pivotal movement

about the shank 41 depending from the bottom of the motor hood. The tiller includes hinged sections 42 and 43 which are extended in longitudinal alignment, as illustrated in Figure 2, during the normal operation of the tiller, but which are adapted to be folded one upon the other when the device is not in use. The arcuately curved rack bar 44 has its ends bolted to the opposite sides of the tiller and with the curved portion thereof circumventing the pivoted end of the tiller. The curved portion of the rack passes through the vertical slots 45 in the drive shaft housing and with the teeth 46 thereof disposed concentrically about the pivot pin 41 in a manner to permit the same to mesh with the drive pinion 47 carried by the drive shaft 18.

The pinion 47 is supported by the integral flange 48 on the drive shaft and is formed with diametrically opposed internal pockets 49 which receive the rollers 50. The end walls 51 of the pockets 49 are longer than the end walls 52 so that the bottom face 53 thereof defines a cam face. The end walls 51 are of greater length than the diameter of the rollers 50 and the end walls 52 are of lesser length than the diameter of the rollers, whereby independent rotation of the gear about the drive shaft may be effected in an anti-clockwise direction; however, upon rotation of the pinion in a clockwise direction, the rollers will become wedged between the cam faces 53 of the pockets and the drive shaft to lock the pinion to the drive shaft and to effect the rotation thereof upon rotation of the pinion.

When the tiller 40 extends inwardly over the rearward end 30 of the boat and in spaced parallel relation with the flange 25 of the attaching bracket, the end 54 of the rack will be positioned in closest proximity to the pinion, which portion of the rack is not provided with teeth for a limited interval therealong to permit the pinion to have independent rotation relative thereto. Pivotal movement of the tiller in a direction to cause the teeth of the rack to mesh with the pinion will effect the rotation of the pinion in an anti-clockwise direction. When rotating in this manner, the pinion may rotate independently of the shaft in the manner hereinbefore described. If the tiller is then rapidly moved in a clockwise direction, the rollers 50 will bind the pinion to the shaft to effect the rapid rotation thereof, and upon return of the tiller to the initial position, the rack will disengage from the pinion. The impetus thus imparted to the drive shaft 18 will be sufficient to start the motor and the return of the tiller to the initial position will bring the portion 54 of the rack adjacent to the pinion to permit the pinion to rotate without danger of meshing with the teeth of the rack. In the event that the motor does not start upon one actuation of the tiller in the above manner, the operation may be repeated until the motor starts.

The section 42 of the tiller is provided with a longitudinally extending central bore 55 the end 56 of which opens through the upper side of the section and the end 57 thereof opens through the bottom side of the section. A lock bar 58 is slidably mounted within the bore 55 and is formed at one end with an upwardly extending U-shaped portion 59 the end 60 of which is slidably received within the bore 61 of the sleeve 62, integrally formed on the upper side of the tiller. The shank portion 63 of the locking bar extends downwardly from the tiller through the opening 57 and detachably engages the locking bolt 64.

The sleeve 65 is integrally attached to and extends radially from the motor housing in slight spaced relation above the flange 25 of the attaching bracket. The locking bolt is slidable within the sleeve and the upstanding abutment 66 is received by the elongated slot 67 in the sleeve to limit the sliding movement of the bolt. A coil spring 68 is disposed within the sleeve 65 rearwardly of the locking bolt and normally acts to position the bolt in the extended position, as illustrated in Figure 3. The transverse slot 69 in the upper face of the locking bolt receives the depending shank 63 of the locking bar, which shank is received within the slot 70 of the sleeve upon retraction of the locking bolt therein. When the bolt is in the extended position the outer end thereof and the extending shank 63 of the locking bar will engage the upstanding abutment 81 to prevent further pivotal movement of the tiller in a clockwise direction. Retraction of the locking bolt within the sleeve will move the locking bar in the direction of the motor hood 16 and thereby cause the horizontally disposed end 60 thereof to move into the recess 71 of the keeper 72. The side wall 73 of the keeper defines a cam face adapted to be engaged by the end 60 of the locking bolt upon pivotal movement of the tiller in a clockwise direction and to guide the said end into the recess 71.

