April 25, 1933. R. ENSENAT 1,905,162

STERN PADDLE WHEEL PROPULSION MECHANISM FOR BOATS

Filed Dec. 26, 1931

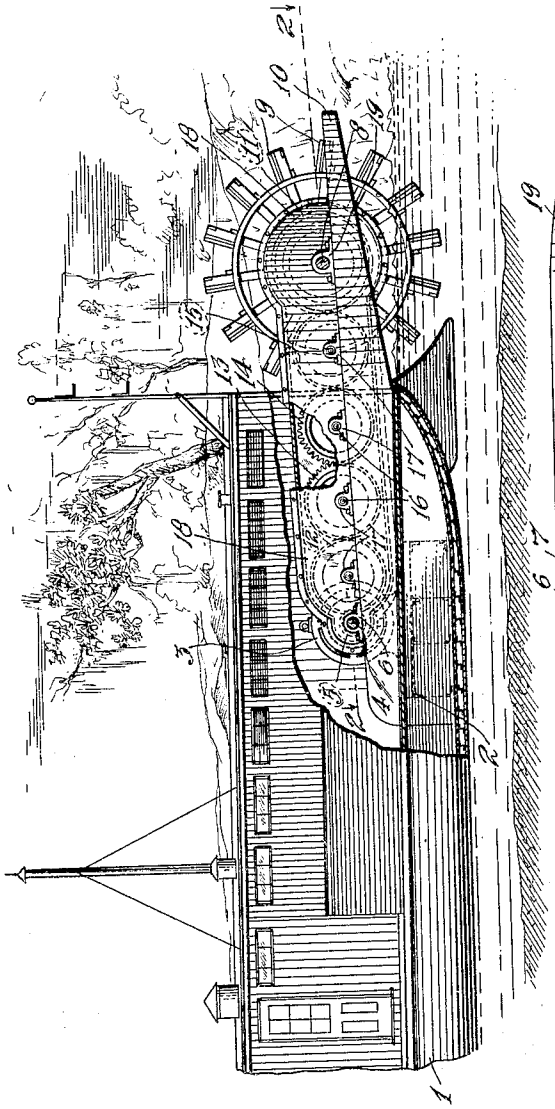

Fig. 1

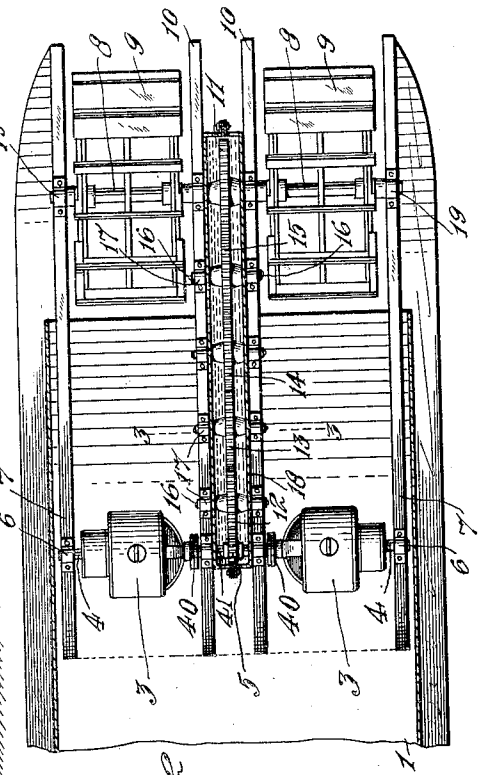

Fig. 2

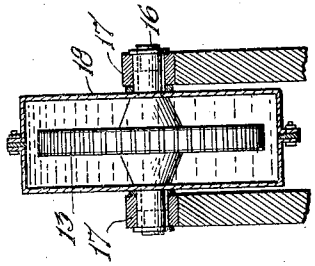

Fig. 3

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Patented Apr. 25, 1933 1,905,162

UNITED STATES PATENT OFFICE

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STERN PADDLE-WHEEL PROPULSION MECHANISM FOR BOATS

Application filed December 26, 1931. Serial No. 583,169.

This invention relates particularly to improvements in propulsion mechanism for boats of the stern paddle-wheel type.

In this type of boat, it is desirable that the hull of the vessel be "down at the bow", in other words, that the bow draw somewhat more water than the stern, it being generally recognized that navigation of the vessel under such conditions is easier.

Some propulsion equipment for stern paddle-wheel boats includes a prime mover or motor connected by shafts, cranks and connecting rods to the paddle-wheel, while in other propulsion equipment, the motor is connected to the paddle-wheel by sprockets and chains. In both of these types of propelling mechanisms, severe working stresses and torques are placed upon the shafts, connecting rods and paddle-wheels; and furthermore, the driving mechanism occupies a considerable space on the deck. These conditions are especially prevalent in large boats requiring for example 800 to 1,500 horsepower and speeds of from 15 to 25 revolutions per minute of the paddle-wheel.

One object of my invention is to provide a novel and improved driving mechanism for stern paddle-wheels of the character described, whereby great power required for propelling large boats may be effectually transmitted from the engine to the paddle-wheel with a minimum of parts and a minimum of strains or stresses on the connections between the engine and the paddle-wheel.

Another object is to provide novel and improved driving mechanism for stern paddle-wheel boats wherein the heavy portions of the equipment, for example, steam boilers, fuel tanks, and the like, may be placed at the bow of the boat, while the relatively lighter prime mover, for example, electric motor, steam turbine, and the like, and the gearing connecting the prime mover to the paddle-wheel, can be easily arranged at the stern of the boat and shall occupy a small amount of space. The power may be transmitted to the prime movers, for example, steam from the boilers to a turbine through pipes, or electricity from generators driven by Diesel engines to an electric motor through wires, whereby long shafts and complicated trains of gears, links, etc., can be obviated.

