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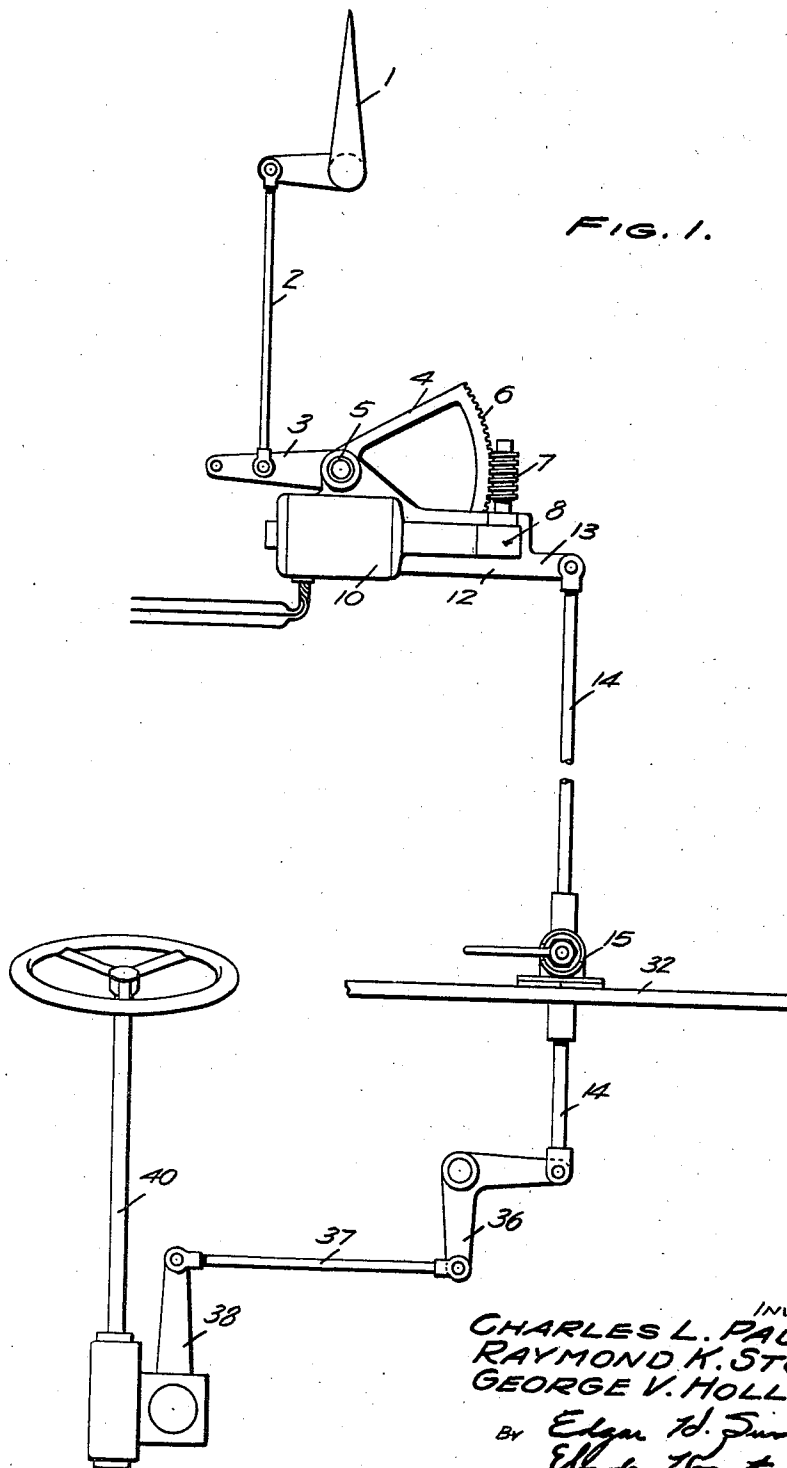
G. V. HOLLOMAN ET AL

2,294,906

LOCKING DEVICE FOR RUDDER CONTROL SYSTEMS

Filed Aug. 21, 1940

2 Sheets-Sheet 1



INVENTORS
CHARLES L. PAULUS
RAYMOND K. STOUT
GEORGE V. HOLLOMAN
BY *Edgar W. Sundgren*
Elmer H. Harty
ATTORNEYS

