

(No Model.)

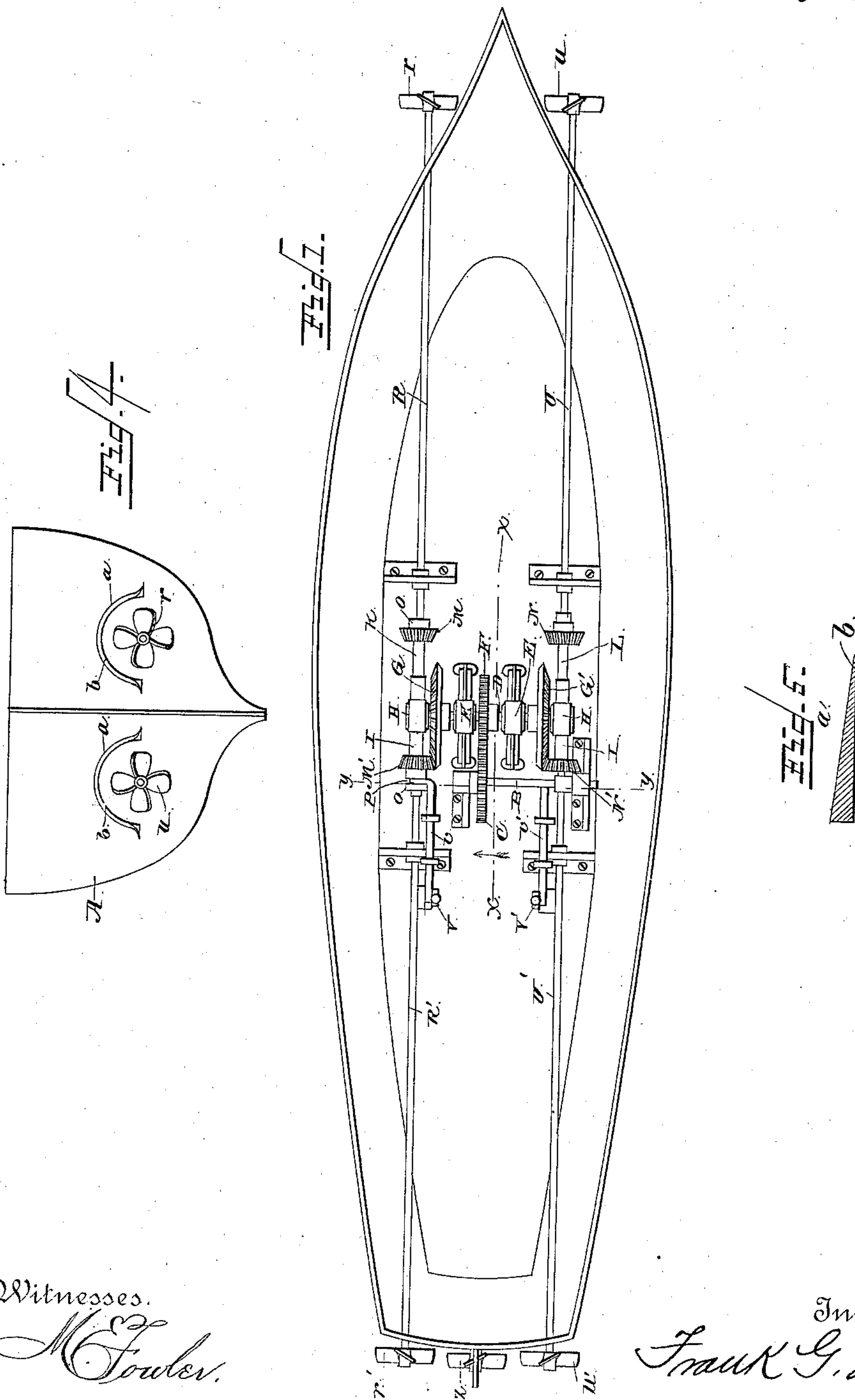
2 Sheets—Sheet 1.

F. G. WHITE.

SCREW PROPELLER FOR VESSELS.

No. 382,398.

Patented May 8, 1888.