The shank 74 of the actuating bolt 75 is connected to the locking bar and slidably supported by the upstanding flange 76. A coil spring 77 is interposed between the locking bar and the flange 76 and normally acts to hold the end 60 of the bar seated within the recess 71 of the keeper. The bolt 75 is similarly formed with hinged sections 78 and 79 which may be folded one upon the other when the device is not in use. The section 79 terminates at its free end in a ring 80 adapted to receive the finger of the operator.

The operation of the device is as follows:

The device is normally positioned, as illustrated in Figure 2 of the drawings, with the horizontally disposed end 60 of the locking bar seated in the recess 71 of the keeper 72. The coil spring 77 is of substantially greater strength than the coil spring 68 rearwardly of the locking bolt 64, whereby the depending shank 63 of the bar will move the bolt to a retracted position. When thus retracted the extending end of the bolt will be moved rearwardly of the upstanding abutment 81 on the flange 25 of the supporting bracket. The positioning of the upper end of the locking bar within the recess 71 of the keeper 72 and the engagement of the lower end thereof by the sleeve 65 will fixedly lock the tiller 40 against independent pivotal movement relative to the motor hood. Movement of the tiller will effect the rotation of the drive shaft housing 17 relative to the supporting bracket in a manner to permit the boat to be steered thereby.

If the motor should stop, and it is desired to start the same, the tiller may be released from the housing by retraction of the locking bar 58. This is best accomplished, as illustrated in Figure 5, by insertion of the operator's finger within the ring 80 and manually retracting the bar against the resilient action of the coil spring 77. The bar should be retracted a sufficient distance to disengage the end 60 thereof from the keeper 72 and to move the locking bolt 64 into abutting relation with the abutment 81. The tiller may then be pivoted about the shank 41 independently of the motor hood to move the

rack 44 into engagement with the pinion 47 in the manner hereinbefore described. The abutment 66 of the locking bolt will be positioned in the outer end of the slot 67 in the sleeve to position the transverse slot 69 of the bolt in register with the path of travel of the depending shank 63 of the locking bolt when the tiller is reversely rotated to start the motor. When the tiller reaches the initial position, the end 60 of the locking bolt will ride along the cam face 73 of the keeper 72 and automatically seat within the recess 71 thereof, and the depending shank 63 will engage the abutment 81 to prevent the tiller from swinging too far in a clockwise direction. The depending shank 63 will be received by the registering slot 69 in the locking bolt and retraction of the end 60 of the bar within the recess 71 in the keeper will move the locking bolt to the retracted position within the sleeve 65 to again permit steering of the boat by the tiller 40.

It may thus be seen that I have provided a combined steering and starting apparatus for an outboard motor that is simple and compact in its construction, that will efficiently and efficaciously perform its duties and that is extremely simple and substantially automatic in its operation. Retraction of the actuating bolt 75 will permit the tiller to act independently of the motor and to operate as a starter. Each time the drive shaft 18 is rotated by the return of the tiller to the initial position, the device will automatically lock the tiller to the motor housing to prevent independent rotation thereof relative to the motor and to permit the same to operate as a steering tiller.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of my invention, or scope of the appended claims.

Having thus described my invention, I claim:

1. In an outboard motor having the drive shaft housing pivotally mounted in an attaching bracket, a starting and steering apparatus comprising a tiller carried by the motor housing and adapted to be rocked about a vertical axis, means detachably locking the tiller against independent pivotal movement, means cooperative with the first-mentioned means to automatically lock the motor housing against pivotal movement relative to the attaching bracket upon disengagement of the said first-mentioned means from the housing, a pinion carried by the drive shaft of the motor, and gear means carried by the tiller, said gear means being engageable with the pinion and adapted to impart rotation thereto upon disengagement of the first-mentioned means to permit independent pivotal movement of the tiller about its vertical axis.