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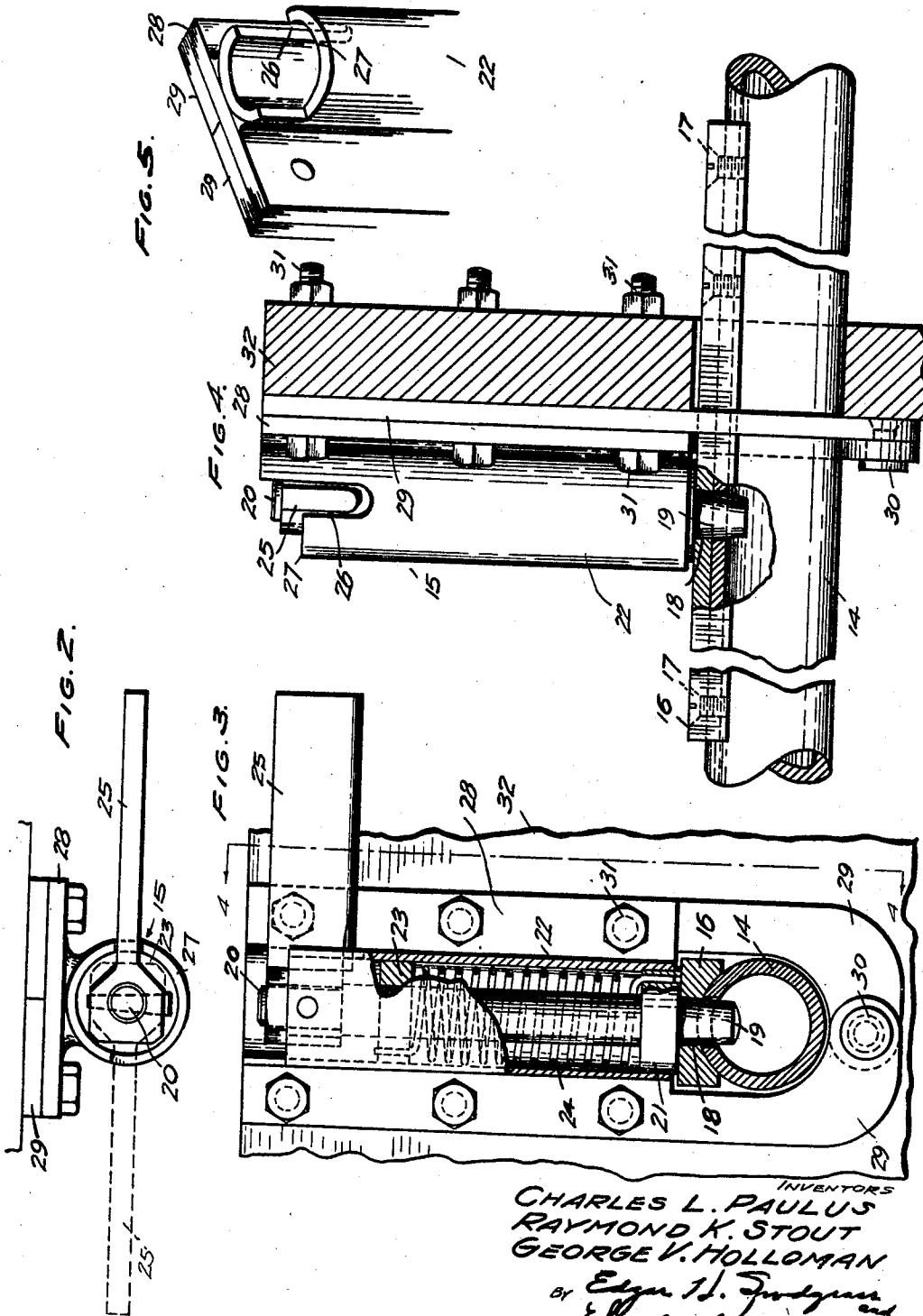
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INVENTORS
CHARLES L. PAULUS
RAYMOND K. STOUT
GEORGE V. HOLLOMAN

BY *Edgar H. Ford* and
Charles H. Smith
ATTORNEYS

UNITED STATES PATENT OFFICE

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LOCKING DEVICE FOR RUDDER CONTROL SYSTEMS

George V. Holloman, Charles L. Paulus and Raymond K. Stout, Dayton, Ohio

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2 Claims. (Cl. 114—144)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to us of any royalty thereon.

