

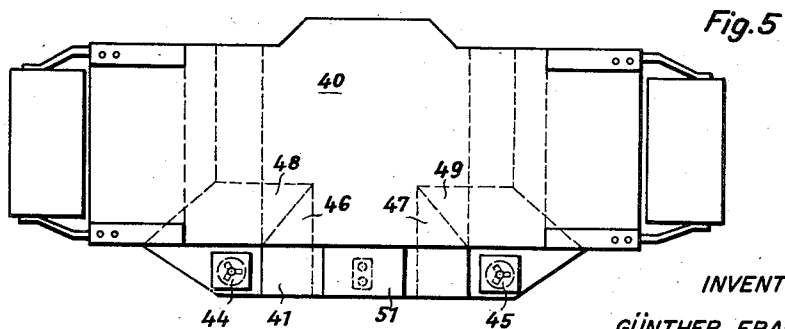
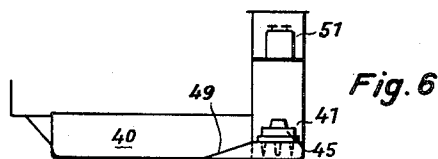
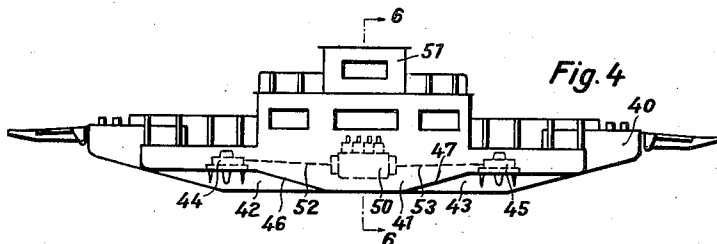
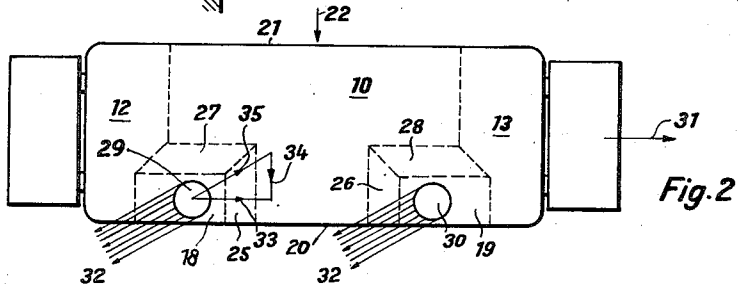
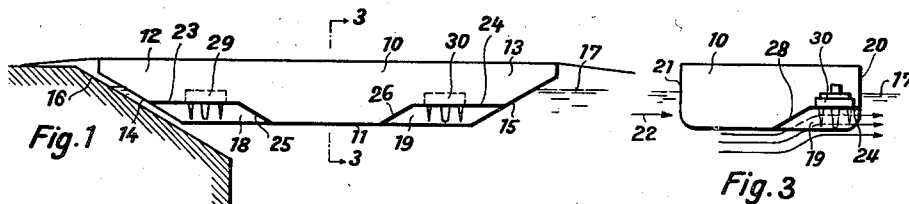
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RIVER FERRY DRIVEN BY TWO SAIL-WHEEL PROPELLERS

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RIVER FERRY DRIVEN BY TWO SAIL-WHEEL PROPELLERS

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1 Claim. (Cl. 114—58)

This invention relates to a novel construction of river ferries of the type having a blade wheel or cycloidal propeller drive and being adapted for landing on under-water ramps.

Cycloidal or blade wheel propellers (Voith Schneider propellers) have been used in the art for driving train ferries and pontoons for floating cranes and the like. Usually one such propeller was provided at the bow and one at the stern of the vessel, both propellers being either arranged on the longitudinal axis of the vessel or one laterally displaced towards star board and the other towards port.

This arrangement has been satisfactory for ferries which land at piers, landing stages, and the like. However, the aforesaid arrangement of the propellers is not suitable for vessels and in particular ferries which cruise back and forth across rivers without turning around and which dock by the opposite end portions ascending with one end portion on the under-water ramps, as is the case in particular with river ferries, since in such a case, the propeller blades protruding vertically downwardly from the bottom of the vessel will impede the latter from ascending on or contacting the submerged part of the ramp.

It is an object of my invention to provide a construction of a ferry wherein the drive comprising blade wheel or cycloidal propellers is protected against damage that may be caused, for instance, by contact with the river bottom or the submerged part of the ramp on which the ferry is landing.

It is another object of my invention to provide a novel construction for the type of ferry as described above, wherein the flow of water to and from the drive means is essentially the same as in a ferry of conventional construction.

It is a further object of my invention to provide a novel arrangement for converting a conventionally constructed ferry into one of the above novel type.

According to the invention both of the propellers are arranged on the long side of the boat opposite the side facing the direction of flow of the water, i. e. the propellers are on the downstream side of the boat in the case of river ferries. The propellers are arranged in recesses in the body of the vessel which are provided at some distance from the ends of the same towards the center of the vessel, the ends having a slantingly ascending bottom serving for contacting the landing ramp.

The recesses are provided sufficiently high that the propeller mounted in the roof of each recess does not have its blades protruding below the keel line. In order to guarantee a hydraulically satisfactory flow of water past the propellers, i. e. access of water afflux to the propellers from all directions and a corresponding outflow of water from the propellers, the recesses are so shaped that they have flat surfaces blending in gradual transition into the basic shape of the hull of the vessel.