Witnesses.  
*M. Fowler.*  
*J. V. Garner*

Inventor,  
*Frank G. White*  
By *his* Attorneys,  
*C. H. Howard*

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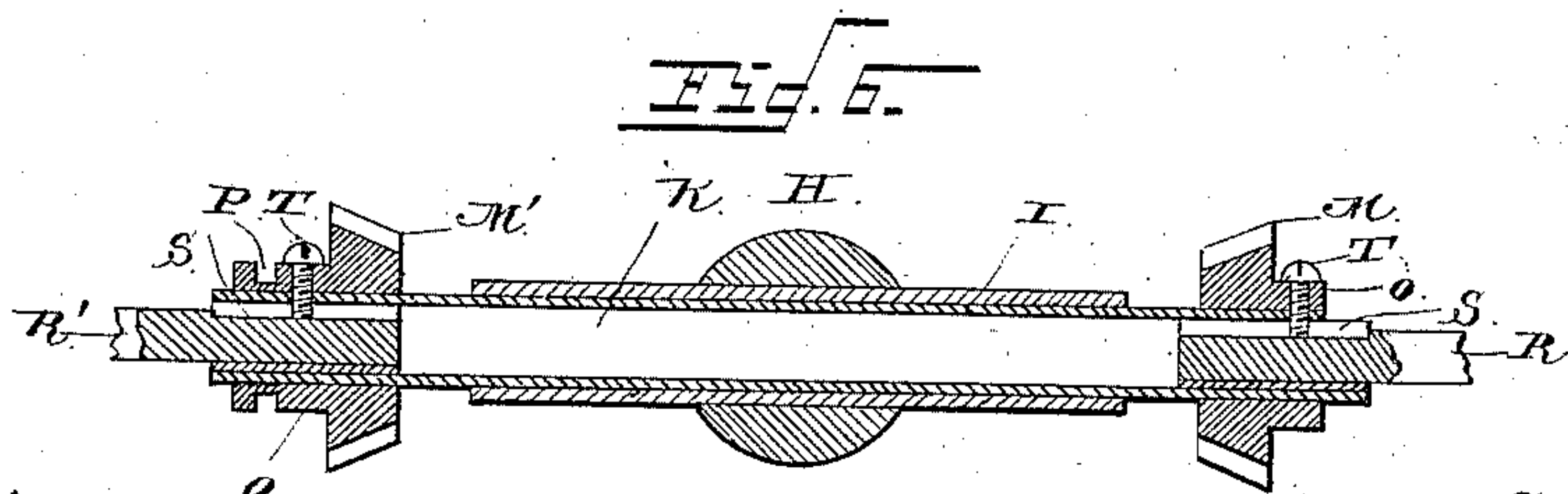