This invention relates to a novel locking means for locking a manually operated rudder control system for a boat, to thereby enable the rudder to be controlled by the power-actuated means.

The subject matter of this application is related to the subject matter disclosed in our copending application Serial No. 353,056 filed August 17, 1940, for improvements in "Control for target boat or other vehicle."

The principal object of the invention is the provision in a rudder control system or the like, of a reciprocable member adapted to actuate the rudder, a latch member carried by the reciprocable member and a spring loaded bolt member adapted to be moved into engagement with the latch member to prevent reciprocation thereof or to be locked in a position out of engagement with said latch member.

A further object of the invention is the provision, in apparatus of the type described, of a cylinder, in rotatable and reciprocable bolt mounted in said cylinder, a spring secured to said cylinder and to said bolt and yieldingly opposing axial movement and rotation of said bolt and locking means carried by said cylinder and said bolt, whereby when said bolt is maintained in locked position said spring is subjected to torsional and compressive stresses which assist in the unlocking of said bolt from said cylinder.

Other objects of the invention not specifically enumerated above will become apparent by reference to the specification and the appended drawings in which:

Figure 1 illustrates a portion of the rudder control system for a boat incorporating the novel locking means for the manual rudder control system;

Figure 2 illustrates a top plan view of the locking means in accordance with the invention;

Figure 3 illustrates a sectional view of the novel locking means taken on line 3—3 of Figure 4;

Figure 4 is a side elevation of the novel locking means; and

Figure 5 is an isometric sketch of a detail of the bolt-locking mechanism.

Referring now to Figure 1, the reference numeral 1 indicates a conventional rudder for directionally steering a boat. The rudder is actuated by means of a link 2, pivotally connected to an arm 3, which forms an integral extension of a gear sector 4 which is rotatably mounted on the

stationary spindle 5. The gear sector 4 has gear teeth 6 which mesh with a spiral-threaded worm 7 driven by a reduction gear unit 8, which in turn is driven in either direction of rotation by the reversible electric motor 10. The worm 7, reduction gear 8 and motor 10 are supported on a base 12, which in turn is freely rotatably mounted on the spindle 5, immediately above the gear sector 4. The base 12 is provided with an integral extension arm 13 which is pivotally connected to a control rod 14, which in turn is pivotally connected to one arm of a bell crank 36, the other arm of which is connected by a link 37 to the steering arm 38 of a conventional wheel type steering mechanism 40. Intermediate its ends the control rod 14 passes through a manually actuated locking mechanism generally indicated by the reference numeral 15. The locking mechanism is mounted on a stationary support 32 forming part of the structure of the boat.

If the base 12 and arm 13 are held in the neutral position corresponding to the "straight ahead" position of the rudder, and the electric motor 10 is energized to run in a desired direction, worm 7 will drive the gear sector 4, which through arm 3 and link 2 will cause the rudder to be positioned at a desired point, the means for controlling the supply of current to the motor 10 and the means for de-energizing the motor after the rudder has moved to a selected predetermined position, being fully disclosed in our above-identified copending application and forming no part of the subject matter claimed herein.

The manual locking means 15 is employed to lock the control rod 14 in a position corresponding to the neutral position of arm 13. Upon release of the locking means and the return of gear sector 4 to a normal neutral position relative to the base 12, manual operation of the steering wheel of the steering mechanism 40 will cause reciprocation of the control rod 14 to effect a desired angular displacement of the supporting base 12 about the spindle 5. The worm 7 then serves as a rigid connection between the base 12 and the gear sector 4, causing the gear sector and the rudder to partake of the angular displacement of the base 12.