Other objects are to provide a stern paddle-wheel driving mechanism comprising a prime mover and a continuous train of gears connected between the prime mover and the paddle-wheel and mounted in a novel and improved manner on the hull of the boat, whereby torques and strains on the driving mechanism and the paddle-wheel shall be reduced to a minimum; to utilize in such driving mechanism a plurality of shafts all arranged with their axes parallel to each other and to the shaft of the paddle-wheel; and to obtain other advantages and results as will be brought out by the following description.

Referring to the accompanying drawing, in which corresponding and like parts are designated throughout the several views by the same reference characters,

Figure 1 is a side elevation, partially in section, of the stern of a boat employing a driving mechanism that embodies my invention;

Figure 2 is a horizontal sectional view, taken on the line 2—2 of Figure 1, and

Figure 3 is an enlarged vertical sectional view, on the line 3—3 of Figure 1.

Specifically describing the illustrated embodiment of the invention, the reference character 1 designates the hull of a shallow draft boat such as is widely used in river service. Mounted at the stern of the boat on a suitable framework 2, is a pair of electric motors 3 which may be driven by electric current generated by electric generators at the bow of the boat which in turn may be driven by Diesel engines or the like. Instead of using electric motors, I might use steam turbines and connect them by pipes to steam boilers disposed at the bow of the boat.

These motors are shown as arranged with their shafts 4 in axial alinement and connected through shaft couplings 40 to a stud shaft 41 on which is mounted a driving pinion 5 at substantially the longitudinal median line of the boat. The shafts 4 are journaled in suitable bearings 6 mounted on beam 7 which extend longitudinally of the boat in

substantially spaced and parallel relation and project beyond the stern of the hull. As shown, there are four beams, one at each side of the hull, and two in close relation to each other at the opposite sides of the longitudinal median line of the boat.

On the projecting ends of the beams 7 in bearings 19 is journaled a shaft 8 having two paddle-wheel sections 9 mounted thereon, each section between one side beam 7 and the next adjacent central beam 10. Upon this shaft 8 between the two central beams 10 is mounted a gear 11. This gear 11 is connected by a train of intermeshing gears 12, 13, 14 and 15 to the driving pinion 5, said gears 12 to 15, inclusive, being mounted on countershafts 16 journaled in bearings 17 on the central beams 10 and with their axes substantially parallel to each other.

Preferably the pinion 5, gears 12 to 15, inclusive, and the paddle-wheel gear 11 are enclosed in a water-tight casing 18 which contains a quantity of oil, so that the gears are constantly bathed in oil and water is excluded from contact with the gears.

The operation of my driving mechanism will be understood from the foregoing. When the motors or other prime movers 3 are started, power is transmitted through the pinion 5 and gears 11 to 15, inclusive, to the paddle-wheel shaft 8 so as to drive the latter. The pinion 5 preferably has a speed-reducing ratio to the gears 12 to 15, inclusive, and also there is a speed-reducing relation between the intermediate gears and the paddle-wheel gear 11, so that the speed of rotation of the paddle-wheel is considerably less than the speed of the prime mover shaft. Of course, the prime movers 3 may be reversible as is customary, or other reversing gears may be used. Great power may be transmitted from the prime movers to the paddle-wheel with a minimum of strains and stresses on the driving connections, and the driving mechanism is smooth-running with no sudden shocks imposed upon the paddle-wheels as occurs in known driving mechanisms including connecting rods, chains, and the like. There are no long shafts to be subjected to torque, and the driving mechanism can be compactly arranged at the stern of the boat and occupy a minimum of space, while the electrical or steam generating apparatus can be arranged at the bow of the boat.

While I have shown and described the now preferred embodiment of my invention, it should be understood that this is primarily for the purpose of illustrating the principles of the invention, and that the details of construction of the driving mechanism may be modified and changed by those skilled in the art without departing from the spirit or scope of the invention. While I have shown two prime movers, obviously one or more than two prime movers might be utilized, and any suitable type of prime mover is contemplated by me. Furthermore, it should be understood that I have shown the mechanism schematically, and that any suitable details of structure may be adopted.

Having thus described the invention, what I claim is:

1. The combination with the hull of a ship, of a beam at each side thereof and two beams each at one side of the longitudinal median line of the hull, all of said beams extending longitudinally of the hull and projecting from one end thereof, a paddle-wheel shaft journaled on the projecting ends of said beams transversely of said hull and having a paddle-wheel thereon, a prime mover mounted on said hull and having a shaft journaled parallel to said paddle-wheel shaft, and a train of gears journaled on the second-mentioned two beams and located therebetween connecting said prime mover shaft to said paddle-wheel shaft.

2. The combination with the hull of a ship, of a beam at each side thereof and two beams each at one side of the longitudinal median line of the hull, all of said beams extending longitudinally of the hull and projecting from one end thereof, a paddle-wheel shaft journaled on the projecting ends of said beams transversely of said hull and having a paddle-wheel section thereon between each of said side beams and one of the second-mentioned beams, a gear on said paddle-wheel shaft between said second-mentioned beams, a prime mover mounted on said hull and having a shaft parallel to said paddle-wheel shaft, a pinion journaled on and located between said second-mentioned beams and connected to said prime mover shaft, and a train of intermeshing gears journaled on and located between the second-mentioned beams and connecting said pinion on the prime mover shaft to said gear on the paddle-wheel shaft.

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