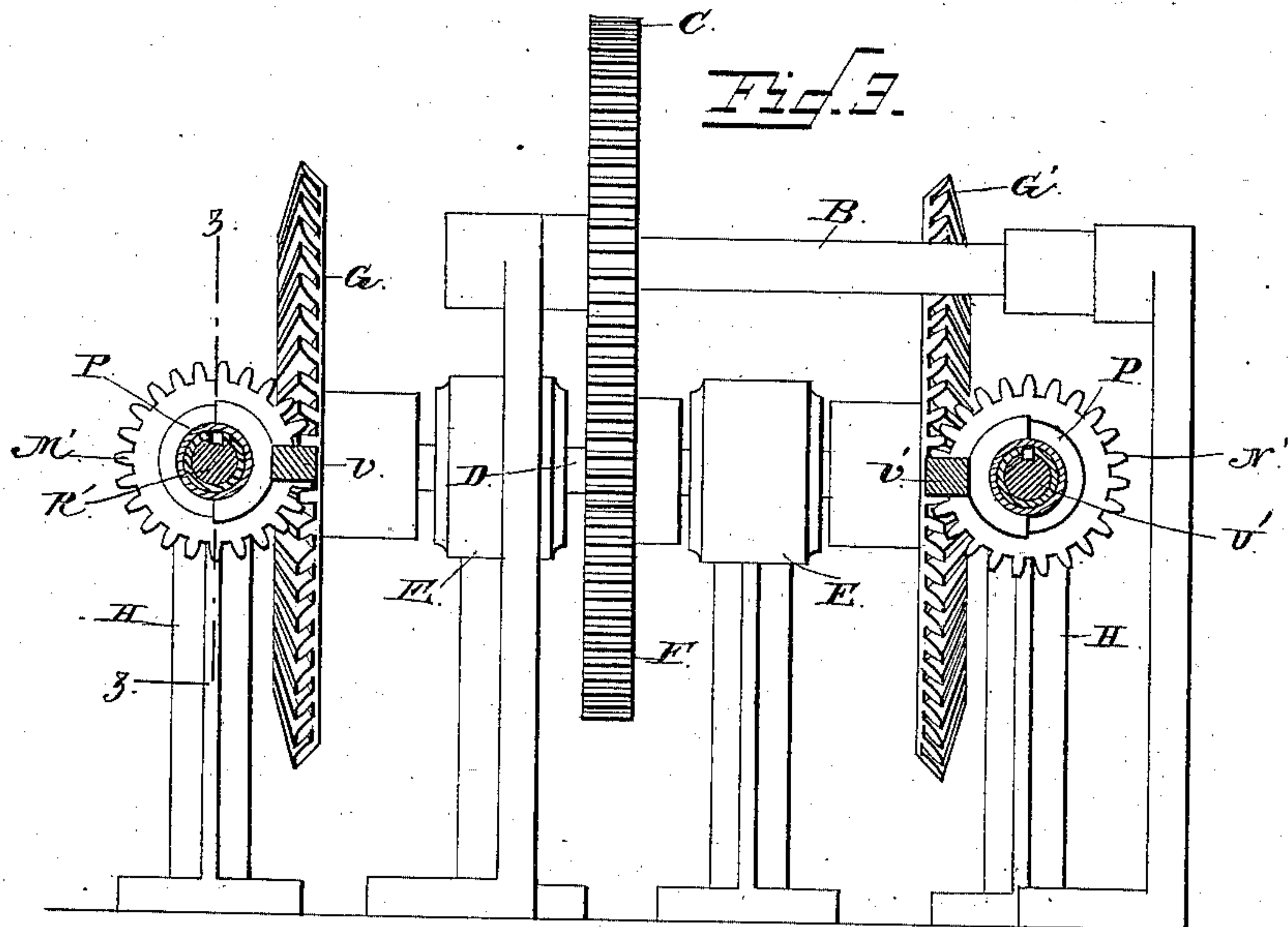
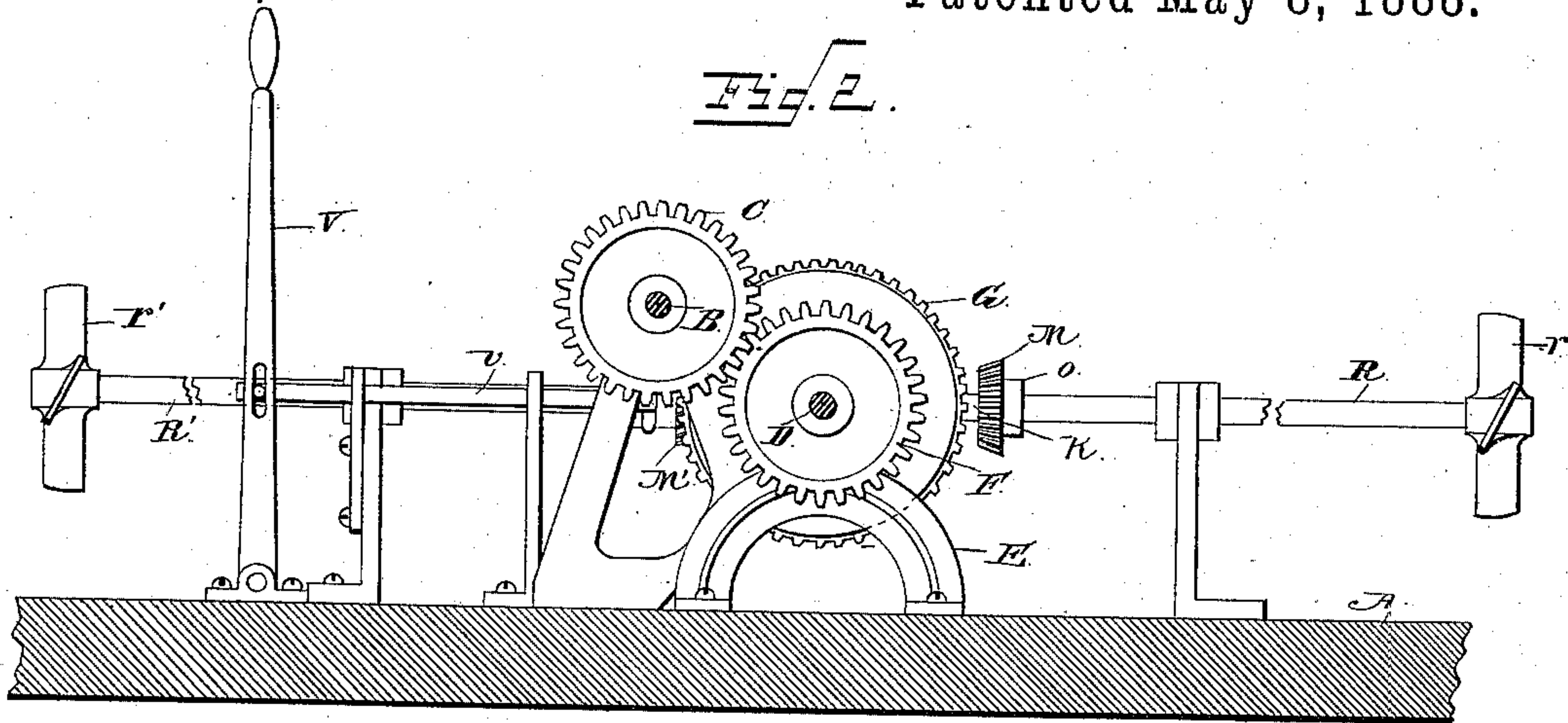
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*C. A. Howells*