The novel locking means 15, for locking the control rod 14 in the neutral position, is illustrated in Figures 2 to 5 inclusive, in which the control rod 14 is provided with an elongated latch member 16, secured on the upper side thereof by means of the countersunk screws 17. The latch member is provided with a conical opening 18 which extends through the wall of the hollow

control rod 14 and cooperates with the tapered end 19 of a bolt 20, to lock the control rod 14 against axial movement. The bolt 20 is reciprocally and rotatably mounted within a cylinder or barrel 22 by means of an enlarged head 21 formed on the bolt 20 adjacent its lower end and engaging the cylinder walls and by a partition 23 pressed into the upper portion of the cylinder 22 and serving as a journal and guide for the upper end of the bolt 20. A torsion and compression spring 24 is inserted in the cylinder barrel between the enlarged head 21 of bolt 20 and the partition 23, concentric with the axis of the bolt 20. The spring 24 has its ends secured respectively to the head 21 and to the partition 23 so that any rotation of the bolt relative to the cylinder causes the spring 24 to be stressed in torsion. The bolt 20 has a handle 25 rigidly secured thereto at its upper end, the handle extending at right angles to the axis of the bolt. On one side of the cylinder 20 is provided with an elongated longitudinally extending slot 26 and the wall of the cylinder is cut away to form a semicircular edge 27, which intersects one side of the slot 26, the portions of the cylinder wall extending beyond the edge 27 serving as stops for the handle 25 (see Figure 4). The cylinder 22 is provided with a mounting plate 28 integrally formed therewith and adapted to seat on a pair of guide members 29, joined at their lower ends by a rivet 30 and serving as a support for the rod 14. The guides, due to their hinged construction, can be assembled around the control rod 14 without disturbing the control system assembly. Bolts 31 serve to attach the cylinder and guides to a stationary support 32 which forms a part of a bulkhead in the boat.

The operation of the locking means is as follows: The latch member 16 is secured to the rudder control rod 14 in such a position that the opening 18 is immediately beneath the tapered end 19 of the bolt 20 when the rudder control is in its mid-travel, or neutral, position. If the handle 25 is raised in the slot 26 and the handle rotated one hundred and eighty degrees to the position indicated by dotted lines in Figure 2, the bolt 20 will be held in the raised position and spring 24 will be stressed in compression and torsion. The control rod 14 may then be freely reciprocated by the manual steering control mechanism 40, to actuate the rudder 1 in the

manner previously described. When it is desired to actuate the rudder by power means, the handle 25 is rotated by the operator's foot, the torsion stress in spring 24 assisting in rotating the handle 25 and bolt 20, and upon handle 25 becoming aligned with slot 26, the compressive stress in spring 24 forces the bolt 20 downward until the tapered end 19 of the bolt engages the latch member 16. When the manual control is brought to the neutral position, the tapered end of the bolt will automatically enter the tapered opening 18 of the latch member 16 and lock the control rod 14 against reciprocation, thereafter maintaining the manual control in the neutral position. The rudder 1 may then be controlled by power means, as previously described.

While one embodiment of the invention has been illustrated and described, other modifications will become apparent to those skilled in the art, as falling within the scope of the invention as defined by the appended claims.

We claim:

1. In a rudder control system for water borne craft of the type wherein the rudder may be actuated by power means and independently actuated by manual control means, said manual means including a reciprocable control rod; the combination with said control rod of a latch member carried thereby, a spring loaded bolt member adapted when released to co-operate with said latch member to automatically lock said control member against movement when the latter is in a predetermined position, means for locking said bolt in an elevated position out of engagement with said latch and foot actuated quick-release means for releasing said bolt for engagement with said latch member.

2. The structure as claimed in claim 1, in which said bolt member is loaded by a compression spring connected thereto so as to resist rotation of said bolt by torsional stress and the latching means for retaining said bolt in an elevated position being constructed such that said bolt must be rotated to latch the same in an elevated position and the torsional stress thereby induced into the loading spring assisting in the quick-release of the bolt by the foot-actuated means.

GEORGE V. HOLLOMAN.
CHARLES L. PAULUS.
RAYMOND K. STOUT.