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By providing an arrangement of the propellers as described above the latter are protected against contact with the ground when the vessel ascends on a ramp. The propellers are equally protected in an excellent manner against drift ice or other objects floating in the water. The afflux of the water to the propellers which are housed in recesses that are blended with a gradual transition into the wall of the hull of the vessel, is the same as in normal vessels having propellers provided with a square tuck, and the outflow of the water jet which has been accelerated by the propellers can take place without obstruction.

The arrangement of the cycloidal propellers according to the invention is also particularly suitable for installation in ferries which are originally built for other drive means and later rebuilt for motor propulsion; in such cases it is only necessary to enlarge the width of the vessel by a lateral extension of the hull by somewhat more than the diameter of the propeller, which extension is built on to the long side of the vessel facing down the river, while the remaining pontoon or hull can be left unchanged except for some local beveling of the edges where the water afflux takes place to the propellers. The extension of the vessel also provides space for housing the driving engine and the pilot's house.

Figure 1 shows schematically the side view of a ferry constructed according to my invention.

Figure 2 is a schematic top view of the same ferry.

Figure 3 is a cross sectional along line 3—3 in Figure 1.

Figure 4 shows in lateral view the long side facing downstream of a conventional rope ferry which has been rebuilt into a ferry which is propeller driven according to my invention.

Figure 5 is a top view of the embodiment shown in Figure 4.

Figure 6 is a cross section along line 6—6 in Figure 4.

Referring now to the drawings more in detail and in particular to Figure 1, reference numeral 10 designates the pontoon hull of a ferry floating crane or the like vessel, having a flat bottom 11 and two end portions 12 and 13 forming, for instance in the case of a river ferry which never turns around, alternately the bow and stern of the pontoon. These end portions 12 and 13 have upwardly slanted planar bottom surfaces 14, 15, which serve for contacting or ascending an upwardly slanted ramp 16 which extends to a varying degree below the water surface 17, depending on the changing water level, for instance of a river.

In the hull 10 two recesses or niches 18, 19 are provided, both being located on the same longitudinal side 20 of the hull, which hull is facing down stream in the case of a river ferry, while the opposite long side 21 of the hull 10 faces the current of the water which is indicated by an arrow 22.

The niches 18, 19 are recessed in the bottom 11 where the same meets with the upwardly slanted bottom surfaces 14 and 15 respectively, each niche having a roof surface 23, 24, a slanted traverse wall 25, 26 and slanted back wall 27, 28 respectively.

In the roof 23, 24 of each niche there is mounted a cycloidal propeller 29, 30 whose blades do not protrude below the bottom surface 11.

Reference numeral 31 in Figure 2 indicates a direction of travel of the vessel across a water whose current is indicated by the arrow at 22, the end portion 13 thus becoming the bow, and the end portion 12 the stern of the vessel. In order to obtain this direction of travel 31, the propellers 29, 30 are caused to produce a jet whose direction is indicated by arrows at 32. The force of

travel is the resultant 33 in the triangle of forces whose other sides are formed by the half 34 of the force which the flow of the water exercises on the boat in the transverse direction 22, and the thrust 35 of the propellers.

In Figure 3 the current of the water 22 in the direction 22 passes below the bottom 11 of the hull 10 from the long side 21 of the hull facing upstream to the opposite side 20. It surges upward along the upwardly slanted back wall 28 of the niche 19 to the propeller 30. The current of water also enters in a corresponding way the niche 18 provided at the other end of the vessel.

Referring now more particularly to Figures 4 to 6 reference numeral 40 designates a pontoon such as the hull of a river ferry built as a conventional rope ferry, which hull has been rebuilt to be fitted out with cycloidal propellers arranged in accordance with my invention. For this purpose an annex or extension 41 has been added to one long side of the vessel, thereby enlarging the hull. Furthermore the bottom of the hull 40 has been reconstructed so as to provide for two niches 42, 43 serving for housing the two cycloidal propellers 44, 45. The niches are shaped similar to the niches 18, 19 in Figures 1 to 3, and have slanted transverse walls 46, 47 and slanted backwalls 48, 49. The annex 41 also houses the engine 50 and the pilot house 51 required when converting the rope ferry into a propeller driven one. Transmission means for transmitting power from the motor 50 to the propellers 44, 45 are schematically shown at 52, 53.

The slanted transverse and back walls 25, 26, 27 and 28 in Figures 1 to 3, and 46, 47, 48 and 49 in Figures 4 to 6 provide for a gradual transition from the bottom of the vessel to the roof of the niches housing the propellers and thereby for an unobstructed and non-turbulent afflux of the water current to the propellers, which is essential for obtaining the maximum degree of efficiency in the performance of the cycloidal propellers as arranged according to the invention.

The cycloidal propellers referred to are of the type shown, for example, in U. S. Patents 1,924,606; 2,015,515; and 2,037,069. These propellers are arranged so the swinging movement of the blades can be controlled to vary the angle of discharge of the propellers whereby they can be used for steering as well as propulsion in both directions. The shape of the walls of the niches housing the propellers is thus of importance.

It will be understood that this invention is susceptible to modifications in order to adopt it to different usages and conditions, and accordingly, it is desired to comprehend such modifications within this invention as may fall within the scope of the appended claim.

What I claim is:

15 A river ferry having a hull with a substantially planar bottom an upstream side and a downstream side, and two end portions provided each with an upwardly slanted substantially planar bottom for landing on an inclined partially submerged ramp, said hull comprising a recess 20 forming a niche at each of said end portions on said downstream side, each of said niches having walls forming obtuse angles with said downstream side and said bottom of said hull and end portion so as to provide a tapering transition of the shape of said niche into the shape of 25 said hull, and a cycloidal propeller in each said niche above the bottom level of the hull.

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