# UNITED STATES PATENT OFFICE.

FRANK. GEORGE WHITE, OF ENGLEWOOD, ILLINOIS.

## SCREW-PROPELLER FOR VESSELS.

SPECIFICATION forming part of Letters Patent No. 382,398, dated May 8, 1888.

Application filed June 8, 1887. Serial No. 240,622. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK. GEORGE WHITE, a citizen of the United States, residing at Englewood, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Screw-Propellers for Steam-Vessels, of which the following is a specification.

My invention relates to an improvement in screw-propellers for steam-vessels; and it consists in the peculiar construction and combination of devices that will be more fully set forth hereinafter, and particularly pointed out in the claims.

The object of my invention is to provide a propelling apparatus which is adapted to move the vessel either forward or back, and to turn the same in either direction without stopping or reversing the engine.

In the drawings, Figure 1 is a top plan view of a vessel provided with propelling apparatus embodying my improvements. Fig. 2 is a vertical sectional view of the same, taken on the line *x x* of Fig. 1. Fig. 3 is a vertical transverse sectional view taken on the line *y y* of Fig. 1. Fig. 4 is a front elevation of the vessel. Fig. 5 is a transverse section of the guard. Fig. 6 is a detail section on the line *z z*, Fig. 3.

A represents a steam-vessel of any preferred construction.

B represents the driving shaft rotated by the steam-engine, (not shown,) and provided with a spur-wheel, C.

D represents the transverse shaft, which is arranged near the center of the vessel or at any other suitable point, and is journaled in standards E. To the center of the said shaft is keyed a spur-wheel, F, which engages the wheel C. To one end of the shaft is keyed a beveled gear-wheel G, and to the opposite end of the shaft is keyed a similar beveled gear-wheel, G'.

H represents a pair of vertical standards or supports, which are arranged just beyond the end of the shaft B. In the upper end of each of the said supporting-standards is secured the longitudinal cylindrical sleeve I.

K represents a longitudinally-movable shaft, which is journaled in the sleeve adjacent to the wheel G, and L represents a similar shaft, which is journaled in the sleeve adjacent to

the wheel G'. At the front and rear ends of the shaft K are beveled gear-pinions M and M', respectively, and at the front and rear ends of the shaft L are beveled gear-pinions N and N'. The said pinions are provided on their outer sides with hollow projecting sleeves or hubs O, and the pinions M' and N' have annular grooves P on their hubs or sleeves, as shown.

R and R' represent a pair of longitudinal shafts, which are arranged in line with the shaft K and have their outer ends projecting beyond and through the bow and stern of the vessel, as shown, and provided with packing-boxes to prevent leakage. The inner ends of the said shafts are provided with longitudinal grooves S, and are adapted to enter the hollow sleeves or hubs of the pinions M and M', and the said hubs or sleeves of the pinions are provided with screws T, which enter said grooves and thereby permit the shaft K to slide longitudinally on the opposing inner ends of the shafts R and R', and also cause the said shafts R and R' to rotate with the shaft K when the latter is turned.

U and U' represent a pair of shafts, which are arranged in line with the shaft L, and extend through the bow and stern of the vessel, and are connected to the shaft L by similar means to those employed to connect the shafts R and R' to the shaft K.

To the rear end of the shaft R' is secured a left-hand propeller screw, *r'*, and to the front end of the shaft R is attached a similar propeller-screw, *r*. The front end of the shaft U has a right-hand propeller-screw, *u*, and the rear end of the shaft U' has a similar screw, *u'*.