2. In an outboard motor having the drive shaft housing pivotally mounted in an attaching bracket, a starting and steering apparatus comprising a drive pinion carried by the drive shaft of the motor, a tiller pivoted to the motor housing, an arcuate rack bar carried by the tiller and engageable with the pinion to rotate the same upon independent actuation of the tiller, a manually actuated bar element carried by the tiller and normally in spring pressed engagement with the housing to prevent independent pivotal movement of the tiller relative to the housing, and means cooperative with the bar element to

hold the housing against pivotal movement relative to the bracket upon disengagement of the said bar element from the housing.

3. In an outboard motor having the drive shaft housing pivotally mounted in an attaching bracket, a starting and steering apparatus comprising a drive pinion carried by the drive shaft of the motor, a tiller pivoted to the motor housing, an arcuate rack bar carried by the tiller and engageable with the pinion to rotate the same upon independent actuation of the tiller, a locking bar slidably carried by the tiller and normally engaging the motor housing to prevent independent actuation of the tiller and to permit pivotal actuation of the housing by the tiller, and means actuated by the locking bar to hold the motor housing against pivotal movement upon disengagement of the locking bar from the said housing.

4. In an outboard motor having the drive shaft housing pivotally mounted in an attaching bracket, a starting and steering apparatus comprising a drive pinion carried by the drive shaft of the motor, a tiller pivoted to the motor housing, an arcuate rack bar carried by the tiller and engageable with the pinion to rotate the same upon independent actuation of the tiller, and a manually actuated bar element carried by the tiller and normally in spring pressed engagement with the housing to prevent independent pivotal movement of the tiller relative to the housing.

5. In an outboard motor having the drive shaft housing pivotally mounted in an attaching bracket, a starting and steering apparatus comprising a drive pinion carried by the drive shaft of the motor, a tiller pivoted to the motor housing, an arcuate rack bar carried by the tiller and engageable with the pinion to rotate the same upon actuation of the tiller, a locking bar slidably carried by the tiller and normally engaging the motor housing to permit pivotal actuation of the housing by the tiller, and a locking bolt slidably carried by the drive shaft housing and actuated by the locking bar, whereby engagement of the locking bar with the motor housing will render the locking bolt inoperative, but disengagement of the said locking bar from the housing will move the locking bolt into engagement with a part of the attaching bracket to hold the motor housing against rotation but permitting pivotal actuation of the tiller independently of the housing to effect the rotation of the said drive pinion.

6. A starting and steering device for outboard motors comprising a pinion carried by the motor shaft, a tiller pivoted to the motor housing, a rack carried by the tiller and engageable with the pinion to rotate the same upon movement of the tiller, said pinion being engageable with the shaft when rotated in one direction but rotating freely thereon when rotated in the opposite direction, a locking bar slidably associated with the tiller and movable into engagement with the motor housing to hold the said tiller against pivotal movement, and a locking bolt slidably associated with the motor housing and actuated by the locking bar, said bolt being inoperative when the locking bar is in engagement with the motor housing to permit pivotal actuation of the said housing by the tiller, and engageable with a stationary part upon disengagement of the locking bar from the motor housing to hold the housing against pivotal movement.

7. In an outboard motor having the drive shaft housing pivotally mounted in an attaching bracket, a starting and steering apparatus com-

prising a drive pinion carried by the drive shaft of the motor, a tiller pivoted to the motor housing, an arcuate rack bar carried by the tiller and engageable with the pinion to rotate the same upon actuation of the tiller, a locking bar slidably carried by the tiller and having one end normally engaging the motor housing to permit pivotal actuation of the housing by the tiller, a tubular casing integral with the drive shaft housing and having a longitudinal slot, a locking bolt slidably disposed within the casing and having a transverse slot adapted to receive the other end of the

5 said locking bar, whereby engagement of the first-mentioned end of the locking bar with the housing will retract the locking bolt into the casing and move the second-mentioned end of the bar into the longitudinal slot of the casing, but disengagement of the first-mentioned end of the bar from the housing will disengage the second-mentioned end thereof from the casing and move the said bolt into engagement with a part of the said attaching bracket. 10

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