V represents a hand-lever, which is fulcrumed at its lower end and is connected to the collar or sleeve of the pinion M' by means of a longitudinally-movable rod, *v*, which is guided by standards W, and is provided at its front end with diverging engaging-arms which enter the groove P of the pinion M'.

V' represents a similar hand-lever, which is connected likewise to the pinion N' by means of the longitudinally-movable rod *v'*.

The operation of my invention is as follows: When the engine is in motion, the shaft D and the wheels F, G, and G' are in constant rotation in the same direction. By moving the hand-levers



V and V' to a vertical position the shafts K and L are moved lengthwise, so as to cause the pinions M and M' and N and N' to be disengaged from the wheels G and G', and as a consequence the propeller-shafts remain stationary. When the levers V and V' are moved forward to cause the pinions M' and N' to engage the wheels G and G', respectively, the propeller-shafts are rotated in opposite directions, as indicated by the curved arrows in Fig. 2, and the right and left hand propellers attached to the ends of the propeller-shafts are rotated in opposite directions simultaneously, and thereby urge the boat forward through the water. When the hand-levers are moved rearward to disengage the pinions M' and N' from the beveled gear-wheels and cause the pinions M and N to engage the same, the propeller-shafts are rotated in the reverse direction from that indicated by the curved arrows in Fig. 2, and the boat is thereby caused to back. By moving one lever forward and the other lever rearward the propeller shafts will be caused to rotate in the same direction, and as the propellers on one side of the vessel are left-handed and those on the other side of the vessel are right-handed, it will be readily understood that when the propeller-shafts rotate in the same direction the result will be that the propellers will turn the vessel in the water either to the right or left, according to the direction in which the shafts rotate.

It will be readily understood from the foregoing that the vessel may be stopped, started, reversed, or turned in either direction without stopping the engine, and thereby the vessel is rendered easily manageable and is adapted to be turned in its own length as upon a pivot.

In case of an accident to either of the propeller-shafts it and its companion shaft on the other side will be disengaged from the shafts K and L while undergoing repairs, the remaining pair of propellers being kept at work in driving the vessel. By thus providing the vessel with propellers at both ends the propeller-shafts may be turned at a lower rate of speed than necessary where only a single propeller is used, in order to drive the vessel at the same speed. When propellers are rotated at a very high rate of speed, the water around them is churned into froth and is filled with air-bubbles, and thus propellers are caused to work in a partial vacuum and are prevented from catching hold of the water at all points of their surface. By providing a vessel with a number of propellers and operating the same at a lower rate of speed this objection is obviated.

A vessel provided with propellers at both

bow and stern is particularly well adapted to sail in rough waters, for the reason that when either end of the vessel is raised by the waves the propellers at the opposite end thereof will be buried in the water and at work urging the vessel forward.

If desired, the usual central propeller, Z, in the stern of the vessel may be employed, as indicated in Fig. 1.

When the vessel is advancing, the propellers at the bow and rotating in opposite directions engage the water with maximum efficiency and cause it to divide at the stem and pass rearwardly obliquely to the right and left, thus giving the propellers the same relative power.

For vessels such as tug-boats, which ply about wharves and shipping, I propose to employ arched guards *a*, which extend above and project beyond the propellers. These guards have broadened flattened blades *b*, which are wedge-shaped in cross-section, and are thus adapted to pass smoothly through the water. (See Fig. 5.)

Having thus described my invention, I claim—

1. In a steam-vessel, the combination of the propeller-shafts arranged in line with each other and extending beyond the bow and stern of the vessel, the right and left hand propeller-screws on both ends of the said shafts adapted to rotate simultaneously in opposite directions, the endwise-moving shaft connecting the opposing ends of the propeller-shafts and having the pinions at opposite ends, and the gear-wheel adapted to engage either of the said pinions when the said shaft is moved endwise, substantially as described.

2. The combination of the propeller-shafts on opposite sides of the vessel arranged in line with each other and provided with right and left hand propelling-screws, the endwise-moving shafts connecting the inner opposing ends of the propeller-shafts and having the beveled pinions at their opposite extremities, the rotating shafts D, the beveled gear-wheels G and G', attached to the said shafts and adapted to engage either of the pinions, and the endwise-moving shafts and the levers connected to the said endwise-moving shafts to shift the same longitudinally, for the purpose set forth, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

FRANK. GEORGE WHITE.

Witnesses:

E. W. SPROUL,  
H. H. HOLMES.